



REPORT
OF
THE CHIEF OF ENGINEERS.

OFFICE OF THE CHIEF OF ENGINEERS,
Washington, D. C., October 20, 1879.

SIR: I have the honor to present, for your information, the following report upon the duties and operations of the Engineer Department for the fiscal year ending June 30, 1879.

OFFICERS OF THE CORPS OF ENGINEERS.

The number of officers holding commissions in the Corps of Engineers, United States Army, at the end of the fiscal year was 105 on the active list, and 5 on the retired list; the latter, however, under the law of January 21, 1870, not being available for duty. In the duties devolving upon the corps by law and by its organizations, the employment of a number of scientists and assistant engineers has been necessary.

Since the last annual report the corps has lost, by death and retirement, four of its officers: Col. Henry Brewerton (retired), who died at Wilmington, Del., April 17, 1879; Col. I. C. Woodruff, who died at Tompkinsville, N. Y., December 10, 1878; Lieut. Col. B. S. Alexander, who died at San Francisco, Cal., December 15, 1878; and Brig. Gen. A. A. Humphreys, Chief of Engineers, who was retired June 30, 1879, at his own request, after more than forty years of continuous active service.

There have been added to the corps, by promotion of graduates of the Military Academy, three second lieutenants and two additional second lieutenants, whose commissions date from June 13, 1879, but who did not become available for duty till after the close of the year, and are, therefore, not included in the strength of the corps.

On the 30th June, 1879, the officers were distributed as follows:

On duty, office Chief of Engineers, including the chief.....	4
On duty, Public Buildings and Grounds, District of Columbia.....	1
On duty, fortifications.....	2
On duty, fortifications and light-house duty.....	2
On duty, fortifications and river and harbor works.....	15
On duty, fortifications, river and harbor works, and light-house duty.....	5
On duty, river and harbor works.....	27
On duty, river and harbor works, and light-house duty.....	6
On duty, survey of Northern and North western lakes and Mississippi River.....	3
On duty, jetties at mouth of Mississippi River.....	1
On duty, explorations of country west of one hundredth meridian.....	4
On duty with Battalion of Engineers.....	8
On duty with Battalion of Engineers and fortifications.....	1
On duty with Battalion of Engineers and Military Academy.....	2
On staffs of generals commanding divisions and departments, and on river and harbor works.....	2
Detached on duty with the General of the Army, generals commanding divisions and departments, Light-house Establishment, Military Academy, Department of State, and the Board of Commissioners of the District of Columbia.....	22
Total.....	105

SEA-COAST AND LAKE-FRONTIER DEFENSES.

During the past fiscal year work upon our sea-coast defenses has been limited, in accordance with the terms of the act of March 23, 1878, to their protection, preservation, and repair.

These works are subject more than any other national structures, with the exception, perhaps, of light-houses, to the destructive and deteriorating effects of the sea, and the amount heretofore appropriated for the above-mentioned objects has proven insufficient, many necessary works of repair and protection remaining unexecuted at the close of the fiscal year, for want of funds.

No progress whatever has been made for several years past in the construction of new, or in the modification of our old works (built before the inventions of modern ordnance and armored ships), for want of appropriations therefor, and I beg to renew the remarks and the recommendations of the last annual report from this Department in relation thereto, as follows:

The system to govern the future construction of our works was elaborated in 1869 and will be found stated in detail in Executive Document No. 271, House of Representatives, Forty-first Congress, second session, where it will be seen the system received the approval of the General of the Army and the Secretary of War, and since then has been repeatedly indorsed by the action of Congress.

The main features of this system are the use of heavy earthen barbette batteries, with parados and traverses, of heavy mortar batteries, and of obstructions in the channels (mainly electrical torpedoes) to hold vessels from running past the batteries and reaching the cities or depots beyond them. The modification of the casemates of our masonry forts was at that time deemed premature, it being then thought preferable to await the further development of iron-clad fleets and their armaments, and to take advantage of the experience of foreign nations.

From 1869 to 1875, while appropriations for coast defense were granted by Congress, much progress was made in earthen barbette batteries for heavy guns and mortars; and further, a system of defense by torpedoes—a subject of continuous study up to this time—has been developed which only requires a sufficiency of material and trained men to put it into practice when needed. But torpedo defense, however efficient in itself, cannot stand alone; the torpedoes must be protected by shore batteries. Unfinished earthen batteries, however, provided with a small fraction only of the number of guns for which they were designed, and those of insufficient caliber, and mortar batteries without mortars, though aided by torpedoes, will form but a feeble defense against the powerful fleets prepared and now being prepared to take the high seas.

The great powers of Europe do not place their reliance on barbette batteries. They believe in, and are constructing, casemated forts, some of which are provided with wrought-iron scarps and others with iron casemate-shields to protect the gun, and gunners serving it, both from direct and curved fire. This department, while recommending and urging the construction of barbette batteries as an initiatory means of obtaining by comparatively small expenditures a partial defense for the numerous exposed harbors of our coast, has always insisted that the efficient service of the large guns mounted in them would require high parapets and depressing or counterpoise carriages. It has also, from the beginning, looked forward to the ultimate conversion of some of our casemated forts, which would admit the change, for the reception of guns of the largest caliber, and to the possible construction of new works. Within the past two years, in furtherance of these views, a large casemated fort has been designed to take the place of old Fort Lafayette at the Narrows entrance to New York Harbor. Plans also have been prepared for modifying the casemates of Fort Schuyler on the East River, and for completing Fort Carroll on the approaches to Baltimore. The modification of other casemated works is now a subject of study. It will require much time and large expenditures to make the foregoing modifications, and to complete our barbette and mortar batteries and furnish them with suitable armaments. It would be but an act of prudence to make the beginning without delay. The disasters of the first three months of a war under the present condition of our defenses might cost the nation tenfold the expenditure that would be needed to thoroughly protect our coast against attack. Our great cities, New York, Philadelphia, Boston, San Francisco, New Orleans, Baltimore, and Washington, should they fall into the hands of an enemy, would suffer ten times more than the cost of all the forts necessary to secure them against such disaster. But such reverses would also be great calamities to the nation, crippling its war power.

When the great change in ships and their armaments was initiated, Great Britain did not hesitate to appropriate \$40,000,000 for the defense of its most important harbors, and in addition she has already expended about \$60,000,000 upon her iron-clad fleet. We may well profit by her example. There is nothing so costly to a nation as a lack of preparation for war. In fact, to be prepared for war will often prevent it; and though we may not feel the daily imminence of war with great foreign powers, as England did, yet with incomplete or inadequately armed defenses for our great sea-port cities, even the *attitude* of belligerency, which we not unfrequently have to assume, has not the imposing effect it should have, nor is it accompanied with a justly founded self-confidence on our own part. The neglect of suitable preparation cost France many millions of treasure, a portion of her territory, and a great humiliation. The same must inevitably happen to the United States if it does not push forward its coast defenses and provide them with guns like those possessed not only by the great powers, but even by smaller nations.

That our forts should be efficient we must have guns of power not inferior to those that will be brought to contend with them. These guns must have a protection—whether by earthen parapet and depressing carriage or by iron armor—no less efficient than that which protects the hostile gun.

Our system of torpedo defense must rely upon forts for protection, otherwise it would be rendered harmless. It would be speedily destroyed by an enemy if one of its iron-clad fleets were suffered to approach it unopposed. It is, therefore, by the combination of the two systems, viz, the torpedo defense and shore batteries, that our harbors can be made secure against the powerful iron-clads of the present day in the event of a war with a maritime nation.

It concerns the honor of the United States, when involved in controversy with other powers, to be able to appeal to the sword, but that appeal should be accompanied by the consciousness that the weapon appealed to would not be inferior to that held by the adversary. This relation of inferiority may at present exist though the adversary be a comparatively weaker power.

We have the assurance that iron plates can be manufactured in this country equal in magnitude and not inferior in quality to those which fifteen years of experience have enabled the English rolling-mills to turn out.

During the past fiscal year plans have been prepared for the modification and completion of two more very important casemated works, viz, the fort at Sandy Hook, the outermost of the works for the defense of the southern approaches by sea to the harbor and city of New York; and Fort Wool, designed to command the entrance to Hampton Roads and defend the passages from sea to the city of Norfolk and its navy-yard. These works, with the three important casemated works especially mentioned in last year's report, viz, Fort Schuyler, commanding the East River approach from sea to the harbor and city of New York; the work designed to replace old Fort Lafayette at "The Narrows" entrance to New York Harbor; and Fort Carroll, which commands the approach from sea to the rich and important city of Baltimore, await appropriations for their construction. Their plans, which have been carefully prepared in the light of full information respecting the recent great improvements in ordnance and armor, provide for mounting the heaviest of modern rifled guns, and for resisting the projectiles of cannon of the immense calibers now possessed by nearly every maritime nation of Europe. Plans for similar modifications of the more important of the other casemated defenses of our harbors will be made as rapidly as practicable, and in the mean time it is urgently recommended that appropriations be made by Congress for the works just mentioned and for the earthworks recently designed for many of our harbors for mounting heavy rifled guns and mortars, which have been already partially constructed, or for which the plans are ready for execution, as will be observed in the synopsis of the reports of the several officers in charge.

It is certain that in our present condition, injuries to our citizens abroad and insults to our flag, could not be resented with that vigor and promptitude demanded by the dignity and honor of the nation, and justified by a knowledge that our fine harbors, important navy-yards rich commercial cities, and depots for military and naval stores were guarded by impreg-

nable fortifications and obstructions; and in earnestly urging the importance of early and reasonable appropriations for our sea-coast defenses I cannot do better than to quote the language of my distinguished predecessor in his letter to the Military Committee of the House of Representatives contained in Report 354, House of Representatives, Forty-fourth Congress, first session, pages 179-181, as follows:

In the event of war with a maritime nation, if we had no well-digested system of sea-coast defense ready for use, the cruisers and war vessels of the enemy could run into our harbors, and, without landing, could either destroy the property along our shores, or else lay the people under contribution. The accurate detailed charts of our harbors and channels published by the United States Coast Survey are accessible to all such nations, and are doubtless in their possession. If the enemy possesses depots and arsenals in close proximity to our shores, the arrival of such armed vessels will follow in a few hours after the declaration of war. Thirty-six hours' steaming could bring vessels from Halifax; six hours, vessels from Havana; and ninety-six hours, vessels from Victoria, Vancouver's Island, to important harbors of the United States. There might be very little time for preparation to meet the assaults of iron-plated ships, for they are plated with from six to fifteen inches of iron, and carry rifled guns from nine inches to fourteen inches bore, all of which guns are more powerful than any gun we have in our service. With a fleet, or even a single vessel of this kind in one of our harbors, it would be of no avail to collect troops in the city or town threatened. Suppose, with our railroad facilities, we could concentrate 100,000 men in twenty-four hours at the point threatened, of what use would they be against the iron-armed ship? Suppose that in a night the men concentrated could throw up earth-works and mount 32-pounders, 42-pounders, 100-pounder rifles (even if it were possible to handle guns of this small size with the rapidity assumed), what injury could all this do to the armored ship in question? The projectiles from such batteries would fall harmlessly from the side of the enemy. While lying, if need be, beyond the range even of our guns, with his more powerful armaments he would pierce such parapets through and through, dismount the guns, and explode such magazines.

But it may be said that we would mount guns as powerful, and even more powerful than those of the enemy. Doubtless this would be done; first, if we had such guns in our service, and, second, if we had the time.

Our largest gun, of which we have any number, is a 15-inch smooth-bore, and weighs over 25 tons. We have about 325 of them for our entire coasts of 12,600 miles, exclusive of Alaska, and beyond a range of 1,200 yards it is a less powerful gun than the 9-inch rifle of 12 tons. The 10-inch rifle weighs 18 tons; the 11-inch, 25 tons; the 12-inch, 35 tons; and the 14-inch, 81 tons; and these guns are immeasurably superior to our 15-inch smooth-bore. They are the kinds of guns we must mount in batteries against the iron-plated vessels. But their great weight and size require corresponding dimensions in the batteries in which they are placed, and in the strength and solidity of the platforms upon which they are mounted. The parapets and traverses of earth and sand to protect them must be three and even four times as thick and massive as they were formerly built, to resist the armaments of fifteen years ago. Where the parapets of earth were but 10 feet in thickness, now they must be 40 feet. Guns that were formerly dragged with ease by fifteen or twenty men, and placed in position over night, are now supplanted by armaments of such huge masses that special mechanical appliances are required to move them even slowly, and cannot be lifted upon their supports without the aid of hydraulic power. No matter how many men may be at our disposal, the time required to place the modern armaments in position is vastly greater than for the guns of fifteen years ago, and before such works could be improvised in a harbor, the enemy in his iron-clads will have accomplished all he desired, and have sailed or steamed for some other harbor to repeat the injuries of the first. But suppose the harbor in question was on the New England coast, and the season of the year the winter—when the ground is frozen hard—then the erection of efficient earthen batteries would be out of the question. Or suppose the harbor was on the Gulf coast, and the season the fall of the year, when only the acclimated could resist the effects of the malarial shores; under such circumstances the erection of efficient batteries would be exceedingly difficult.

Three methods suggest themselves for preventing the enemy from entering our harbors:

- 1st. To stop up the channel-ways by permanent obstructions sunk across the channels, effectually closing the harbor to all egress as well as ingress.
- 2d. To provide for the harbors a force of armed vessels and torpedo-boats superior in strength to the fleet of armored vessels and torpedo-boats which the enemy could bring against us. But this would require us to build and maintain as many fleets of this character as we have harbors to be defended, and would involve an expenditure that this country could not afford. The cost to us of the iron-clad fleet during the

late war amounted up to January 1, 1870, to \$35,371,064.11. (See Executive Document No. 72, Senate, Forty-first Congress, second session.) The cost to us of such vessels as the British ship *Monarch* would not be less than \$400,000 per gun, and the deterioration of the vessel not less than 5 per cent. per year.

3d. To place guns of proper size and caliber in suitable batteries along the shores of the channels and fairways leading into the harbors, and to obstruct these channels by electrical torpedoes that can be rendered in an instant harmless for our own vessels, or active against an enemy, and which, acting as an obstruction, will hold the enemy under the fire of our guns.

This method of batteries and of obstructions is the least expensive method that can be devised, for our new batteries do not cost on the average over \$16,000 per gun. It is the method that has been pursued by all nations from the earliest times. It was used by our English ancestors in the colonial times during the French and Spanish wars, and it was used during the Revolution.

Batteries of heavy guns, with obstructions to hold the vessels under the fire of the guns, is the true method of defense for our harbors, and is the means we are now applying and collecting, and these works should not be abandoned. Our labors are now restricted to the preparation of powerful barbette batteries (by the enlargement of old and the construction of new earthworks) capable of carrying the large modern guns; and to the collection of torpedoes for obstructions. The works are almost wholly of earth and sand; they are the cheapest works that can be devised, but they must be prepared before actual hostilities are upon us.* This is the practice of all maritime nations, and England, with the most powerful fleets in existence, has expended upon nine harbors of her coast, from 1861 to 1875, 6,987,910 pounds sterling, nearly \$35,000,000 in gold (see Report Fortifications, &c., ordered by the House of Commons to be printed August 11, 1875, 432), and is still actively engaged in this work.

Our country is contiguous throughout its northern boundary with the most powerful maritime power on the earth, and close upon our southern shores is another whose strength is not to be despised. These are the nations with whom complications are most likely to arise.

Many of our works are in an unfinished, transition state, our supplies of torpedo materials are insufficient, the caliber and force of our guns are too small, and under these circumstances I must reiterate, the work on our sea-coast fortifications should not, in my judgment, be suspended.

The estimates submitted, based on the several estimates of the officers in charge, which have been carefully revised, present the amounts which, in the judgment of this department, are necessary for the completion, continuance, or commencement of projects during the coming fiscal year.

Special attention is invited to the estimate of \$100,000 for providing torpedoes or submarine mines to be stored in our fortifications, from which they will be planted, in time of war, in the channels and fairways of our harbors.

Fortifications and torpedoes should be considered the twin defenses of our coasts, the latter being designed to form an obstruction or obstacle at the entrances to our harbors and to hold an enemy's vessel under the fire of the former.

The charges in the torpedoes being fired by the electrical current, many parts of the system cannot be obtained in an emergency. It is to procure and store torpedoes and such portions of the apparatus as cannot be speedily obtained in the event of sudden hostilities that the appropriation is asked.

Special attention is also asked to the item of \$100,000 for preparing our most important forts for operating submarine mines, by providing bomb-proof cover, galleries of approach, &c.; all these being essential to the successful operation of the torpedo system of defense, in connection with the forts themselves.

* Since the date of the report from which this extract is quoted, this department has, with much care, and in the light of full information respecting the recent great improvements in ordnance and armor in European maritime countries, prepared plans for the modification of certain of the most important of our old casemated works, and has submitted estimates for appropriations for the same. (See page 5.)

I beg leave to quote the following extract from the report of the Board of Engineers for Fortifications and Torpedo Defenses, which will be found further on in this report, respecting the necessity for increasing the number of enlisted men in the Battalion of Engineers:

It is the duty of the board to again invite attention to the urgent necessity of increasing the number of enlisted men of the Battalion of Engineers sufficiently to enable them to properly perform the new duty assigned them by Congress of acting as a torpedo corps for the defense of our extended coast. The minimum force consistent with reasonable efficiency has been carefully estimated at 520 men, and the number now available is only about one-fourth of that figure. No increase in the legal organization, nor in the number of officers is required. A provision authorizing the President to recruit the companies to the standard now authorized by law will supply the needful number. The duty is perhaps more technical than any other in the Army, and requires special qualifications and special training, and the men are equally as available for other duties in an emergency as those enlisted in the other three combatant arms of the service.

The desirability of the increase referred to has long been apparent, and I heartily concur in the recommendations of the board.

FORTIFICATIONS.

Fort Wayne, Michigan, in charge of Maj. Walter McFarland, Corps of Engineers.—This work commands the channel of Detroit River, and, with its exterior barbette batteries already planned, will control the navigation of that stream.

It is essentially in the same condition in which it was left in 1870, when work upon it was discontinued, the lateral batteries, forming a most important part of the work, being left in an unfinished condition. The estimated cost of their completion is \$35,000.

No money has been received for or expended upon this work during the past year. The weather has damaged the masonry to some extent during the past nine years, and for the repair of this and of the sewers an appropriation of \$2,500 is asked.

No appropriation was made for the fiscal year ending June 30, 1880.
Appropriation asked for next fiscal year..... \$2,500 00

Fort Porter, Black Rock, near Buffalo, N. Y., in charge of Maj. Walter McFarland, Corps of Engineers.—This work is situated on the Niagara River, within the limits of the city of Buffalo, and consists of a square stone tower or keep in ruins, surrounded by a square barbette battery.

No change whatever has occurred in the condition of this work since the close of the last fiscal year. No money has been expended upon it, and no appropriation is asked for it.

No appropriation was made for the fiscal year ending June 30, 1880.
No appropriation asked for next fiscal year.

Fort Niagara, mouth of Niagara River, New York, in charge of Maj. Walter McFarland, Corps of Engineers.—This work is situated at the débouché of the Niagara River into Lake Ontario, and commands the entrance to that river.

No money has been expended upon this work during the past year. It is in good condition generally, but needs some repairs to its masonry, for which an appropriation of \$2,000 is asked.

No appropriation was made for the fiscal year ending June 30, 1880.
Appropriation asked for next fiscal year..... \$2,000 00

Fort Ontario, mouth of Oswego River, New York, in charge of Maj. Walter McFarland, Corps of Engineers.—This work lies within the limits of the city of Oswego, at the mouth of the Oswego River, and commands

the water approaches to the city. No money has been expended on it since 1872, except for slight repairs.

The estimated cost of the completion of the work according to plans approved by the Secretary of War is \$119,975, of which amount \$50,000 could be profitably expended during the next fiscal year.

No appropriation was made for the fiscal year ending June 30, 1880.
Appropriation asked for next fiscal year..... \$50,000 00

Fort Montgomery, outlet to Lake Champlain, New York, in charge of Col. Henry W. Benham, Corps of Engineers.—This work occupies an important strategic point, and commands the entrance to Lake Champlain from the Richelieu or Saint John River.

No active operations have been under way during the past fiscal year, from want of funds. Some strengthening tie-rods are required on the curtain of front III, as also the thickening of the walls of the magazines, and the replacing of wooden gun-platforms with brick arches and stone floors in two curtains of the channel fronts.

Projects for the modification of this work to suit its armament of heavy guns have been prepared by the Board of Engineers for Fortifications, and should be carried out.

No appropriation was made for the fiscal year ending June 30, 1880.
Appropriation asked for next fiscal year..... \$33,000 00

Fort Knox, Bucksport, Penobscot River, Maine, in charge of Lieut. Col. J. C. Duane, Corps of Engineers, until May 5, 1879; since that date in charge of Lieut. Col. C. E. Blunt, Corps of Engineers.—This work, situated at the narrows of the Penobscot River, furnishes a defense for the city of Bangor, 18 miles above, and other towns bordering the river, and renders it available as a secure harbor of refuge for the shipping of the extensive eastern coast.

The condition of the work remains unchanged, no operations having been carried on during the fiscal year except for the necessary care and preservation of the property.

No appropriation was made for the fiscal year ending June 30, 1880.
No appropriation asked for next fiscal year.

Fort Popham, Kennebec River, Maine, in charge of Lieut. Col. J. C. Duane, Corps of Engineers, until May 5, 1879; since that date in charge of Lieut. Col. C. E. Blunt, Corps of Engineers.—This work defends the entrance, through the mouth of the Kennebec River, to the rich valley of this river, the cities of Bath and Augusta, and the United States arsenal at the latter place.

The condition of this work remains unchanged, no operations having been carried on during the fiscal year except for the necessary care and preservation of the property.

No appropriation was made for the fiscal year ending June 30, 1880.
No appropriation asked for next fiscal year.

Fort Gorges, Portland Harbor, Maine, in charge of Lieut. Col. J. C. Duane, Corps of Engineers, until May 5, 1879; since that date in charge of Lieut. Col. C. E. Blunt, Corps of Engineers.—This work is one of the series of forts designed to defend the harbor and channels leading into the harbor of the important strategic position occupied by the city of Portland.

The condition of this work remains unchanged, no operations having been carried on during the fiscal year except for the necessary care and preservation of the property.

The completion of the gun-platforms, now partially constructed, will place this work in a condition to receive its full armament, and for this purpose an appropriation for the next fiscal year is recommended.

No appropriation was made for the fiscal year ending June 30, 1880.
Appropriation asked for next fiscal year..... \$10,000 00

Fort Preble, Portland Harbor, Maine, in charge of Lieut. Col. J. C. Duane, Corps of Engineers, until May 5, 1879; since that date in charge of Lieut. Col. C. E. Blunt, Corps of Engineers.—This work occupies such a position that three-fourths of its guns command the two principal channels entering the harbor of Portland.

The condition of this work remains unchanged, no operations having been carried on during the fiscal year except for the necessary care and preservation of the property.

Plans for the completion of this work have been prepared by the Board of Engineers for Fortifications and approved by the Secretary of War, but are only partially executed.

No appropriation was made for the fiscal year ending June 30, 1880.

Appropriation asked for next fiscal year \$30,000 00

Fort Scammel, Portland Harbor, Maine, in charge of Lieut. Col. J. C. Duane, Corps of Engineers, until May 5, 1879; since that date in charge of Lieut. Col. C. E. Blunt, Corps of Engineers.—This work occupies a very important position in the harbor, and commands four of the channels leading into it.

The condition of this work remains unchanged, no operations having been carried on during the fiscal year except for the necessary care and preservation of the property.

Plans for the modification of this work have been prepared by the Board of Engineers for Fortifications and approved by the Secretary of War, but are only partially executed.

No appropriation was made for the fiscal year ending June 30, 1880.

Appropriation asked for next fiscal year \$100,000 00

Battery on Portland Head, Portland Harbor, Maine, in charge of Lieut. Col. J. C. Duane, Corps of Engineers, until May 5, 1879; since that date in charge of Lieut. Col. C. E. Blunt, Corps of Engineers.—This work covers by its guns all the approaches to the main channel leading into the harbor, and will prevent by its fire an enemy's fleet from taking up, unopposed, a position behind Bangs' Island, from which to bombard Portland or shell the shipping in the harbor.

The condition of this work remains the same as at the close of the last fiscal year, no operations having been carried on except for the necessary care and preservation of the property.

For continuing the construction of this work, according to plans approved by the Secretary of War, an appropriation for the next fiscal year is recommended.

No appropriation was made for the fiscal year ending June 30, 1880.

Appropriation asked for next fiscal year \$100,000 00

Batteries on Cow Island, approaches to the harbor of Portland, Maine.—The object of these batteries is, with batteries designed to be placed on Great Hog Island, to prevent an enemy's occupation of Casco Bay, and to guard the passages from it to Portland Harbor.

Plans for the construction of batteries for the heaviest guns, on this island, have been prepared by the Board of Engineers for Fortifications, and it is proposed to commence work upon them as soon as funds are available.

No appropriation for their construction has yet been made.

Appropriation asked for next fiscal year \$50,000 00

Batteries on Great Hog Island, approaches to the harbor of Portland, Maine.—The object of these batteries is, with batteries designed to be placed on Cow Island, to prevent an enemy's occupation of Casco Bay, and to guard the passages from it to Portland Harbor.

Plans for the construction of batteries for the heaviest guns, on this island, have been prepared by the Board of Engineers for Fortifications, and it is proposed to commence work upon them as soon as funds are available.

No appropriation for their construction has yet been made.

Appropriation asked for next fiscal year \$50,000 00

Fort McClary, Portsmouth Harbor, New Hampshire, in charge of Lieut. Col. J. C. Duane, Corps of Engineers, until May 5, 1879; since that date in charge of Lieut. Col. C. E. Blunt, Corps of Engineers.—This work, together with Fort Constitution opposite, forms the inner line of defense to the mouth of the Piscataqua River and to the navy-yard at Kittery, Me.

The condition of the work remains the same as at the date of last report, no operations having been carried on except for the necessary care and preservation of the property.

No appropriation was made for the fiscal year ending June 30, 1880.

No appropriation asked for next fiscal year.

Fort Constitution, Portsmouth Harbor, New Hampshire, in charge of Lieut. Col. J. C. Duane, Corps of Engineers, until May 5, 1879; since that date in charge of Lieut. Col. C. E. Blunt, Corps of Engineers.—This work, together with Fort McClary opposite, forms the inner line of defense to the mouth of the Piscataqua River and to the navy-yard at Kittery, Me.

The condition of this work remains unchanged, no operations having been carried on except for the necessary care and preservation of the property.

No appropriation was made for the fiscal year ending June 30, 1880.

No appropriation asked for next fiscal year.

Battery on Gerrish's Island, Portsmouth Harbor, New Hampshire, in charge of Lieut. Col. J. C. Duane, Corps of Engineers, until May 5, 1879; since that date in charge of Lieut. Col. C. E. Blunt, Corps of Engineers.—This battery, with the one opposite on Jerry's Point, forms the outer line of defense to Portsmouth Harbor, and to the navy-yard at Kittery, Me.

The work remains the same as at the close of the last fiscal year, no operations having been carried on except for the necessary care and preservation of the property.

Plans for the completion of this work have been prepared by the Board of Engineers for Fortifications and approved by the Secretary of War, but are only partially executed.

No appropriation was made for the fiscal year ending June 30, 1880.

Appropriation asked for next fiscal year \$36,000 00

Battery on Jerry's Point, Portsmouth Harbor, New Hampshire, in charge of Lieut. Col. J. C. Duane, Corps of Engineers, until May 5, 1879; since that date in charge of Lieut. Col. C. E. Blunt, Corps of Engineers.—This battery is on the western side of the entrance to the harbor of Portsmouth, New Hampshire, and with the battery at Gerrish's Island, on the opposite side of the entrance, forms the outer line of defense to that harbor, and to the navy-yard at Kittery, Me.

No operations were carried on at this work during the past fiscal year except for the necessary care and preservation of the property.

Plans for the completion of this work have been prepared by the Board of Engineers for Fortifications and approved by the Secretary of War, but are only partially executed.

No appropriation was made for the fiscal year ending June 30, 1880.

Appropriation asked for next fiscal year \$24,000 00