

part of the harbor to 18 feet at mean low-water, in placing additional mooring posts, and in protecting the foundation of the exterior pier with rip-rap.

An appropriation of \$23,000 is recommended by the officer in charge for the fiscal year ending June 30, 1881, for the construction of one additional pier, which will complete the harbor according to proposed design.

July 1, 1878, amount available.....	\$10,000 00	
Amount appropriated by act approved March 3, 1879.....	5,500 00	\$15,500 00
July 1, 1879, amount expended during fiscal year.....	9,092 44	
July 1, 1879, outstanding liabilities.....	150 00	
July 1, 1879, amount available.....		9,242 44
Amount (estimated) required for completion of existing project.....		3,000 00
Amount that can be profitably expended in fiscal year ending June 30, 1881..		3,000 00

(See Appendix E 9.)

14. *Improvement of Wilmington Harbor, Delaware.*—During the fiscal year the appropriation of June 18, 1878, was applied to dredging, principally from the channel near the mouth, and to the removal of fast-rock from the ledge below Third Street Bridge, Wilmington.

A survey made in the spring shows that with the exception of a shoal area of considerable extent near the entrance there is a 12-foot mean low-water channel to near Third Street Bridge, although of less width than is required in the interest of navigation.

The south side of the channel, both above and below this bridge, is obstructed by fast-rock. The appropriation of March 3, 1879, will be applied to continuing the removal of this rock.

During the year ending June 30, 1881, it is proposed to dredge the shoal at the mouth, and to remove the reef above Third Street Bridge to 13 feet at mean low-water. For this work an appropriation of \$10,000 will be required.

July 1, 1878, amount available.....	\$7,001 15	
Amount appropriated by act approved March 3, 1879.....	3,500 00	\$10,501 15
July 1, 1879, amount expended during fiscal year.....	6,599 78	
July 1, 1879, outstanding liabilities.....	358 32	
July 1, 1879, amount available.....		6,958 10
July 1, 1879, amount available.....		3,543 05
Amount (estimated) required for completion of existing project.....		10,000 00
Amount that can be profitably expended in fiscal year ending June 30, 1881..		10,000 00

(See Appendix E 10.)

15. *Ice-harbor at Chester, Pennsylvania.*—This harbor is the uppermost of the series of ice-harbors existing on the Delaware River for the protection of shipping. The area inclosed is about 700 feet by 150 feet, protected by 4 wooden piers on two lines.

The commerce seeking shelter has largely outgrown the capacity of the harbor, and the act of March 3, 1879, provides for an examination of this and the Marcus Hook Harbor with the view of enlarging their facilities.

Repairs were made during the fiscal year, principally to the lower line of piers, and in the construction of a new connecting bridge, and the replacing of decayed or worn-out material.

July 1, 1878, amount available.....	\$3,400 00	
July 1, 1879, amount expended during fiscal year.....	2,695 26	
July 1, 1879, amount available.....		704 74

(See Appendix E 11.)

16. *Ice-harbor at Marcus Hook, Pennsylvania.*—This harbor was completed in 1871 in accordance with the existing plan. It consists of two landing-piers of wood and four of stone, sheltering an area of about 600 feet by 250 feet. It is yearly filled with vessels during the ice-season, and has become inadequate to supply the demand for additional space.

The two landing-piers were thoroughly repaired during the past fiscal year; the bridges connecting them with the shore were rebuilt, and the harbor deepened to 18 feet at mean low-water by dredging.

An examination of this harbor will be made with the view of enlarging its capacity.

July 1, 1878, amount available.....	\$5,021 76	
July 1, 1879, amount expended during fiscal year.....	4,663 80	
July 1, 1879, amount available.....		357 96

(See Appendix E 12.)

17. *Ice-harbor at Reedy Island, Delaware River.*—This work, begun in 1852, was, owing to the insufficiency of the appropriation, constructed of wood and but partially completed. It is now in an unserviceable condition from the decay of the pier and the accumulation of mud.

The importance to the shipping and commerce of the Delaware River of a harbor in this vicinity for vessels against drifting ice being very great, a careful examination will be made of the locality with a project for the reestablishment of the harbor.

(See Appendix E 13.)

18. *Improvement of Broadkill River, Delaware.*—Nothing has been done for the improvement of the river since 1874. Should further appropriation be made, a resurvey and examination will be required, as the long time that has elapsed since the work was suspended makes it desirable to have a resurvey to show if any modification of the original project is desirable before expending more money upon it.

(See Appendix E 14.)

19. *Improvement of Mispillion Creek, Delaware.*—The appropriation of March 3, 1879, for the improvement of this stream will be applied to removing the shoals therefrom so as to secure a 6-foot low-water navigation. The depth at the entrance is even a greater obstruction, but the amount available does not admit of any work at that point.

Amount appropriated by act approved by March 3, 1879.....	\$3,000 00	
July 1, 1879, amount available.....	3,000 00	

Amount (estimated) required for completion of existing project.....	8,000 00	
Amount that can be profitably expended in fiscal year ending June 30, 1881..	8,000 00	

20. *Construction of pier in Delaware Bay, near Lewes, Delaware.*—This work was commenced in 1870. The plan adopted was the combination of wrought-iron screw-pile shafts and cast-iron caps and screws, with a superstructure of yellow-pine timber. The length of pier was to be 1,701 feet, and to reach 22 feet at low-water. The estimated cost was \$387,000. The first pile was driven in 1872. Tests of the weight-supporting capacity of the piles have been made with satisfactory results.

Owing to the decreased prices of labor and material the cost of constructing the pier will not reach the original estimate, but the insufficient annual appropriations have largely drawn upon the saving due to this cause.

Owing to the late date at which the appropriation of June 18, 1878, became available, and delays incident to labor difficulties and the outbreak of yellow fever at the South, the new material for continuation of

work on the pier was not received until November; the remaining two bays of substructure were then pushed to completion despite the disadvantages attending such work so late in the year.

July 1, 1878, amount available	\$20,001 09	
Amount appropriated by act approved March 3, 1879.....	10,500 00	
		\$30,501 09
July 1, 1879, amount expended during fiscal year	19,926 47	
July 1, 1879, outstanding liabilities	60 00	
		19,986 47

July 1, 1879, amount available..... 10,514 62

Amount (estimated) required for completion of existing project	24,500 00
Amount that can be profitably expended in fiscal year ending June 30, 1881.	24,500 00

(See Appendix E 15.)

21. *Delaware Breakwater Harbor.*—In view of the present condition of this work and the deterioration it has undergone, which is still in progress, and may at no distant day render it useless except for the smaller class of vessels, the questions involved in the preservation of the harbor were referred to the Board of Engineers for Fortifications for its views and recommendations.

The Board, after careful consideration, recommended as a possible remedy the closure of the gap existing between the breakwater proper and its adjoining ice-harbor, which it is believed would to a greater or less extent check further deposits within the harbor and remove those existing on the shoals in its vicinity and would increase the protected area of anchorage nearly fourfold. The cost of this was approximately estimated at less than \$600,000, and the Board believing that the necessity of giving full efficiency to this great harbor of refuge is urgent, recommended an immediate appropriation of \$150,000.

This report was transmitted to Congress on the 15th February last, and printed in House of Representatives Executive Document No. 92, Forty-fifth Congress, third session.

The construction of this great work was begun in 1829, and completed in accordance with the original design in 1869, at a cost of \$2,123,000.

In addition, the removal of the eight wrecks which have been lying in the western portion since October, 1877, and rendered it practically useless as an anchorage, is imperatively demanded by the interests of navigation and domestic commerce.

The estimated cost of removal is \$28,000, which sum it is recommended be appropriated.

(See Appendix E 16.)

22. *Port Wardens' Line, Philadelphia, Pennsylvania.*—The charts of the topographical and hydrographical survey of the city front not having been completed at the date of this report, this question remains as last reported.

(See Appendix E 17.)

EXAMINATIONS AND SURVEYS FOR IMPROVEMENT.

To comply with provisions of the river and harbor act of June 18, 1878, Colonel Macomb was charged with and has completed the following examination and surveys:

1. *Manasquan River, New Jersey.* The results of this survey were transmitted to Congress and printed in House Ex. Doc. No. 53, Forty-fifth Congress, third session. (See also Appendix E 18.)

2. *The Mispillion Creek, Delaware.* (See Appendix E 19.)
 3. *Duck Creek, Delaware.* (See Appendix E 20.)
 The results of these were transmitted to Congress January 4, 1879.
 4. *The Salem River, New Jersey, between Sharpstown and Delaware Canal.* (See Appendix E 21.)
 5. *Woodbridge Creek, Middlesex County, New Jersey.* (See Appendix E 22.)

6. *Elizabeth River, New Jersey.* (See Appendix E 23.)
 7. *Rahway River, New Jersey.* (See Appendix E 24.)

The results of these were transmitted to Congress January 7, 1879.
 8. *The Delaware River below League Island.* (See Appendix E 25.)
 And to comply with provisions of the river and harbor act of March 3, 1879, has been charged with and is now engaged upon the following, the results of which will be duly submitted when received:

1. *The Delaware River at Chester and Marcus Hook, Pennsylvania, to ascertain its adaptability for an ice-harbor.*
 2. *Susquehanna River, Pennsylvania.*

IMPROVEMENT OF HARBORS AND RIVERS OF CHESAPEAKE BAY, MARYLAND; OF JAMES AND APPOMATOX RIVERS, VIRGINIA; OF GREAT KANAWHA AND ELK RIVERS, WEST VIRGINIA; OF NEW RIVER, VIRGINIA AND WEST VIRGINIA; AND OF CAPE FEAR RIVER, NORTH CAROLINA.

Officer in charge, Maj. W. P. Craighill, Corps of Engineers, having under his immediate orders Capt. J. W. Cuyler and Lieut. Thomas Turtle, Corps of Engineers.

1. *Improvement of Susquehanna River, near Havre de Grace, Maryland.*—At the request of Prof. S. F. Baird, made to the Secretary of War May 23, 1879, some dredging was done in the latter part of May and the early part of June, near Spesutie Island, to aid the movements of boats engaged in the business of the United States Commission of Fish and Fisheries. The funds for the work, \$500, were derived from the general appropriation for examinations and surveys and contingencies of rivers and harbors, no specific appropriation having been made for the work. The assistant commissioner states that more work is necessary. It is recommended that a specific appropriation of \$5,000 be made for this purpose.

July 1, 1879, amount expended during fiscal year (allotment)..... \$500 00

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 F 1.)

2. *Improvement of the harbor of Queenstown, Maryland.*—The last appropriation for this locality previous to 1879 was made June 10, 1872. The expenditure was concluded in December, 1872, with the formation of a channel 100 feet wide, 8 feet deep at low-water, from Chester River to the steamboat wharf. The community interested obtained another appropriation of \$3,000 March 3, 1879, as some deposition had taken place in the channel and it needed straightening.

Amount appropriated by act approved March 3, 1879..... \$3,000 00
 July 1, 1879, amount available..... 3,000 00

(See Appendix F 2.)

3. *Improvement of Chester River at Kent Island Narrows.*—The last appropriation for this work was made June 18, 1878, \$3,000, but nothing has been done during the year ending June 30, 1879. The channel seems to be but little used. See annual report of last year.

July 1, 1878, amount available..... \$3,004 83
 July 1, 1879, amount available..... 3,004 83

(See Appendix F 3.)

4. *Improvement of Patapsco River, Baltimore, Maryland.*—Originally not more than 16 feet at low-water could be carried to Baltimore. Now the channel has at no place a less depth than 24 feet at low-water, or about 26 feet at high-water. The channel is still too narrow, being at some points not half as wide as the length of the large steamships which make it the terminus of their transatlantic voyages.

The operations of the fiscal year just closed have been the removal of 481,416 cubic yards of material from the Brewerton Channel at 9¢ cents per cubic yard.

Since the capacity of the channel to Baltimore has been better known at home and abroad, there has been a great increase in the number of large vessels of heavy draught coming to that port; and to the same cause is due another remarkable feature of commercial development, the erection by the great railways terminating there of large wharves, store-houses, grain elevators, &c. A dry-dock of large capacity is now being built on a portion of the site of Fort McHenry, granted by Congress to a company organized for that purpose.

Baltimore is also greatly interested in the ship-canal proposed to connect the waters of the Delaware and Chesapeake Bays, for which surveys have lately been made.

In compliance with a resolution of the State of Maryland, the governor requested the President of the United States to appoint a commission to survey the harbor of Baltimore City and adjacent waters and to establish pier and bulkhead lines. This commission consisted of the Chief of Engineers, United States Army, the Superintendent of the United States Coast Survey, and the engineer in charge of the improvement of the Patapsco. A report was made dated January 31, 1878.

July 1, 1878, amount available..... \$76,410 50
 Amount appropriated by act approved March 3, 1879..... 160,000 00

 \$236,410 50

July 1, 1879, amount expended during fiscal year..... 58,818 90

July 1, 1879, amount available..... 177,591 60

Amount (estimated) required for completion of existing project..... 100,000 00
 Amount that can be profitably expended in fiscal year ending June 30, 1881. 100,000 00

(See Appendix F 4.)

5. *Improvement of Cambridge Harbor, Maryland.*—The last appropriation for this harbor, previous to 1878, was in March, 1873, under which operations were closed in August, 1873. The inner harbor had been greatly improved, the entrance thereto was widened to 125 feet, and the outer channel was rectified by cutting off a sharp point at the turn. After the lapse of five years the community interested obtained another appropriation of \$5,000 without an estimate from the Engineer Department. This, like the preceding one, was expended in increasing the capacity of the inner harbor, widening the entrance thereto, and improving the outer channel. Work ceased March 26, 1879. The town has now a commodious harbor, with a depth of not less than 8 feet at low-water, easily accessible.

July 1, 1878, amount available..... \$5,000 00
 Amount appropriated by act approved March 3, 1879..... 2,500 00

 \$7,500 00

July 1, 1879, amount expended during fiscal year..... 4,480 97

July 1, 1879, amount available..... 3,019 03

(See Appendix F 5.)

6. *Improvement of Wicomico River, below Salisbury, Maryland.*—The expenditure of the appropriation of \$5,000, made June 15, 1878, was not completed until the middle of April, 1879. It was expended in increasing the depth of the channel from 5 to 7 feet at low-water; but it was insufficient to carry this depth nearer to the town than $\frac{2}{3}$ of a mile, and this with a width of 40 feet. Some repairs of small extent were made to the dikes in March, 1879.

July 1, 1878, amount available..... \$5,035 00
 Amount appropriated by act approved March 3, 1879..... 3,000 00

 \$8,035 00

July 1, 1879, amount expended during fiscal year..... 5,034 95

July 1, 1879, amount available..... 3,000 05

Amount (estimated) required for completion of existing project..... 7,000 00
 Amount that can be profitably expended in fiscal year ending June 30, 1881. 7,000 00

(See Appendix F 6.)

7. *Removing obstructions in the Pocomoke River, Maryland.*—An appropriation of \$10,000 was made for this work June 15, 1878, but not based upon a survey or estimate of the Engineer Department.

As a map was an essential prerequisite to a proper expenditure of the funds available, a survey was made in August, 1878. The portion of the river needing improvement was found to be that immediately below Snow Hill for a distance of 5 or 6 miles. It was discovered that the chief troubles with navigators were the very sharp bends and the narrowness of the channel at certain points. Some stumps also required removal. What is necessary is in progress and nearly completed at the close of the fiscal year, as far as the appropriation of 1878 will go.

July 1, 1878, amount available..... \$10,000 00
 Amount appropriated by act approved March 3, 1879..... 2,500 00

 \$12,500 00

July 1, 1879, amount expended during fiscal year..... 6,592 81

July 1, 1879, outstanding liabilities..... 630 00

 7,222 81

July 1, 1879, amount available..... 5,277 19

(See Appendix F 7.)

8. *Improvement of Onancock Harbor, Virginia.*—An examination of this harbor was made in the latter part of 1878, under the supervision of Capt. C. B. Phillips, Corps of Engineers. He recommended the excavation of a channel across the bar, 8 feet deep at low-water and 300 feet wide, and a channel of the same depth 100 feet wide through the mud flats near the wharves. His estimate for the work was \$10,000. Congress appropriated \$3,000 March 3, 1879, which it is proposed to expend in dredging on the bar to the depth recommended, but with less width of channel.

Amount appropriated by act approved March 3, 1879..... \$3,000 00
 July 1, 1879, amount available..... 3,000 00

 6,000 00

Amount (estimated) required for completion of existing project..... 7,000 00
 Amount that can be profitably expended in fiscal year ending June 30, 1881. 7,000 00

(See Appendix F 8.)

9. *Improvement of James River below Richmond, Virginia.*—In 1870, when the United States commenced actively this improvement, but 8 feet could be carried to the city of Richmond at low-water, equivalent to 11½ feet at high-water, and the great freshet of 1870 reduced each of these depths by 1 foot. At the close of the fiscal year just ended there

were nearly 12 feet at low-water, equivalent to $15\frac{1}{4}$ feet at high-water. The operations of the year have consisted, as heretofore, of the removal of rock by blasting, of dredging, and the construction of wing-dams. The total quantity of material removed has been 88,574 cubic yards, of which 1,234 was of solid rock. The material excavated was deposited on the wing-dams, giving them additional strength, and thus becoming a useful instead of a hurtful element in the river.

Rocketts Reef has been lowered so that there is a channel 60 feet wide, with 11.8 feet at low tide (15.3 feet at high tide). The removal of perhaps 50 cubic yards from points of the ledge will increase this depth to 13 feet. The channel is now 1 foot deeper than was reported last year. Below this reef the channel has been widened 28 feet, but this additional cut has not been carried through the shoal. The channel opposite the lower end of Drewry's Island has been widened 56 feet, and been deepened for a greater width; it now has 13 feet at low tide, and for the most part 15 feet. There are hard points in the bottom, some of which will require to be blasted.

The plan of contraction by wing-dams was continued, but much more of this work remains to be done before the full benefit of the experiment can be secured. Richmond bar has lowered 1 foot during the year, and now has $12\frac{1}{2}$ feet at low tide, an improvement of at least 5 feet since 1879. A shoal, 500 feet long, remains at the head of Randolph flats, with $11\frac{1}{2}$ feet at low tide, which will probably be removed shortly; elsewhere, except as stated above, the channel has 13 feet at mean low tide.

Dutch Gap Cut-off has been greatly improved by widening at the entrances, thus allowing a better direction to vessels passing through. The least width at low tide is about the middle, and is 200 feet; at the entrance the width is over 300 feet. The least depth in the fair-way is 15 feet, and the removal of 500 cubic yards would make a channel of 18 feet at low tide with 130 feet bottom width.

July 1, 1878, amount available.....	\$70,011 94	
Amount appropriated by act approved March 3, 1879.....	75,000 00	\$145,011 94
July 1, 1879, amount expended during fiscal year.....		62,010 46
July 1, 1879, amount available.....		83,001 48
Amount (estimated) required for completion of existing project.....	161,000 00	
Amount that can be profitably expended in fiscal year ending June 30, 1881.	100,000 00	

(See Appendix F 9.)

10. *Improvement of Appomattox River below Petersburg, Virginia.*—The work of the fiscal year has been upon the portion of the river from Petersburg to the upper end of the puddle dock channel, as that has specially needed improvement. The 13 wing-dams commenced in the last fiscal year have been completed, requiring the addition of 693 running feet of original construction or repairs. Five new wing-dams have been built, 630 feet, as also the training-wall at Hare's bar, and the closure-dike at the Gap, 1,235 feet; a thorough system of protection of dams, &c., against dangerous scour has been put in, in the shape of mats of fascines, 39,000 square feet; quarrying and placing 1,100 cubic yards of riprap stone. Extensive repairs of dams, &c., due to an unusually severe winter, have been made, 545 running feet. Dredging to the extent of 15,248 cubic yards has been done, to meet immediate needs of commerce, the material being used to strengthen banks and fill in blind guts.

The year has witnessed a marked advance towards the attainment of

the results for which the previous operations were preparatory. A draught of $11\frac{1}{4}$ feet at mean high-water can be carried to the wharves of Petersburg, except for a short section in the Petersburg channel, where there are but 9, whereas, at the close of the late war, not more than $6\frac{1}{2}$ could be found at high-water, or $3\frac{1}{2}$ at low.

July 1, 1878, amount available.....	\$30,005 19	
Amount appropriated by act approved March 3, 1879.....	20,000 00	\$50,005 19
July 1, 1879, amount expended during fiscal year.....		29,964 05
July 1, 1879, amount available.....		20,041 14
Amount (estimated) required for completion of existing project.....	42,000 00	
Amount that can be profitably expended in fiscal year ending June 30, 1881.	30,000 00	

(See Appendix F 10.)

11. *Improvement of New River from the lead mines in Wythe County, Virginia, to the mouth of Greenbrier, West Virginia.*—The work of the year has been in continuation of that of the preceding year and following the same plan, making a practicable channel-way for the keel-boats now running on the river, but keeping in view a more extended improvement for light-draught steamboats.

From July 1 to September 13, 1878, the work progressed well on the section of the river immediately above the bridge of the Virginia and Tennessee Railroad, the object being to bring that portion into close connection with a railway running east and west.

A very severe freshet in September, 1878, did so much damage that it was considered inexpedient to resume there, so nearly was the season closed.

For special reasons work was commenced in September, 1878, on the portion of the river immediately above the mouth of the Greenbrier River at Hinton, in West Virginia. This continued actively until near the end of November. Work was resumed on the same section as early in 1879 as the state of the river permitted, viz, early in June.

July 1, 1878, amount available.....	\$23,429 49	
Amount appropriated by act approved March 3, 1879.....	12,000 00	\$35,429 49
July 1, 1879, amount expended during fiscal year.....		19,125 01
July 1, 1879, amount available.....		16,304 48
Amount (estimated) required for completion of existing project.....	114,160 00	
Amount that can be profitably expended in fiscal year ending June 30, 1881.	20,000 00	

(See Appendix F 11.)

12. *Improvement of Great Kanawha River, West Virginia.*—A great part of the season of 1878 was very unfavorable for work in the water, as there were thirteen rises of the river to interrupt operations between May and November.

Much delay and annoyance was also occasioned by the violence of lawless men among the laborers, supported by secret associations, &c.

On the 30th of June, 1879, operations were in progress, night and day, at sites 3, 4, and 5, which are respectively near Paint Creek, Cabin Creek, and Brownstown.

The locks are completed at 4 and 5. The iron gates are (under contract) to be in place at 5 by August 1, 1879. The material is on hand for the wooden gates of 4. The irons for the passes and weirs of dams 4 and 5 are on hand. The abutment and pier are finished at 5. The abutment is finished at 4. Work in the coffer of the pass at 5 is nearly finished, and arrangements are in progress for getting forward rapidly

with the weir. If the season is good and labor troubles do not arise, lock and dam 5 will be in readiness for use by the end of 1879. Dam 4 is not quite so well forward, but will be completed early in 1880.

Work commenced at No. 3 in 1878. Good progress has been made there. Quarries have been opened, tramways built, &c. The coffer of the lock is complete, and masonry is being rapidly laid in it, while a large force of cutters is engaged preparing more stone. The abutment of this dam and about half of the dam itself will be built in 1879. Arrangements are made for rapid progress, and the completion of the lock and dam in 1880 is hoped for, if unfavorable circumstances do not prevent.

Some repairs were necessary and were made upon Two-mile riprap dam below Charleston.

The resurvey of the river to the Ohio has been completed, except some soundings near the lower part. This has resulted in a relocation of the locks and dams below Charleston, and a diminution of their number by one. The omission for the present of lock and dam No. 1, which pertain to the central water-line rather than the improvement proper of the Kanawha, enables the original estimate to be still more reduced.

An appropriation of \$150,000 was made March 3, 1879, which will be applied to procuring other sites and beginning work at two of them.

July 1, 1878, amount available	\$460,080 44	
Amount appropriated by act approved March 3, 1879	150,000 00	
		\$610,080 44
July 1, 1879, amount expended during fiscal year.....	216,854 68	
July 1, 1879, outstanding liabilities	10,000 00	
		226,854 68
July 1, 1879, amount available		383,225 76

Amount (estimated) required for completion of existing project 2,610,000 00
Amount that can be profitably expended in fiscal year ending June 30, 1881. 200,000 00

(See Appendix F 12.)

13. *Improvement of Elk River, Virginia.*—An appropriation of \$5,000 was made for this work June 18, 1878. The Secretary of War decided not to expend it. Congress directed March 3, 1879, that the money should be applied to the removal of obstructions to open navigation from Braxton Court House to the mouth of Big Sandy, with permission to expend \$500 at Jarrett's Ford. Arrangements were made to carry out these directions during the season of low-water of 1879, which usually terminates in October. It is supposed that the funds already available will suffice for the present needs of this river.

July 1, 1878, amount available	\$5,000 00
July 1, 1879, amount expended during fiscal year.....	29 25
July 1, 1879, amount available.....	4,970 75

(See Appendix F 13.)

14. *Improvement of Cape Fear River, North Carolina.*—The work of the year has been the placing of stone on the New Inlet dam, and the repairs and operation of the suction dredge Woodbury on the Baldhead bar. The inlet is closed, but the dam needs more stone for its entire security. The slopes should be filled out and the top finished with large blocks of natural or artificial stone.

The beneficial effect of this closure and of the work of the suction dredge are plainly to be seen on the Baldhead bar, where at the end of June there were not less than 12 feet at mean low-water, a depth which no entrance to the Cape Fear has had within the memory of living men.

Subsequent to the receipt of the annual report of the officer in charge,

a very severe gale in the latter part of the month of August caused considerable damage to the unfinished top of the New Inlet dam.

In consequence of this it becomes necessary to increase the estimate of the amount required for the improvement for the present year, ending June 30, 1881, to \$75,500.

July 1, 1878, amount available	\$160,558 24
Amount appropriated by act approved March 3, 1879	100,000 00
	\$260,558 24
July 1, 1879, amount expended during fiscal year.....	131,467 06
July 1, 1879, amount available.....	129,091 18
Amount (estimated) required for completion of existing project	75,000 00
Amount that can be profitably expended in fiscal year ending June 30, 1881.	75,000 00

(See Appendix F 14.)

EXAMINATIONS AND SURVEYS FOR IMPROVEMENT.

To comply with the provisions of the river and harbor act of June 18, 1878, Major Craighill was charged with and has completed the following examinations and surveys:

1. *The bars at the entrance of Annapolis Harbor, Maryland, with a view to accommodation of deep-draught vessels at low tide.* (See Appendix F 15.)

2. *West branch of Patapsco River, Maryland, from Light-street bridge to head of tide-water, and an estimate of the cost of making the same navigable for canal-boats.* (See Appendix F 16.)

The results of these examinations and surveys were transmitted to Congress and printed in House Ex. Doc. No. 49, Forty-fifth Congress, third session.

3. *New River, from the lead mines in Wythe County to the mouth of Wilson, in Grayson County, Virginia.*—The results of this survey were transmitted to Congress and printed in Senate Ex. Doc. No. 41, Forty-fifth Congress, third session. (See also Appendix F 11.)

4. *The peninsula of Maryland and Delaware, with a view to a construction of a ship-canal to connect the waters of the Delaware and Chesapeake Bays.*

A preliminary report of the results of this survey, made by the officer in charge, was transmitted to Congress in February last, and printed in House Ex. Doc. No. 91, Forty-fifth Congress, third session. (See also Appendix F 17.)

A detailed report of this survey, with estimates of cost, &c., is expected to be ready to be submitted to Congress during its next session.

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

1. *For survey of Broad Creek, a prong of the Nanticoke River, from its mouth to Laurel, Delaware.*
2. *Nanticoke River, Delaware and Maryland.*
3. *Chincoteague Inlet, Virginia.*
4. *Channel leading into Cabin Creek, Maryland.*
5. *Northeast River, Maryland.*
6. *Tread Haven Creek, Maryland, for a distance of three miles below Easton.*
7. *Slaughter Creek, Maryland.*
8. *Choptank River, Maryland, between Denton and Greensborough.*
9. *Secretary Creek, Maryland.*
10. *Tuckahoe Creek, Maryland.*
11. *Shenandoah River, Virginia and West Virginia.*