55TH CONGRESS, 3d Session. } SENATE. { DOCUMENT No. 21.

EIGHTH REPORT

OF THE

BOARD OF ORDNANCE AND FORTIFICATION.

OCTOBER 31, 1897, TO OCTOBER 31, 1898.

DECEMBER 7, 1898.—Referred to the Committee on Naval Affairs and ordered to be printed.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1898.

LETTER OF TRANSMITTAL.

WAR DEPARTMENT,
Washington, December 5, 1898.

SIR: I have the honor to transmit herewith, as required by law, copy of the report of the Board of Ordnance and Fortification for the year ended October 31, 1898.

Very respectfully,

R. A. ALGER,
Secretary of War.

Hon. GARRET A. HOBART,
Vice-President of the United States, President of the Senate.

REPORT OF THE BOARD OF ORDNANCE AND FORTIFICATION.

WAR DEPARTMENT,
Washington, D. C., October 31, 1898.

The SECRETARY OF WAR.

SIR: In compliance with the provisions of the act approved February 24, 1891, the Board of Ordnance and Fortification has the honor to submit, for transmission to Congress, its annual report for the year ended October 31, 1898.

PERSONNEL.

A change was made in the personnel of the Board during the year by the relief of Capt. James C. Ayres, Ordnance Department, on April 6, as recorder, and the appointment of Lieut. I. N. Lewis, Sixth Artillery, in his stead.

Captain Ayres had served as recorder of the Board since July 1, 1894, and, as an expression of its appreciation for his services, the following extract from the proceedings of April 12, 1898, is inserted:

> Capt. J. C. Ayres, having been relieved as recorder of the Board of Ordnance and Fortification, the Board desires to place on record its high appreciation of his intelligent, efficient, and faithful assistance in the performance of its duties.

NEW LEGISLATION.

The only new legislation affecting the Board was contained in the fortification act, approved May 7, 1898, which made an appropriation for the work of the Board during the year ending June 30, 1899, as follows:

> *Board of Ordnance and Fortification.*—To enable the Board to make all needful and proper purchases, experiments, and tests to ascertain, with a view to their utilization by the Government, the most effective guns, small arms, cartridges, projectiles, fuses, explosives, torpedoes, armor plates, and other implements and engines of war, and to purchase or cause to be manufactured, under authority of the Secretary of War, such guns, carriages, armor plates, and other war material as may, in the judgment of the Board, be necessary in the proper discharge of the duty devolved upon it by the act approved September twenty-second, eighteen hundred and eighty-eight; to pay the salary of the civilian member of the Board of Ordnance and Fortification provided by the act of February twenty-fourth, eighteen hundred and ninety-one, and for the necessary traveling expenses of said member when traveling on duty as contemplated in said act; for the payment of the necessary expenses of the Board, including a per diem allowance to each officer detailed to serve thereon when employed on duty away from his permanent station of two dollars and fifty cents a day, and for the test of experimental guns, carriages, and other devices procured in accordance with the recommendation of the Board of Ordnance and Fortification, one hundred thousand dollars: *Provided*, That before any money shall be expended in the construction or test of any gun, gun carriage, ammunition, or implements under the supervision of the said Board, the Board shall be satisfied, after due inquiry, that the Government

of the United States has a lawful right to use the inventions involved in the construction of such gun, gun carriage, ammunition, or implements, or that the construction or test is made at the request of a person either having such lawful right or authorized to convey the same to the Government.

That all material purchased under the foregoing provisions of this act shall be of American manufacture, except in cases when, in the judgment of the Secretary of War, it is to the manifest interest of the United States to make purchases in limited quantities abroad, which material shall be admitted free of duty.

APPROPRIATIONS AND ALLOTMENTS.

In compliance with the act of February 24, 1891, which requires the Board to "give a detailed statement of all contracts, allotments, and expenditures made by the Board," an exhibit, marked Appendix A, is attached to this report, giving this detailed statement from October 31, 1897, to October 31, 1898.

No contracts are entered into by the Board, as they are made by the chief of the department to which the work pertains, under the direction of the Secretary of War.

The following table gives a summary of the balances of appropriations at the date of the last report, the appropriation and allotments made during the year, and the balances remaining on hand October 31, 1898.

Summary.

Act.	Balance Oct. 31, 1897, and appropriated during the year.	Net allotments during the year.	Balance available for allotment.
Fortification act of—			
Sept. 22, 1888	$5,392.60		$5,392.60
Mar. 2, 1889	14,775.00		14,775.00
Aug. 18, 1890	10,305.69	$2,895.63	7,410.06
July 25, 1892; Feb. 18, 1893; Aug. 1, 1894; Mar. 2, 1895; June 6, 1896, and Mar. 3, 1897	123,248.47	96,375.01	126,873.46
May 7, 1898	100,000.00		
Total	253,721.76	99,270.64	154,451.12

GENERAL OPERATIONS.

The general operations of the Board have been largely influenced by the war with Spain, officially declared April 21, 1898.

A majority of the members have been called to duty in the field during the summer, and it has been necessary to meet at longer and more irregular intervals than usual. A very large number of instruments and devices for coast defense, together with many plans and suggestions pertaining to offensive and defensive weapons, have been carefully considered, but comparatively little new work of experimental character has been undertaken, the Board directing its work in the emergency to making effective existing methods and means of national defense rather than in experimenting with the new and untried. However, no suggestion or device which, in the opinion of the Board, gave sufficient promise of future military value to warrant it, has failed to receive a suitable allotment for development and test.

SUBJECTS CONSIDERED.

A greater number and variety of subjects than usual have come before the Board. A list of these subjects, with a brief statement of the action in each case, is given in Appendix B.

CONTRACT GUNS.

The hundred-gun contract.—Under this contract, twenty-five 8-inch, fifty 10-inch, and twenty-five 12-inch guns are to be made by the Bethlehem Iron Company. The following report of the company, dated October 4, 1898, shows that excellent progress is being made toward the completion of this contract:

MACHINE TOOLS AND EQUIPMENTS.

Several additions have been made to the assembling plant during the past year, including two No. 4 Universal milling machines and two 14-inch lathes.

PRESENT CONDITION OF GUNS BEING MANUFACTURED UNDER CONTRACT.

Twenty-five guns, 8-inch caliber.

Guns No. 1 to 25, inclusive.—Shipped.

Fifty guns, 10-inch caliber.

Guns No. 26 to 40, inclusive.—Shipped.
Gun. No. 41.—Accepted and ready for shipment. In use in shop for gun-carriage tests.
Guns No. 42 to 50, inclusive.—Shipped.
Guns No. 51 and 52.—Proof fired and ready to ship.
Guns No. 53 to 55, inclusive.—Assembled and breech mechanisms being fitted.
Guns No. 56 to 58, inclusive.—Assembled, finish-bored in main bore, and partly finish-turned outside.
Gun No. 59.—A hoops assembled; B hoops machined ready for assembling.
Guns No. 60 and 61.—All forgings excepting C hoops passed test and machined ready for assembling; C hoops forged and rough machined.
Guns No. 62 to 75, inclusive.—Of the 154 forgings (exclusive of breech mechanism parts) required to complete these guns, there are passed and machined for assembling eight tubes, four jackets, two B2, two B3, three D, and ten trunnion hoops; in addition there are forged and rough machined one tube, one jacket, three A1, one A3, and two C hoops.
Breech mechanisms for guns No. 56 to 65, inclusive, about half finished. For guns No. 66 to 75, inclusive, about one-third finished.

Twenty-five guns, 12-inch caliber.

Guns No. 76, 77, and 80.—Shipped.
Gun No. 79.—Accepted and ready for shipment. In use in shop for gun-carriage tests.
Guns No. 78, 81, and 82.—Assembled, finish bored, rifled, and finish turned.
Gun No. 83.—C hoops assembled; A, B, and D hoops passed and machined for assembling. Jacket forged and rough machined.
Guns No. 84 and 85.—Of 22 forgings (excluding breech-mechanism parts) required to complete these guns there are passed and machined for assembling one tube, two A1, two A2, two A3, two B2, two B3, two C1, two C2, two D, and two trunnion hoops.
Breech mechanisms for guns Nos. 78, 81, 82, 83, 84, and 85 are more than one-half completed.

EXPERIMENTAL GUNS.

The 8-inch Gatling cast-steel gun.—This gun has been constructed under a special act of Congress, approved June 6, 1896, appropriating $40,000 for the purpose.

In August, 1897, the Board witnessed the casting of the gun at the works of the Otis Steel Company, Cleveland, Ohio, and in the following March was present during an attempt to mandrel it.

Dr. Gatling reports that the gun is now completed and ready for shipment to Sandy Hook for test.

The 10-inch Brown segmental-tube wire-wound gun.—Under date of September 30, 1898, the trustees of this gun report that progress during

the past year has not been as rapid as was desired, on account of the difficulty of getting steel from the manufacturers in time. They also report that the gun is now in the lathe and partly turned to size and the first layer of wire partly wound.

It is hoped this gun will be ready for test early in the coming year.

GUNS FOR THROWING HIGH EXPLOSIVES.

The only material progress made during the year in the development of guns for safely throwing charges of high explosives, has been confined to light field guns of the smaller calibers, of the type known as powder pneumatic.

Two systems of construction are under consideration by the Board.

(1) *The Sims-Dudley system.*—The Sims-Dudley gun was first brought to the attention of the Board by the Sims Dudley Defense Company of New York, in January, 1896. The Board witnessed the firing tests of a 4-inch gun at the company's proving ground the following April, a full account of which is contained in the proceedings of the Board of April 13, 1896, and a description of the gun tested will be found in our sixth annual report. A number of improvements have since been made, and the Board, believing that this system of projecting high explosives gives promise of considerable military value, made, at its meeting of June 29, 1898, an allotment of $7,500 to enable the Chief of Ordnance to procure for test one 5-inch gun of this design, together with fifty rounds of ammunition.

The company reports that the gun is now ready for their preliminary firing tests and the official tests of this gun may be completed within the next sixty days.

(2) *System proposed by the Dynamite Ordnance and Armaments Company.*—An allotment was made by the Board at its meeting of June 29, 1898, of $5,000 to procure for test one 3-inch gun of the design proposed by the Dynamite Ordnance and Armaments Company, with one hundred rounds of ammunition.

The gun and ammunition have been delivered at the proving ground, and the necessary tests will be completed as soon as possible.

The essential principle of operation in this gun is similar to that employed in the Sims-Dudley. The details of construction are, however, different. No auxiliary chambers are used. The propulsive charge is carried in the tailstock of the projectile, a small priming charge inserted in the breechblock being used to ignite the main charge. The air contained in the bore space surrounding the tail of the projectile when seated, acts as a cushion in starting the projectile from rest, and when violently compressed by the powder gases it assists in propelling the projectile.

HEAVY RAPID-FIRE GUNS.

The Driggs-Seabury 4.72-inch rapid-fire gun.—This gun, which was originally known as the "Seabury 4.72-inch gun," has been fitted with an entirely new and much improved breech mechanism. The gun was received back at the proving ground, Sandy Hook, January 3, 1898, and its test was begun February 17. Twenty-four rounds have been fired in the general test of the new mechanism with very promising results. It is expected that the tests will be completed at an early date.

Five-inch rapid-fire built-up gun.—This gun, for which the Board made an allotment March 12, 1896, was completed and was undergoing test at the proving ground, when it burst, at the seventy-fourth round, from

abnormal action of the powder charge. An experimental smokeless powder, blended, was employed, and the character of the rupture showed the development of an abnormal pressure. There was no evidence of weakness in the design of the gun, nor defect in the quality of the metal used.

Six-inch rapid-fire gun.—This gun was proposed by the Board, and an allotment was made July 13, 1897, for its construction according to a design submitted by the Chief of Ordnance. It has been completed during the present month, but has not yet been tested.

Three-inch rapid-fire gun.—In September, 1897, and in March, 1898, the Board made allotments to enable the Chief of Ordnance to procure two type 3-inch 15-pounder rapid-fire guns, with suitable mounts, for the purpose of protecting mine fields. The guns have not yet been purchased.

MOUNTS FOR RAPID-FIRE GUNS.

Mount for 3-inch gun.—Two types of mount are to be procured for test with the two type 3-inch rapid-fire guns—one casemate and one parapet mount, the latter to be of the balanced pillar or masking type.

Pillar mount for 5-inch gun.—The 5-inch barbette carriage on balanced pillar mount was completed, with the exception of the shield, March 14, 1898, and in the emergency then existing was issued direct to Fort Hancock. The shield has since been attached, and the carriage is now undergoing test.

Mount for 6-inch gun.—The six-inch disappearing carriage, model of 1898, is now under construction. Its completion is expected within the coming year.

RAPID-FIRE FIELD GUNS.

Under allotment by the Board, the Chief of Ordnance has ordered from abroad a Maxim-Nordenfelt field gun and a Darmancier field carriage, but they have not yet been received for test.

MISCELLANEOUS.

Maxim-Nordenfelt 75-mm. mountain gun.—This gun is completed, but not yet received in this country.

Hotchkiss 1-pounder balloon gun.—The Board made an allotment February 15, 1898, to enable the Chief of Ordnance to procure for test one Hotchkiss 1-pounder balloon gun, with mount. A special mount for this gun has been ordered constructed at the Rock Island Arsenal.

Wilder machine gun.—On March 16, 1898, the Board made an allotment to enable the Chief of Ordnance to test this gun. The company controlling the gun has not yet presented it for test.

POWER APPARATUS FOR HEAVY GUNS.

The necessity for suitable power apparatus in the service of our new coast armament being generally recognized, the Board at its meeting in May made an allotment to cover the cost of a type electrical equipment for one of the 10-inch guns at Fort Wadsworth.

This equipment includes a motor for traversing, one to operate the elevating gear and the retraction gear, and one for operating the ammunition hoist, together with the necessary wiring, switches, and controllers. This plant is already partly installed.

GUN CARRIAGES.

The Emery 12-inch elevating carriage.—This carriage was contracted for under a special act of Congress approved February 18, 1893, appropriating $110,000 for the purpose, and an additional appropriation made June 6, 1896, of $10,000 for a loading apparatus.

The expenditures to date upon this carriage amount to $84,821, of which $12,500 has been expended in purchase of the ammunition for test.

The following letter from Mr. Emery shows the progress made during the past year:

STAMFORD, CONN., *September 29, 1898.*

GENTLEMEN: In reply to your letter of September 24, in regard to progress on my contract for 12-inch elevating gun carriage, of date March 17, 1893, which was modified by a provision of the act approved June 6, 1896, in such a manner as to permit the actual construction of this carriage, I would say work in the shops was commenced in the fall of 1896, and has proceeded during the past two years, but not with such rapidity as I had hoped and expected.

The drawings for this carriage had been made prior to this date, but many modifications of these drawings have been and are still being made, many of which were found desirable for the general utility and use of the carriage, and some to meet the exigencies which have arisen as the work progresses.

I spent three months in Washington in the spring and early summer in endeavoring to get contracts for guns which I felt would be of great advantage to our Government, if ordered. The time thus spent somewhat delayed this work, but a source of much greater delay has been caused by the great pressure of other Government work being done in the shop upon which I rely for the final finishing of a large part of my carriage.

Another source of very great delay is that much of the work is tentative and can not be decided and ordered until much other work is done, so that some of the rough material could not yet properly be ordered, some experiments having yet to be made first.

There are an unusually large number of different parts, each of which must be particularly looked after, some of which have required several shops to produce and finish a single piece.

Notwithstanding all these difficulties, there has been put into the different shops material for the metal work of this carriage amounting to more than 420,000 pounds, from which parts have been finished covering over 222,000 pounds of finished weight. The rest of this material is in the various stages of construction, with the exception of the material which could not yet be ordered, for the reasons above given. Besides this, there has been finished and delivered for the preliminary and proof tests of the carriages upwards of 92,000 pounds of ammunition.

I have a good force at work on the carriage pushing the work as fast as I can consistently with the great necessity of seeing that all the different parts of an entirely new machine are so made that they will properly fulfill the functions required of them, and so that the whole may be successful when done.

I remain, your obedient servant,

A. H. EMERY.

THE BOARD OF ORDNANCE AND FORTIFICATION,
War Department, Washington, D. C.

The second 10-inch pneumatic carriage.—This carriage has been constructed under a special act of Congress approved August 1, 1894, appropriating $50,000 for the purpose, and is now mounted at the proving ground, Sandy Hook, New Jersey. Owing to unexpected mechanical difficulties, the contractors have not yet reported the carriage ready for test. Of the total appropriation available, $40,000 has already been expended.

The 10-inch Howell counterpoise carriage.—The firing tests of this carriage are now in progress at the proving ground, under the supervision of the Board.

The 10-inch disappearing carriage all-around fire.—This carriage was completed at the Watertown Arsenal September 21, 1898. In principle it is similar to the limited-fire carriages for guns of the same caliber.

It is intended to issue it directly to the emplacement prepared for it at Galveston, Tex., where the usual firing tests will take place.

The 12-inch disappearing carriage.—This carriage was completed at the Watertown Arsenal May 8, 1897. It has since passed a very satisfactory test at the proving ground and has been issued to the service.

EXPERIMENTAL PARAPET.

Steel-rail parapet.—In October, 1897, the Board made an allotment of $10,000 for the purpose of constructing an experimental parapet to demonstrate the value of steel rails for the protection of guns and magazines.

The Chief of Engineers reports that the parapet has been constructed, but test has been delayed owing to the fact that the gun which was to have been used for the purpose was temporarily removed for use in the defenses at Fort Washington.

HIGH EXPLOSIVES.

The Board at its meeting on February 16, 1898, recommended the adoption of emmensite and wet gun cotton as types of high explosives to be used in charging shells, and on April 12 this action was supplemented by the addition of Joveite to the list. These recommendations were approved by the Secretary of War.

AUTOMOBILE DIRIGIBLE TORPEDOES.

No material progress has been made during the year in the development of a serviceable dirigible torpedo of moderate cost.

The Halpine automobile torpedo, for which an allotment was made by the Board July 1, 1896, has not yet been presented for test. On August 25, 1898, the inventor requested permission to make a preliminary trial of his first torpedo at Willets Point, in order to demonstrate certain points which would be of advantage to him in the construction of a second torpedo for delivery to the Board. This request has been granted, and it is expected that the value of this invention will be determined during the coming year.

RANGE AND POSITION FINDERS.

Emergency type position finder.—At its meeting April 12, 1898, the Board recommended that the instrument adopted as the emergency type position finder should have an accuracy of 1 per cent of range up to 6,000 yards when the vertical base is 60 feet; when greater than 60 feet, the accuracy should be 1 per cent of range up to 8,000 yards, and the instruments should be so constructed in several classes as to admit of being adjusted to varying lengths of base within certain limits. This proceeding was approved by the Secretary of War.

Both the Rafferty and the Lewis instruments comply with these requirements, and the question as to which will be procured should be determined by the cost.

Rafferty range finder to be attached to gun carriage.—This instrument was constructed under an allotment by the Board and sent to the Artillery School at Fort Monroe for trial. The board of artillery officers, which convened at that post to test the instrument, reports that—

> The board is of the opinion that an emergency range finder is very desirable for use at the gun when the regular range-finding system fails from any cause; that the depression principle with stable mount in some suitable place in the gun emplace-

ment capable of being quickly adjusted and the adjustment verified on successive bench-marks as the target changes its distance, and easily and accurately leveled or kept level, will give great satisfaction. The board does not, however, recommend the present instrument as a form practicable for the artillery service.

The Barr and Stroud fortress range finder.—This instrument, purchased under an allotment of the Board, has been thoroughly tested during the past year at the proving ground and has not proved satisfactory for service use.

The alternating current range finder.—In December, 1896, Prof. A. C. Crehore, of Dartmouth College, and Lieut. George O. Squier, Third Artillery, proposed the construction of an "alternating current range finder," for use with a long horizontal base, in which alternating currents with the Wheatstone bridge were to be used to obtain parallelism of the plotting arms. Drawings and estimates of cost were submitted, and the Board made an allotment for the construction and test of an instrument of this type. Under the allotment an instrument was built and installed at Fort Monroe, where it was inspected and tested by the Board on the Regulation of Seacoast Artillery Fire, sitting as a board to test range finders, June 16, 1898. From the report of that board it appears that the inventors, during construction, abandoned the characteristic electrical features, and in the form finally submitted for test the instrument is purely mechanical. The Board reports, however, that from its inspection of the instrument and its working it gives accurate results, and will be a very satisfactory instrument in service.

The Ruckman-Crosby range finder.—Lieut. J. W. Ruckman reports that, owing to other exacting duties during the year, he has been able to devote but little time to the further development of this instrument.

BOARD ON THE REGULATION OF SEACOAST ARTILLERY FIRE.

The operations of this board have been confined principally to the revision and correction of proof of the text and plates of the Drill Regulations for Coast Artillery, which have been approved by the Secretary of War and distributed to the service; the calculation of range tables and gun commanders' range scales for all the different guns composing the coast armament, and in examining into and reporting upon the various special devices which have been submitted to it.

The typical artillery station at Fort Wadsworth has been completely equipped under its supervision, with the exception of a portion of the auxiliary defenses.

The routine work of the Board has been much interfered with by the detail of its several members on active duty in the field, and it has not been practicable to make exhaustive tests of the typical equipment.

ESTIMATES FOR THE COMING YEAR.

In order to carry on the work of the Board for the coming year an estimate of one hundred thousand dollars was submitted at the October meeting.

It is recommended that the appropriation be made as heretofore in a single amount to enable the Board to make all needful and proper purchases, experiments, and tests to ascertain, with a view to their utilization by the Government, the most effective guns, small arms, cartridges, projectiles, fuses, explosives, torpedoes, armor plates, and other implements and engines of war, and to purchase or cause to be manufactured, under authority of the Secretary of War, such guns, carriages, armor plates, and other war material as may, in the judgment of the Board, be necessary in the proper discharge of the duty devolved upon it by the act approved September 22, 1888; to pay the salary of the civilian

member of the Board of Ordnance and Fortification provided by the act of February 24, 1891, and for the necessary traveling expenses of said member when traveling on duty as contemplated in said act; for the payment of the necessary expenses of the Board, including a per diem allowance to each officer detailed to serve thereon when employed on duty away from his permanent station, of $2.50 a day; and for the test of experimental guns, carriages, and other devices procured in accordance with the recommendation of the Board of Ordnance and Fortification, the expenditure of which shall be made by the several bureaus of the War Department heretofore having jurisdiction of the same, or by the Board itself, as may be approved by the Secretary of War.

The Board desires to call especial attention to the change recommended above in regard to expenditures. The Board believes it to be for the best interests of the service that it should more directly control the appropriation made for its work, subject always to the approval of the Secretary of War.

CONCLUSION.

While types of all the more important engines and appliances of war for our coast defenses have already been developed and adopted under the auspices of the Board, much remains to be accomplished in order to make the armament truly effective. It is the aim of the Board to keep in touch with the best inventive talent of the country in all that pertains to war material, to encourage the development of every suggestion and device of value presented, and to use the funds at its disposal to secure for our service the best products of American genius.

NELSON A. MILES,
Major-General Commanding the Army, President of the Board.

ROYAL T. FRANK,
Colonel, First Artillery, U. S. Army.

PETER C. HAINS,
Colonel, Corps of Engineers, U. S. Army.

JOSEPH H. OUTHWAITE.
Civilian Member, Board of Ordnance and Fortification.

I. N. LEWIS,
First Lieutenant, Sixth Artillery, Recorder of the Board.

I concur in the above, except as to the proposed change in the manner of making disbursements, believing the method prescribed by Congress at the creation of the Board is still for the best interest of the Government.

FRANK H. PHIPPS,
Lieutenant-Colonel, Ordnance Department, U. S. Army.

APPENDIX A.

TABLE SHOWING ALLOTMENTS AND EXPENDITURES MADE BY THE BOARD OF ORDNANCE AND FORTIFICATION FROM OCTOBER 31, 1897, TO OCTOBER 31, 1898, INCLUDING STATEMENT OF UNEXPENDED BALANCES UNDER THE SEVERAL APPROPRIATIONS.

Act of September 22, 1888.

Balance on hand October 31, 1897	$5,392.60
Allotments during the year	
Balance available for allotment	5,392.60

Act of March 2, 1889.

Balance on hand October 31, 1897	$14,775.00
Allotments during the year	
Balance available for allotment	[1] 14,775.00

Act of August 18, 1890.

Balance on hand October 31, 1897		$10,305.69
Allotments during the year:		
Nov. 17. One Maxim-Nordenfelt 75 mm. mountain gun, with carriage, ammunition, etc	2,895.63	
Balance available for allotment		7,410.06

Acts of July 23, 1892; February 18, 1893; August 1, 1894; March 2, 1895; June 6, 1896; March 3, 1897, and May 7, 1898.

Balance on hand October 31, 1897		$123,248.47	
Act of May 7, 1898		100,000.00	
			$223,248.47
Allotments during the year:			
Nov. 17.	Two Rafferty position finders, on tripods	1,500.00	
Dec. 21.	Experiments and tests of explosives for charging shells	31,834.00	
Jan. 6.	Charge against Board for mileage paid by Pay Department	1,001.20	
	Charge for stationery and miscellaneous supplies	115.68	
18.	Five 8-inch Gathmann shells	2,750.00	
19.	Driggs-Seabury minimum recoil field carriage	1,800.00	
	Bofors 15-centimeter rapid-fire gun and mount	13,000.00	
Feb. 15.	Hotchkiss 1-pounder balloon gun and mount	1,500.00	
16.	Instrument for observation of fire	250.00	
18.	Charge against Board for transportation paid by Quartermaster's Department	7.00	
Mar. 14.	Schmidt chronograph	300.00	
15.	3-inch 15-pounder rapid-fire gun and mount	9,560.00	

[1] Available only for the purchase of movable submarine torpedoes.

Allotments during the year—Continued.			
Mar. 16.	Test of Wilder machine gun	$300.00	
	Experiments with wireless telegraph at Fort Monroe	600.00	
	Experiments with wireless telegraph at Fort Wadsworth	600.00	
	Combination horizontal base and depression position finder	3,000.00	
Apr. 12.	Bofors 15-centimeter gun, additional	2,417.00	
	Two searchlights	4,000.00	
13.	Lewis range finder, repair of	130.00	
	Photochronograph, expenditure connected with	2.70	
	Range and azimuth transmitting device	175.00	
	Installation of same	192.00	
	Instrument for observation of fire, additional	46.00	
27.	Charge for stationery and miscellaneous supplies	46.40	
May 11.	Electrical manipulation of guns, equipping gun, etc	700.00	
	Pierce photographic plane table, construction and test	500.00	
June 29.	3-inch dynamite gun and ammunition	5,000.00	
	5-inch dynamite gun and ammunition	7,500.00	
Aug. 5.	Charge for stationery and miscellaneous supplies	67.31	
Oct. 1.	Charge against Board for transportation paid by Quartermaster's Department	140.90	
31.	Expenses of the Board	9,839.82	
	Total	99,125.01	
Revocation of allotment under these acts:			
Oct. 1.	From allotment of January 18, 1898, for Gathmann shells	2,750.00	
	Total net allotments		$96,375.01
	Balance available for allotment		126,873.46

RECAPITULATION.

Act.	Balance on hand Oct. 31, 1897, and appropriated during the year.	Allotments during the year.	Allotments revoked.	Balance on hand available for allotment.
September 22, 1888	$5,392.60			$5,392.60
March 2, 1889	14,775.00			14,775.00
August 18, 1890	10,305.69	$2,895.63		7,410.06
July 25, 1892; February 18, 1893; August 1, 1894; March 2, 1895; June 6, 1896, and March 3, 1897	123,248.47	99,125.01	$2,750.00	126,873.46
May 7, 1898	100,000.00			
Total	253,721.76	102,020.64	2,750.00	154,451.12

APPENDIX B.

Subjects considered during the year.

Subject.	Proposed by—	Action.
Aerial blasting apparatus	Arthur John Worrall	Not recommended.
Electric revolver	F. H. Caldwell	Do.
Land battery	M. Bennett	Do.
Field gun, 75 mm., complete, ammunition, etc	Maxim-Nordenfelt Gun and Ammunition Co.	Recommended.*
Mountain gun, 75 mm., complete, ammunition, etc.	do	Allotment.
Depression position finders, on tripods	Lieut. W. C. Rafferty	Do.
Air-navigating machine	James Seldon Cowdon	Not recommended.
Shell for projecting frozen dynamite	H. W. Blair and H. P. Hurst	Do.
Fuse	H. P. Hurst	Do.
Projecting high explosives	Arthur Foster	Do.
Submarine boat	C. O. Rude	Referred to Secretary Navy.
Under-sea battery	F. Rossi	Not recommended.
Range-finding devices	Tokiwa Matsuo	Do.
Booms for harbor defense	Cornelius O'Brien	Do.
Combination shotgun and rifle	F. G. Smith	Do.
Observation stations in batteries, position of	Board on Regulation of Seacoast Artillery Fire.	Deferred for test.
Wireless telegraph	Lieut. I. N. Lewis	Allotment.
Coast defense, comments on	Jacob Maumee	Filed.
Data necessary in laying seacoast guns, instrument for finding.	Lieut. Wm. S. McNair	Estimates called for.
Tests of explosives, etc	Chief of Ordnance	Allotment.
High-explosive shell, Gathmann	G. W. McMullen	Do.*
Disappearing war ship	F. Rossi	Not recommended.
Armored car	J. A. F. Brownwell	Do.
Coast defense	Wm. D. Elting	Do.
Explosive shell	C. A. Amundson	Do.
Mortars, position in battery	Board on Regulation of Seacoast Artillery Fire.	Under consideration.
Lewis azimuth indicators for 8 and 10-inch guns at Fort Wadsworth.	do	Recommended.
Field carriage, minimum recoil	Driggs-Seabury Gun and Ammunition Co.	Allotment.
Iron fortifications, casting of	James Acton Miller	Not recommended.
Micrometer range finder	Capt. D. D. Gaillard	Allotment.
Explosive shell	J. Byron Roney	Not recommended.
Range-finding system	Frank O. Weary	Do.
Air-navigating device	Charles Fiesse	Do.
Cavalry equipment, changes in	S. E. Chamberlain	Do.
Rapid-fire gun, 15 cm., with mount and ammunition.	Aktiebolaget Bofors-Gullspang.	Allotments.
Torpedo gun, 24-inch	Hudson Maxim	Not recommended.
Hotchkiss 1-pounder balloon gun and mount	Chief of Ordnance	Allotment.
Armored turret	C. H. Adams	Not recommended.
Device for quick computation of measurements	J. H. Jackson	Do.
Rapid-fire gun and submarine boat	C. P. Labatt	Do.
Instrument for observation of fire	Board on Regulation of Seacoast Artillery Fire.	Allotment.
Steel plates for fortifications	Clark W. Fish	Not recommended.
Air ship	G. Berger	Do.
Torpedo system, transfer to artillery arm	Board on Regulation of Seacoast Artillery Fire.	Postponed.
Ammunition for testing typical artillery station.	do	Recommended.
Packing ammunition for small arms	Lieut. J. A. Penn	Not recommended.
High explosives, emmensite, and gun cotton	Board of Ordnance and Fortification.	Adopted as types.
Wilder machine gun, test	R. O. Surbridge	Allotment.
Schmidt chronograph	Chief of Ordnance	Do.
Transporting artillery, suggestions for	Geo. W. Fisher	Filed.
Small arms, rest for	B. N. Firmin	Not recommended.
Repeating bombshell	Thos. B. Ashford	Do.
Torpedo system	J. M. E. Hall	Do.
Suggestions in case of war	Will Ellsworth	Filed.
Armor-plate ball-bearing fort	W. H. Fitzgerald	Not recommended.

* Not approved by Secretary of War.

Subjects considered during the year—Continued.

Subject.	Proposed by—	Action.
Air ship	Therese Schaetzl	Referred to Chief Signal Officer.
Wire-wound gun	T. Reynolds	Not recommended.
Steel fortification	F. Rossi	Do.
Wire-wound, segmental-tube 12-inch mortar	Brown & Munsell	Postponed.
Method of manufacturing ordnance and projectiles.	J. A. Potter	Under consideration.
Telephones, whether satisfactory	Chief Signal Officer	No changes recommended.
Bomb-dropping device	F. Peale	Not recommended.
Coast defense by petroleum	D. G. Wood	Do.
Torpedoes, offer to supply	G. H. Selleck & Co	Referred to Chief of Engineers.
Observation tower	Geo. S. Kyle	Not recommended.
Portable breastworks	Elmer E. Van Wie	Do.
Harbor defense	B. C. Monroe	Do.
High-explosive shell	W. A. Scott	Do.
Torpedo system	Albert Bierstadt	Do.
Torpedo defense	J. C. Schuler	Do.
Practice bullet	Paul Alexander	Do.
Data for laying guns, device for obtaining	Capt. Sedgwick Pratt	Estimates called for.
Air ship	William Auberlin	Not recommended.
Automatic range finding sight, Rafferty	American Artillery Range Finder and Relocator Co.	Insufficient data.
Three-inch 15-pounder rapid-fire gun, complete, Vickers & Maxim.	Chief of Ordnance	Allotment.
High-explosive shell	J. A. Bremner	Not recommended.
Automobile torpedo	Jno. H. Patrick	Postponed.
Automobile torpedo	John L. Lay	Do.
Projectile for smooth-bore guns	Weaver & Leedy	Not recommended.
Bomb-dropping device	James A. Hill	Do.
Smoke-producing shell	Joseph Dister	Do.
Harbor defense	J. M. Case	Do.
Torpedo system	J. A. Bower	Do.
Projectile	C. C. Henley	Do.
Coast defense by petroleum	John Coefield	Do.
Range finding	J. W. Scott	Do.
High-explosive shell	R. J. McKeone	Do.
Smoke-producing shells, suggesting	George F. Cole	Filed.
Flying machine	Charles E. Morgan	Not recommended.
Wireless telegraph	Lieut. Geo. O. Squier	Allotment.
Combination horizontal base and depression position finder.	Board on the Regulation of Seacoast Artillery Fire.	Do.
Revolving rapid-fire 12-inch gun	D. S. Haynes	Not recommended.
Rocket	Charles White	Do.
Range finder	Nicholas Tobin	Do.
Air ship	Martin Braun	Referred to Chief Signal Officer.
Submarine mines, suggestions	T. P. Sleeper	Filed.
Submarine mine	J. J. Rusterholz	Not recommended.
Aerial torpedo	G. H. Stout	Do.
Inventive faculty, offering time and	John Wilde	Filed.
Torpedoes, operation of	A. Osterloh	Not recommended.
Cast-iron projectile	F. Schmidt	Do.
Aerial torpedo	J. A. Murphy	Do.
High-explosive shell	E. L. Manhayfer	Do.
Torpedo system	Wm. F. Brewster	Filed.
Position finder and bomb dropper	Theo. F. Krueger	Not recommended.
Coast defense, projectile for	James A. Hentz	Do.
Revolving turret	Thomas H. Scott	Do.
Air-navigating machine	A. W. Barnard	Referred to Chief Signal Officer.
Automatic loading mechanism for small arms	A. B. Harmon	Not recommended.
Range-finding device	W. G. Caffrey	Do.
Circular floating battery	Thomas L. Sturtevant	Do.
Fort	Chas. La Due	Do.
Shell for throwing inflammable oil	F. L. Seely	Filed.
Coast defense, system of	C. W. Dutton	Referred to Navy Department.
Range finders, emergency	Lieut. I. N. Lewis and Lieut. W. C. Rafferty.	Price to determine selection.
Dirigible torpedo	Richard Lamb	Not recommended.
Automatic loading of small arms	A. B. Harmon	Do.
Conversion of 15-inch smoothbore guns	A. H. Emery	Do.
Joveite, high explosive	Joveite Manufacturing Co.	Adopted as a type.
Searchlights	General Electric Co	Allotment.
Lewis position finder, repair of	Chief of Ordnance	Do.
Installation of photochronograph, expenditure	do	Do.
Long base depression range finder	Lieut. D. W. Ketcham	Not recommended.
Torpedo	James Mackintosh	Do.
Range and azimuth transmitter, Prentiss Clock Co.	Board on Regulation of Seacoast Artillery Fire.	Allotment.

Subjects considered during the year—Continued.

Subject.	Proposed by—	Action.
Gatling cast-steel gun, data relative to mandrelling.	Capt. W. W. Gibson	Filed.
Projectile for smoothbore guns	W. J. Holman	Under consideration.
Dirigible torpedo	J. E. Trimble	Referred to Patent Office.
Seacoast forts, necessary work in, recommendations.	Board on Regulation of Seacoast Artillery Fire.	Referred to the several bureaus.
Torpedo-dropping device	George C. Short	Not recommended.
Ammunition cart	Capt. W. C. Manning	Referred to Chief of Ordnance.
Wire-wound gun, further test	W. E. Woodbridge	Not recommended.
Explosive compounds	T. L. Abbott	Do.
Packing ammunition, method of	F. L. Hagadorn	No action.
Magnetism in warfare	E. H. Ropes	Under consideration.
Overhead torpedo system	Electrical Defense Co	Not recommended.
Ordnance construction	E. J. Spink	Do.
Submarine foundations for forts	A. Blanchard	Do.
Interlocking flange plates for armor	Joseph Kopcsay	Do.
Air-ship propeller	A. G. Cummings	Referred to Chief Signal Officer.
High explosives, letter relative to	Geo. Blackman	Filed.
Device for conveying torpedoes	John A. Ettler	Not recommended.
Range-finding device	Joseph T. Brown	Do.
High-explosive projectile	E. R. Levy, attorney	Do.
Cartridge	James W. McMillan, by E. R. Levy.	Do.
Air ship	Atlantic and Pacific Aerial Navigation Co.	Referred to Chief Signal Officer.
Torpedo defense, system of	Ferdinand Fish	Not recommended.
Projectile, further experiments	Justin Projectile Co	Do.
Railroad battery	Jacob Maumee	Do.
Torpedo system	G. W. Gilmore	Do.
Bomb-dropping device	Andrew E. Veon	Do.
Coast defense by balloons	M. L. S. Buckner	Do.
Submarine mine	Lewis Wolfley	Do.
Dynamite gun, Hicks	E. H. Van Deusen	Do.
Dirigible torpedo	H. P. Wellman	Do.
Air ship	Thomas J. Brown	Referred to Chief Signal Officer.
Range finding, system of	N. Bray	Not recommended.
Projectile	J. J. Moore	Do.
High-explosive shell	E. L. Drake	Do.
Explosive shell	L. H. KeHogg	Do.
Nitroglycerine shell	W. J. Young	Do.
Pneumatic projectile	G. T. Bruckman	Do.
Invention, not described	A. B. Bryant	Do.
Projectile	J. D. Smith	Do.
Projectile, new form	Brewster Phillips	Do.
Blunt-point armor-piercing projectile	W. H. Weddington	Do.
Portable cannon	T. W. Davidson	Do.
Projectile	E. C. Smith	Do.
Dirigible torpedo	John F. Alexander	Do.
Ordnance construction, John Schnepf	F. F. Atkinson	Do.
Multicharge gun	Robert E. Cason	Do.
Multicharge projectile	Hon. W. F. Foote	Do.
Haskell gun for experiment	F. L. Rankin	Do.
Ordnance construction	Joseph West	Do.
Torpedo system	A. T. Keliher	Do.
Projectile	Berg & Wenig	Do.
Rifling cannon, method of	....do	Already in use.
Armor-piercing projectile, experiment	Geo. D. Potter	Not recommended.
Gun for projecting high explosives	F. L. Hall	Do.
Rapid-fire gun	C. J. W. Johnson	Do.
Air ship	Wm. Hugershoff	Referred to Chief Signal Officer.
Invention, not described	E. E. Davis	Not recommended.
Bomb-dropping device	J. S. Axtell	Do.
Rafferty range finder, accuracy of	Board on Regulation of Seacoast Artillery Fire.	Filed.
Joveite, tests of, report	Maj. F. H. Phipps	Do.
Torpedo, dirigible, Sims-Edison	Sims-Dudley Defense Co	Not recommended.
Offer of services as chemist	Charles Stuart Bailey	Do.
Horizontal-base range finder	Lieut. Geo. O. Squier and Prof. A. C. Crehore.	Tested.
Explosive projectile	Arthur J. Padron	Not recommended
Shell filled with gasoline	John Murphy	Do.
Lessening noise in firing cannon	L. W. Edmister	Do.
Powder to incommode enemy	H. H. Edwards	Do.
Noiseless gun	John Thomas	Do.
Projectile	F. E. Austin	Do.
Gasoline shell	H. J. Coon	Do.

Subjects considered during the year—Continued.

Subject.	Proposed by—	Action.
Coast defense	E. F. Atkinson	Not recommended.
Defense by balloons	John W. Phillips	Do.
Torpedo	A. A. Mahon	Do.
Electrically charged projectile	A. M. Barber	Do.
Method of loading dynamite	W. H. Burdett	Do.
Rocket torpedo	Wm. A. Adams	Do.
Lightning ball	R. L. Betts	Do.
Bombshell	H. S. Brooking	Do.
Attachment to scatter bullets	T. J. Suggs	Do.
High-explosive shell	W. O. Journeay	Do.
Shell filled with snuff	Joseph Bard	Do.
Floating fort	T. B. Peacock	Do.
Torpedo	F. P. Shepard, W. O. Brissey	Do.
War machine	C. L. Correll	Do.
Gasoline shell	Wm. R. Elliott	Do.
Projecting dynamite from powder guns	A. E. McIlwain	Do.
Armored fort	C. Mellish	Do.
Revolving turret	P. H. McCall	Do.
Floating fort	Mark Franklin	Do.
Accelerating projectile	G. W. Blankenbeckler	Do.
Gun mounted on car	J. H. Abernethy	Do.
Use of compressed air instead of powder	J. W. Marsey and J. H. Woods.	Do.
Telescopic projectile	W. F. White	Do.
Coast and harbor defense	Henry Bruns	Do.
Inflammable shell	W. E. Duplanty	Do.
Balloons in warfare	M. W. Clement	Do.
Floating battery	Daniel Cook	Do.
Coast defense by burning oil	James H. Reinhardt	Do.
Plan to prevent heating of guns	E. M. Reed	Do.
Device for harbor defense	J. H. Wilkins	Do.
Coast defense by petroleum	A. W. Burnham	Do.
Cable torpedo launch	Richard Giffin	Do.
Oil shell	J. S. Rankin	Do.
Powerful sunglass to burn cities	W. S. Herman	Do.
Sighting rifles by spirit level	E. W. Collins	Do.
Chain shot	Henry Hope	Do.
Armored car	B. F. Smith	Do.
"50-barrel multi-gun"	F. M. Shields	Do.
Range-finding system	S. B. Phifer	Do.
Aerial torpedo	E. C. Colardean	Do.
Coast defense by magnetic currents	James Coker	Do.
Projectile	C. H. Prescott	Do.
Submarine boat	J. M. Case	Do.
Armored car	A. R. Jackson	Do.
Coast defense	Henry H. Lemke	Do.
Four-barrel cannon	Horace A. Manley	Do.
Means to prevent heating of rifles	M. C. Barden	Do.
Steel shield	Michael D. Powers	Do.
Floating mine and torpedo conveyor	Geo. Richardson	Do.
Double-action bullet	Max Cohen	Do.
Armored turrets	P. H. T. Hines	Do.
Projectiles	R. W. Trotter	Do.
Shells charged with prussic acid	F. J. Bruguiere	Do.
Electricity in projectiles	P. L. West	Do.
Harbor defense by pipe line and inflammable oil	G. S. Nutter	Do.
Bomb-dropping device	A. A. Minkler	Do.
Self-propelled armored car	Frank J. Nelson	Do.
Bullets for small arms	John Kauck	Do.
Shells containing cayenne pepper	T. Silcox	Do.
Hollow projectile	Roy Gilman	Do.
Coast defense	W. A. Stidston	Do.
Harbor defense	Joseph Delamar	Do.
Shells filled with cayenne pepper, chloroform, gasoline, etc.	John Elliott	Do.
Torpedo	C. E. Mowre	Do.
Torpedo system	Mrs. N. M. Atwood	Do.
Torpedo tube	P. H. Wedmark	Do.
Gun 300 calibers in length	Wm. B. Felts	Do.
Blunt point armor-piercing projectile	E. J. Calvert	Do.
Shell for firing nitroglycerine	D. M. Clinton	Do.
Shell filled with explosive liquid	A. A. Thompson	Do.
Iron and earth parapet	L. Clark Leftrich	Do.
Projectile for smoothbore guns	C. J. Little	Do.
Shell in which explosive force is formed after impact.	J. H. Donnell	Do.
Observation tower, torpedo, etc	James P. Cosgrove	Do.
Rawhide-wound gun, test of	James E. Lee	Do.
Electrical power for manipulating guns	Chief of Engineers	Allotment.
Shells, method of exploding	Chas. Walker	Not recommended.
Photographic plane table	Josiah Pierce, jr	Allotment.

Subjects considered during the year—Continued.

Subject.	Proposed by—	Action.
Submarine mines, operation of and armor for	Henry Guy Carlton	Not recommended.
Base fuse	Wm. W. Kimball, by J. H. Costello.	Do.
High-explosive shell	Justus Day	Do.
Aerial torpedo, dynamite, and rapid-fire gun	Wm. M. Douglas	Do.
Accelerating projectile	Joseph West	Do.
Nitroglycerine shell	W. J. Young	Do.
Explosive shell	J. E. Schlorff	Do.
Projectile	J. H. Hammer	Do.
Air ship	A. Thomas	Referred to Chief Signal Officer.
Self-propelling vehicle for artillery	R. H. Plass	Not recommended.
Armored turret	M. C. Mengis	Do.
Range and position finder	Wm. A. Norton	Do.
Device to prevent noise when firing cannon	Robert Schindler	Do.
Projectile	J. H. Gibson	Do.
Combustible shell	W. E. Baxter	Do.
Device for firing dynamite	B. Van Caurvenbergh	Do.
Air compressor	C. H. Callahan	Do.
Bomb dropping device	W. W. Bennett	Do.
Subcaliber barrel for Springfield rifles	H. R. Mansfield	Do.
Floating battery	Jacob Roux	Do.
High-explosive shell	J. A. Laycock	Do.
Bicycle with rapid-fire gun	Herman Stelter	Do.
Armored pneumatic tire for bicycles	R. C. Hansell	Do.
Aerial bomb-dropping device	W. C. Vandergrift	Do.
Rocket projectile for high explosives	John S. Passenger	Do.
Projectile	E. J. Short	Do.
Compound shell	W. C. Alexander	Do.
Means of destroying submarine mines	W. T. Mosher	Do.
Dynamite bombs	T. G. Duckworth	Do.
Multicharge projectile	E. E. Brown	Do.
Shell to contain powerful gas	A. T. Cwerdinski	Do.
Converting repeating rifles into rapid-fire guns	James A. Rogers	Do.
High-explosive shell	A. Schumacher	Do.
Shell to contain oil and inflammable cotton balls	Robert L. Barr	Do.
Rapid-fire gun	P. M. Weber	Do.
Breech mechanism for rapid-fire gun	E. C. Ernst	Do.
Metal-piercing projectile	J. Breinig	Do.
Aerial torpedo, modification	George F. Cole	Do.
System of offense by balloons	Elias A. Long	Do.
Method of firing dynamite	A. T. Koopman	Do.
Means of transporting heavy guns	L. J. Germain	Do.
Spring-cushion armor plate, Le Page	Henry Parker	Do.
Subterra torpedo	James S. Schuler	Do.
High-explosive shell	C. de M. Silveira Lobo	Do.
Steel tower for observation purposes	Augustus Smith	Filed.
Fulminate of gold, offer to experiment	John D. Dow	Not recommended.
Air ship	J. C. D. Towson	Do.
High-explosive shell	Hiram Shaver	Do.
Aerial torpedo and fuse, Dana	Norman M. Paull	Do.
Smokeless powders, report	Chief of Ordnance	Filed.
High explosive, resubmitted	Americanite Manufacturing Co.	Adverse action adhered to.
Dirigible torpedo	H. P. Wellman	Not recommended.
Range finder to be attached to gun carriage, Rafferty.	American Artillery Range Finder and Relocator Co.	Do.
Projectile with detachable sabots	W. S. Davis	Do.
Shell filled with hydrogen gas	W. T. Forbes	Do.
Dirigible torpedo	A. Watkins	Do.
Rapid-fire gun	Z. T. Obenshain	Do.
Floating mortar battery	Pneumatic Gun Carriage and Power Co.	Do.
Self-propelled armored car	B. H. Kuhns	Do.
Operating torpedoes, method of	D. H. Mowen	Do.
Projectile, adjustable sight, etc	W. W. Watkins	Do.
High-explosive shell	Wm. E. Pugsley	Do.
"Recoil-operated automatic ordnance"	A. A. McKnight	Do.
Portable steel breastworks	B. D. Crawford	Do.
Four-pointed nonglancing shell	J. M. Craddock	Do.
Smoke-producing shells	I. A. Smith	Do.
Dynamite gun	Alfredo Rosa	Referred to Chief of Ordnance.
Hardened copper, process	C. L. Leiby	Tested and not recommended.
Magnesium to be loaded in shells	Aluminium ünd Magnesium Fabrik.	Postponed.
Double shell for powder and oil	J. A. Le Sueur	Not recommended.
Transmission of power on rays of search light, comments on.	James Coker	Filed.
Aerial torpedo	Carl Klose	Not recommended.

Subjects considered during the year—Continued.

Subject.	Proposed by—	Action.
Rest for small arms	W. E. Pedley	Not recommended.
Photographic return shell	J. H. Wendell	Do.
Dirigible torpedo	A. M. Barber	Do.
Dynamite shell	Theodore Hawkins	Do.
Rapid-fire centrifugal-force gun	H. Hellenga	Do.
Bomb-dropping device	H. L. Dunlap	Do.
Device to prevent cutting of mine cables	Alex. A. Knight	Do.
Compound shell	Henry M. Williams	Do.
Alteration in breech-mechanism of small arms	Ansley H. Fox	Under consideration.
Aerial bomb-dropping device	Geo. W. Mapes	Not recommended.
Offer to sell canal	Florida Coast Line Canal Transportation Co.	Do.
Rapid-fire gun	P. F. Ankrom	Do.
Observation tower	J. G. Weatherly	Do.
Double accelerating projectile	J. T. Mills	Do.
Explosive bombs and projectiles	Valeriano O'Bando	Do.
Breech-loading gun and projectile	J. M. Stone	Do.
High explosive shell	Joseph W. Balet	Do.
Flexible sabot for projectiles	Alfred Tshinkel	Do.
Dynamite gun, 3-inch	Dynamite Ordnance and Armaments Co.	Allotment.
Dynamite gun, 5-inch	Sims-Dudley Defense Co.	Do.
Inflammable composition	R. F. Cooke	Not recommended.
Projectile	Arthur R. Colburn	Do.
Destroying submarine mines, method of	John Quinn	Do.
Projectile	B. F. Averill	Do.
Torpedo operated on cable	F. A. Carmony	Do.
Range finder and submarine boat	Louis S. Tuttle	Do.
Submarine boat and automobile torpedo	Chas. J. Patrick	Do.
Use of quantities of naphtha in harbor defense	Geo. E. Crater	Do.
Handling and firing high explosives, method of	John R. Hamilton	Do.
Multicharge shell	A. M. Peck	Do.
Gasoline shell	J. H. Ware	Do.
Range finder	G. O. Holman	Do.
Magnetizing cannon	C. P. Carlin	Do.
Shot and shell, combined	N. R. Holcomb	Do.
War rafts, plans for	W. H. K. Minnix	Do.
Floating fort	Patrick Duffy, jr.	Do.
Portable shield	Levi Black	Do.
Accelerating rocket projectile	R. C. Lewis	Do.
Mounting guns on tracks	James Davis	Do.
Bell-shaped shield for quick-firing guns	C. B. Jessen	Do.
Double-acting bombshell	A. O. Tannerberg	Do.
Portable shield for light artillery	C. M. Howe	Do.
Shield propelled by engine	F. G. Bennett	Do.
Base fuse	Justus Day	Do.
Taper-bore cannon	John W. Mead	Do.
Balloon to drop dynamite bombs	Henry H. Dingman	Do.
Shell loaded with red pepper	L. B. Couch	Do.
Projectile with inserted steel point	G. H. B. Hooper	Do.
Shells loaded with noxious gas, red pepper, snuff, etc.	Jos. Atkins	Do.
Torpedo tubes mounted on cars	J. A. Miller	Do.
Steel revolving turret	J. H. Kinter	Do.
Bombshell	E. H. Cowan	Do.
Small arms, change in stock	C. G. Hall	Do.
Armored car	J. W. Bernstein	Do.
High-explosive shell	C. L. Melcher	Do.
"Trap shell"	J. A. Hultgren	Do.
Portable breastworks	Z. M. Little	Do.
Multicharge projectile	B. R. Hooker	Do.
Revolving gun shield	C. F. Meyer	Do.
Mine destroyer	C. M. Ingersoll	Do.
Glass projectile	A. G. Heinle	Do.
Plan to electrocute an enemy	G. W. Blakey	Do.
Gasoline shell	Roe & Perry	Do.
Torpedo	W. O. Bramblett	Do.
Armor plate	S. Victor	Do.
Plan for destroying mines by nitroglycerine	Chalmers Prentice	Do.
High-explosive shell	J. A. Carpenter	Do.
Glass-pointed, nigh-explosive shell	M. Jacobs	Do.
Explosive shell	H. D. Van Campen	Do.
Multicharge projectile	Wilkins Stevens	Do.
Magazine attachment for rifle	Wm. M. Crow	Do.
Four-cornered bullet	John Kauck	Do.
Explosive shell	W. T. Pool	Do.
Projectile, with shoulder to prevent penetration	R. T. Yardley	Do.
Catapult for throwing high explosives	Theo. F. Krueger	Do.
Device employing catapult principle	Robert Williams	Do.
Throwing dynamite by springs, etc., method of	G. Jared	Do.
Lever for lifting weights, application of	S. Victor	Do.

Subjects considered during the year—Continued.

Subject.	Proposed by—	Action.
Horizontal base range finder, Squier-Crehore, report on.	Board on Regulation of Sea-coast Artillery Fire.	Filed.
Seven-inch howitzer for high explosives	Hudson Maxim	Specifications called for.
Sectional gun	American Sectional Cannon Co.	Not recommended.
"Eophone"	Frank Della Torre	Do.
Sectional gun	P. Asher	Do.
Shell to contain asphyxiating gas	Johnston & Lewis, attorneys	Do.
Torpedoes, method of operating	C. F. Finlayson	Do.
Mine igniter and signal	Carl Klose	Do.
Multiple-gun construction	M. C. Taylor	Do.
Small arms, alteration in	Edmond Redmond	Do.
Breech mechanism and magazine	E. C. Ernst	Do.
Minimum-recoil carriage and high-explosive shells.	George W. Le Vin	Do.
Subcaliber barrels for small arms	R. M. Towson	Do.
Small arms, change of barrel	E. Whitcomb	Do.
Shell to contain sulphite carbon	Thos. B. Johnson	Do.
Signaling device	S. L. Phillips and Geo. G. Tilden.	Do.
High explosive, "Rex"	Hiram P. Tuttle	Test of approved.
Disappearing carriage	J. A. Howell	Undergoing test.
Shell	P. A. Clemants	Not recommended.
Portable range finder	J. B. Wilson	Do.
Portable gun shield and cannon within cannon.	J. Covel Cary	Do.
Projectile within a shell	W. M. De Loach	Do.
High-explosive shell	J. A. Laycock	Do.
Torpedo, double mortar, etc	E. Friedli	Do.
Method of causing vacuum in dynamite guns	W. W. Priestly	Do.
Petroleum shell	H. G. Dunstan	Do.
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