

NAVAL GUNNERY



INSTRUCTIONS

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GUNNERY INSTRUCTIONS,

SIMPLIFIED

FOR THE

Volunteer Officers of the U. S. Navy;

WITH HINTS TO

EXECUTIVE AND OTHER OFFICERS.

BY

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THIS WORK
IS
RESPECTFULLY DEDICATED
TO THE
ACTING MASTERS AND THE ACTING MASTERS' MATES
OF THE
UNITED STATES NAVY.

PREFACE.

EXECUTIVE Officers and Officers of Divisions, will find this work particularly valuable as a book of reference and advice to them in the performance of the duties of their respective positions.

The disposition of the crew of a man-of-war in every contingency of *battle* is dictated and the duties of each man defined.

Guns, their calibre and weight, the number of men they are entitled to, the stations and duties of each, are all concisely explained.

Wherever there is a departure from the "Ordnance Manual," the change has been suggested by experience

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GUNNERY INSTRUCTIONS.

NOMENCLATURE OF CANNON.

See Figs. 1, 2, 3, 4, 5, 6 and 7.

THE CASCABEL, *A L*, is that part of the gun behind the base-ring, and in general terms, includes the knob, the neck, and the base of the breech; but as the forms, and consequently the nomenclature of the subdivisions of the cascabel, as well as the other parts of the gun, vary in guns of different construction, these minor details are given in the diagrams, and the explanation.

THE BASE OF THE BREECH, *A J*, is a spherical or spheroidal segment in rear of the breech, between the base-ring and the fillet, or commencement of the neck.

THE BASE-RING, *A*, is a projecting band of metal adjoining the base of the breech, and with few exceptions is connected with the body of the gun by a concave moulding, called the curve of the base-ring.

THE BREECH, *a J*, is the mass of solid metal behind the bottom of the bore, extending to the fillet or the commencement of the neck.

In all navy guns of recent construction there are two reinforces, designated respectively as the first and second reinforce.

THE FIRST REINFORCE, *B C*, is the cylindrical part of

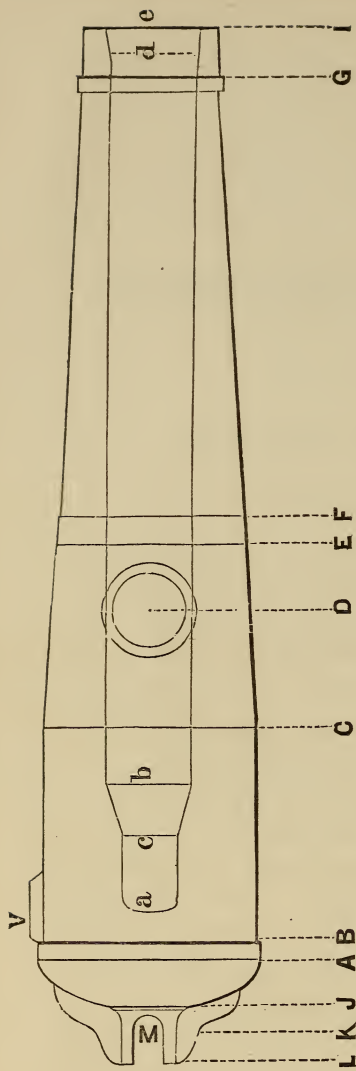


Fig. 1.

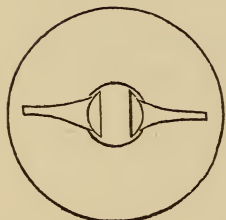


Fig. 2.

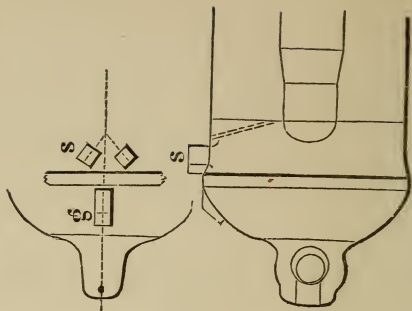


Fig. 3.

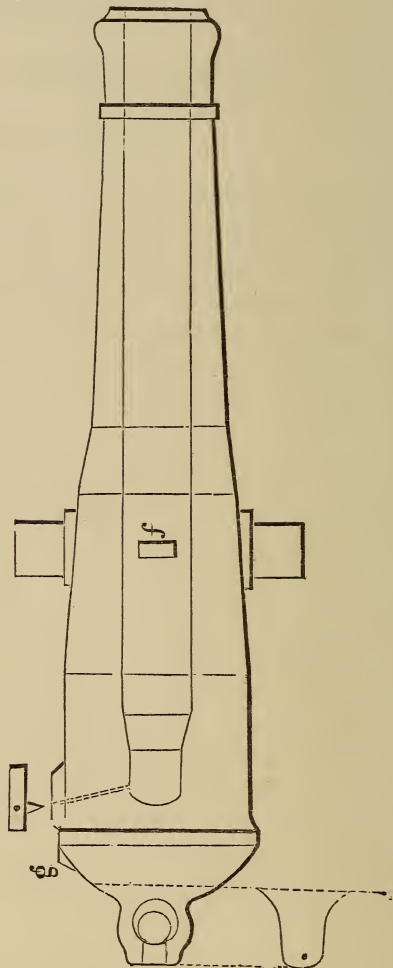


Fig. 4.

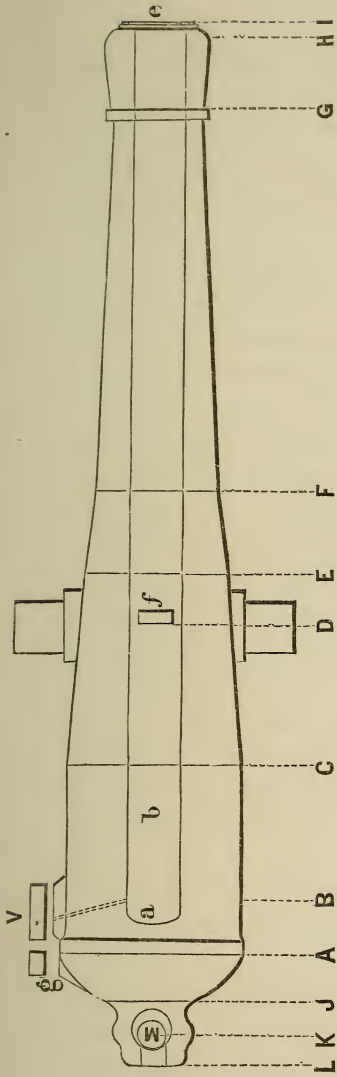


Fig. 5.

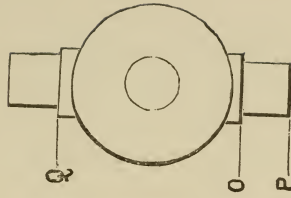


Fig. 6.

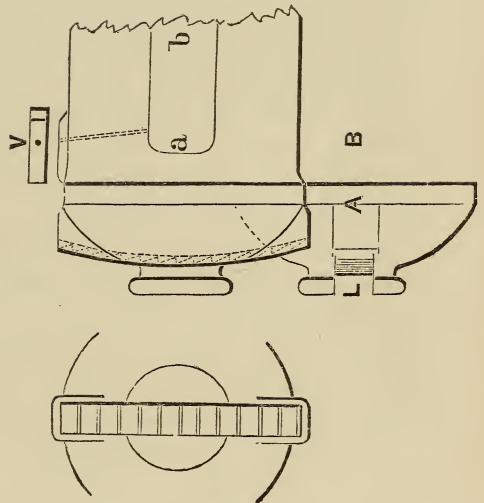


Fig. 7.

the gun in front of the base-ring, and is the thickest part of the body of the gun in front of that ring.

The SECOND REINFORCE, $C E$, is the truncated cone in front of the first reinforce, and extends to the chase, to which it is connected by a concave moulding, $E F$, called the curve of the reinforce.

The CHASE, $F G$, is the conical part of the gun in front of the *second reinforce*, and is banded toward the muzzle by a ring, G , called the chase-ring.

The MUZZLE is that part of the gun comprised between the *chase ring*, G , and the face of the piece, I .

In a few shell guns the form of the muzzle is cylindrical, see Fig. 1, $G I$, in which case the gun is called straight-muzzled. Since 1845, however, all guns, excepting the boat and field howitzers, have been cast with tulip muzzles, the parts of which are composed of the neck, the swell, the fillet, the lip, and the face.

The NECK is the narrowest part of the gun in front of the chase-ring.

The SWELL, H , Fig. 5, the largest part of the gun in front of the neck, and the fillet and lip, the cylindrical and concave mouldings which terminate the swell.

The FACE, e , is the terminating plane, perpendicular to the axis of the bore.

The TRUNNIONS, D , are cylinders, the axes of which are in a line perpendicular to, and in the same plane with, the axis of the bore.

The RIMBASES $Q O$ (Fig. 6, section at the trunnions), are short cylinders uniting the trunnions with the body of the gun. The ends of the rimbases are planes perpendicular to the axis.

The BORE of the piece, $a e$, Fig. 1, includes all the

parts bored out, viz., the cylinder, $b c$, the chamber, $a c$, and the conical or spherical surface, $c b$, connecting them.

All shell guns in the United States navy are chambered, also howitzers and mortars.

The only solid shell gun in the navy that is chambered, is the 32-pounder, of 27 cwt.: this gun, as well as the shell guns of 8-inch calibre, have their chambers cylindrical, and they are united with the large cylinder by a conical surface called the slope, $c b$.

The howitzers, and 9, 10 and 11 inch guns, have conical chambers joined to the cylinder of the bore by a portion of a spherical surface, and are called gomer chambers.

The BOTTOM OF THE BORE, a , is the interior termination of the bore.

In the shell gun represented by Fig. 1, it is a plane united with the sides, in profile, by an arc of a circle, the radius of which is one-fourth of the diameter of the bore at the bottom.

In shell guns of the model described in Fig. 4, the bore at the mouth of the piece is bevelled conically; this part of the bore, d , is then called the flash rim or cup.

The AXIS OF THE BORE is coincident with the axis of the piece.

The LENGTH OF THE GUN, $A I$, is the distance from the rear of the base-ring to the face of the muzzle. The rear of the base-ring is to be understood as the point from which all measurements of length are to be made.

The axis of the vent, V , is in a plane passing through

the axis of the bore, perpendicular to the axis of the trunnions.

The LOCK-PIECE is a block of metal at the outer opening of the vent, to which the lock is attached.

The BREECH-SIGHT MASS is a block of metal on the base of the breech, just in rear of the base-ring, and forms a support to the box in which the breech-sight is made to slide.

The REINFORCE-SIGHT MASS is a block of metal on the second reinforce, just in front of the axis of the trunnions, and forms a base to which the reinforce sight is screwed.

The 64-pounder cannon of 106 cwt. has a ratchett, *R*, Fig. 7, in the base of the breech, which is divided into notches to receive the pawl and elevating lever, by means of which the breech is supported and elevation altered.

NAVAL GUN-CARRIAGES.—NOMENCLATURE.

ORDINARY NAVAL TRUCK-CARRIAGE.

Wooden Parts.

CARRIAGE.

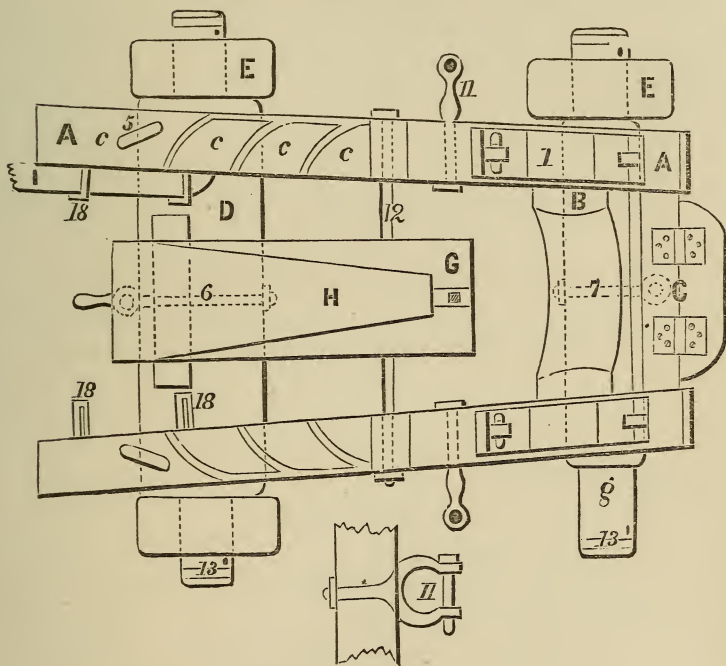


Fig. 8.



Fig. 9.

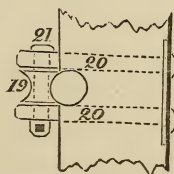


Fig. 10.

A. Brackets of large carriages are made each of two pieces joined by a jog (*a*), and dowelled. The remaining parts of the brackets are the trunnion-holes (*b*), steps (*c*), quarter-rounds (*d*), and arch (*e*).

B. Transom.

C. Breast-piece, in two parts, the inner part fixed, the outer part movable, connected by hinges.

D. Front and rear axle-trees, consisting each of a square body (*f*), and arms (*g*).

E. Front and rear trucks.

F. Dumb trucks.

G. Bed and stool.

H. Quoin.

Implements.

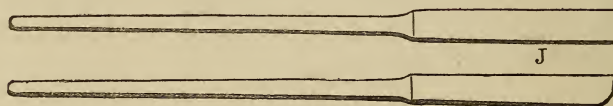


Fig. 11.

J. Handspike.

K. Chocking-quoin.

Metal Parts.

1. Two capsquares.
2. Four capsquares, bolts and two keys.
3. Two bracket bolts.
4. Two rear axle-tree bolts.
5. Two side-tackle eye-bolts.
6. One train-tackle eye-bolt.
7. One transporting eye-bolt.
8. Breast-bolts.
9. Two hinges of breast-pieces.
10. Two transom-bolts (upper and lower).

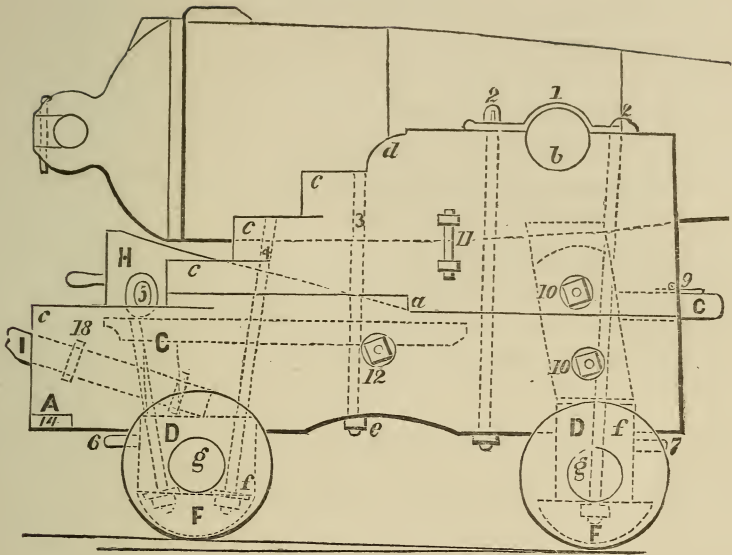


Fig. 12.

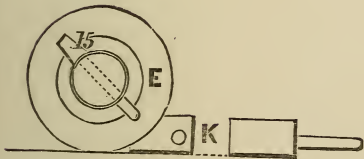
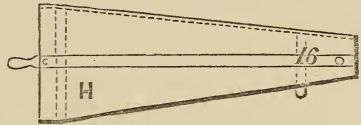
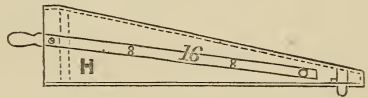


Fig. 13.

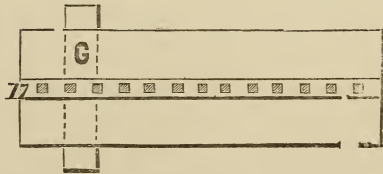


Fig. 14.

11. Two breeching-shackles and pins.
12. Bed-bolt.
13. Four axle-tree bands.
14. Two chafing-plates.
15. Four linchpins and washers.
16. Quoin plate and stop.
17. Ratchett for quoin-stop.
18. Four training-loops.
19. Breeching-thimbles (cast iron).
20. Side shackle-bolts for breeching.
21. Shackle-pin, plates, and keys.

DUTIES OF COMMANDING OFFICER.

THE commanding officer must require that all orders be strictly enforced on board of his vessel, and see that the crew is properly stationed at quarters. He must also see that the crew is well drilled, and exact frequent, short, and spirited exercises.

In order to carry out strictly his instructions, he should occasionally inspect the divisions, exact from his officers a strict adherence to their duties, and see that all the spare implements are at hand.

In so doing he will avoid the mortification of an unfavorable report by the inspecting officers, prior to the vessel being put out of commission.

The commander should be careful that his armament is effective. He must direct his executive officer to see that all articles allowed are in a good state, and properly stowed in the places assigned them. He must have his crew exercised at the pistol, rifle, and sword drill, and battalion drill, when convenient.

He should also cause his boats' crews to be exercised in preparations for embarking, landing, and attacking parties, and cause the launch's crew to be drilled at the howitzer, with a boat and land carriage.

The ordnance stores should be frequently examined and their condition reported to him. The executive officer will cause convenient places to be assigned for

stowage of spare articles which may be required for action, having a number of shot and one shell near the guns on the respective decks. The executive has general superintendence of all stores.

A weekly and monthly report of the expenditure of stores must be made by the yeoman, to the commanding officer, *through the executive officer*. Stores are not to be delivered from the store-room, without the sanction of the executive officer.

OFFICERS OF DIVISIONS.

THEY should be conversant with the duties assigned them, and when instructing their men at the drill, should give their orders in a short, peremptory, commanding tone.

They must make out monthly requisition lists for the clothing of the crew of the division, and also the list of the clothing they have on hand.

They must be particular that the clothing is properly marked with the name and ship's number of the men, and should give the men to understand that all unmarked articles found in their possession, will be considered as stolen property. They should require the men to show their clothing before permitting the articles to be condemned, thereby preventing a useless waste.

The men's bags should be examined once a month.

THE DUTIES OF AN EXECUTIVE OFFICER.

WHEN an executive officer is ordered to take charge of a ship, his first duty, after receiving the crew, is to divide it into two watches, taking care that the watches are equally efficient, and then into messes, and proceed to make out the quarter bills. The government allows a full gun's crew for one side only, and a sufficiency of men for the master's and powder divisions. (See *Appendix*.)

In so doing, he selects the crews for the odd-numbered guns from the *starboard* watch, and for the even-numbered guns from the *port watch*, and the crews for pivot guns, the first part from one watch, and the second part from the other. For instance, if you have two pivot guns, you will select the first part of No. 1 pivot from starboard watch and second part from port watch; and for No. 2 pivot, the first part from port watch and second part from starboard watch.

This will facilitate casting loose at night time, for while one watch are bringing up their hammocks, the other watch are casting loose.

If there is an odd side-gun on board the vessel (for instance, fifteen guns on a side), the fifteenth gun's crew must be selected, the first part from the starboard watch, and the second part from the port watch, in order to cast loose and prepare for action at night, when only one watch is on deck.

The guns' crews, as near as possible, are composed of one-third petty officers and seamen, one-third ordinary seamen, and one-third landsmen and boys.

They must be taken from all parts of the ship, so that in the event of accident in action, the loss may be equally felt.

In numbering the guns, begin forward. The two forward guns on port and starboard side are numbered 1, the next two guns, 2, and so on, in numerical progression. See Fig. 15.

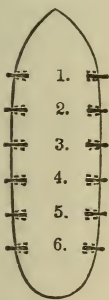


Fig. 15.

In selecting the gun's crew, station the heaviest men at the handspikes, quick, active men for spongers and loaders, strong men for shellmen and shotmen, and men of quick eye and force of character for captains of guns.

A petty officer should, if possible, never be placed in a subordinate position at a gun; still it may be advisable to take a man of an inferior rate, because of his superior qualifications for the position.

Guns are allowed crews, according to their different calibres, *to wit*:

- 11-in. pivot, average weight, 15,700 lbs.; 25 men; charge, 15 lbs.; weight of shell, 135 lbs.
- 10-in. pivot, average weight, 12,000 lbs.; 20 men; charge, 12½ lbs.; weight of shell, 100 lbs.
- 9-in. pivot, average weight, 9,000 lbs.; 17 men; charge, 10 lbs.; weight of shell, 72 lbs.
- 8-in. pivot, average weight, 63 cwt.; 17 men; charge, distant, 9 lbs.; ordinary, 8 lbs.; near, 6 lbs.; weight of shell, 51 lbs.; shot, 64 lbs.

Side-Guns.

- 64-pounder, 106 cwt. ; 16 men and a boy ; charge, distant, 16 lbs. ; ordinary, 12 lbs. ; near, 8 lbs.
- 9-in. side-gun, see 9-in. pivot, for allowance of charge ; 17 men.
- 8-in., 63 cwt. ; 14 men and a boy ; for charge, see 8-in. pivot ; shot, 64 lbs.
- 32-pounder, 61 cwt. ; 14 men and a boy ; charge, distant, 10 lbs. ; ordinary, 8 lbs. ; near, 6 lbs.
- 8-in., 55 cwt. ; 12 men and a boy ; charge, distant, 7 lbs. ; ordinary, 7 lbs. ; near, 6 lbs. ; weight of shot, 64 lbs.
- 32-pounder, 57 cwt. ; 12 men and a boy ; charge, distant, 9 lbs. ; ordinary, 8 lbs. ; near, 6 lbs.
- 32-pounder, 42 cwt. ; 10 men and a boy ; charge, distant, 6 lbs. ; ordinary, 6 lbs. ; near, 4 lbs.
- 32-pounder, 33 cwt. ; 8 men and a boy ; charge, distant, $4\frac{1}{2}$ lbs. ; ordinary, $4\frac{1}{2}$ lbs. ; near, 4 lbs.
- 32-pounder, 27 cwt. ; 6 men and a boy ; charge, distant, 4 lbs. ; ordinary, 4 lbs. ; near, 3 lbs.
- Parrott's rifled guns, as side-guns, or mounted on ordinary carriages, 20-pounder ; weight, 1,795 lbs. ; 6 men and a boy ; charge, $1\frac{3}{4}$ lbs. old cannon powder, or 2 lbs. No. 7 Dupont.

Parrott's Rifled.

On ordinary carriages, or as side-guns, 30-pounder, weight, 3,520 lbs. ; 10 men and a boy ; charge, $2\frac{1}{2}$ lbs. old cannon powder, or $3\frac{1}{4}$ lbs. No. 7 Dupont.

100-pounder, weight 9,688 lbs. ; 16 men and a boy ; charge, 10 lbs. ; shot, 84 lbs. ; shell, 100 lbs.

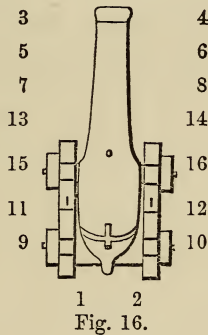
Parrott.

200-pounder, weight 16,000 lbs.; 25 men; charge 16 lbs.; shells, 155 lbs., and 200 lbs.

30-pounder pivot, 12 men and a boy.

20-pounder pivot, 10 men and a boy.

Officers in selecting a gun's crew for rifled guns, must be governed by their positions as side-guns or pivots, allowing the same number of men as are allowed to smooth-bore guns of the same weight.



In stationing a gun's crew, the odd numbers are on the left side of the gun—the even numbers on the right of the gun. The first part of the gun's crew stands on the left of the gun, with the exception of the first sponger, who stands on the right, as the gun is sponged and the load sent home from that side.

The second part of the gun's crew stands on the right of the gun, with the exception of the second loader, who stands on the left side, as the gun is loaded from that side.

The two loaders are stationed next to the muzzle on

the left side, the two spongers next to the muzzle on the right side, the handspike-men abreast of the rear trucks, and the captains at the breech of the gun.

One-half of gun's crew are boarders.

One-quarter " " pikemen, as near as possible.

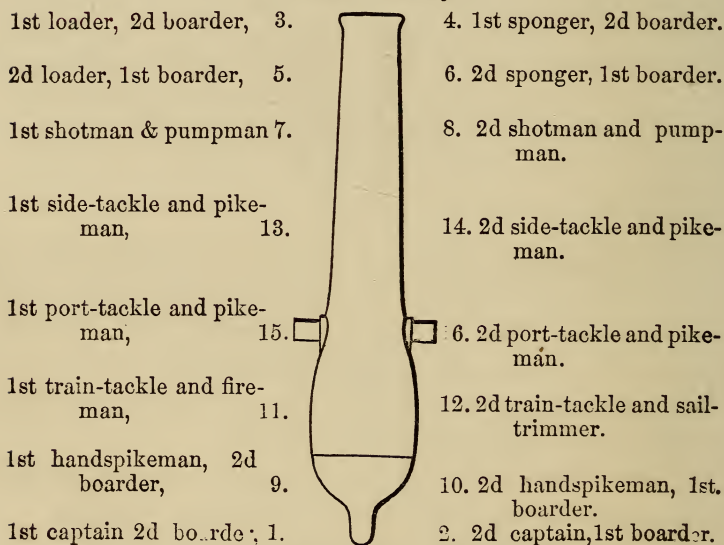
The first boarders are selected from the second part of the gun's crew, and the second boarders from the first part.

The duties of the pikemen are to repel enemy's boarders, and the duties of boarders to board enemy when ordered.

Side Guns.—Stations.

Calibre 9-inch, and 64-pounder, 106 cwt.

16 men and boy.



Powder-boy.

Fig. 17.

To reduce a gun's crew of 16 men and boy to a crew of 14 men and boy, omit the higher numbers (15 and 16) port-tackle men, and No. 10, the second handspike-man becomes a pikeman instead of boarder.

To reduce a gun's crew of 14 men and boy to one of 12 men and boy, omit the higher numbers (13 and 14) side-tackle men, and the first handspike-man, No. 9, becomes pikeman instead of boarder, and first shotman, No. 7, becomes pikeman instead of pump-man.

To reduce a gun's crew of 12 men and a boy to one of 10 men and a boy, omit the higher numbers (11 and 12) train-tackle men, and No. 10, second handspike-man, becomes a train-tackle man and sail-trimmer instead of handspike-man, and second loader, No. 5, a pikeman instead of boarder, and first shotman, No. 7, a fireman instead of pikeman.

To reduce a gun's crew of 10 men and a boy to one of 8 men and a boy, omit the two higher numbers (9 and 10), and the second captain, No. 2, is also a handspike-man. No. 8 becomes a train-tackle man and fireman and sail-trimmer, instead of shotman and pump-man, and the second sponger, No. 6, becomes a pikeman instead of boarder, and No. 7 becomes a pump-man instead of fireman.

To reduce a gun's crew from 8 men and boy to 6 men and boy, omit the two higher numbers (7 and 8), the second captain is also handspike-man and train-tackle man, the second loader is shotman and pump-man, first sponger is pikeman, and second sponger is fireman.

The calls for assembling at Quarters.

The ordinary beat will be the call for inspection.

The ordinary beat, followed by one roll, means exercise at general quarters, without powder.

The ordinary beat, followed by two rolls, action, or general quarters with powder.

At the *beat* for general quarters, the starboard watch will provide and cast loose the starboard guns, and the port watch will provide and cast loose the port guns.

The first part of guns' crews on starboard side, provide and cast loose the odd, and the second part the even numbered guns. The first part performing their respective duties (in casting loose), besides the duties assigned to the second part, and the second part performing their respective duties, besides those assigned to the first part.

The first part of guns' crew on the port side, provide and cast loose the even, and the second part the odd numbered guns. See *Cast Loose and Provide*.

In securing the guns, the same order of distributing the men is to be observed.

When the services are performed, and the luffs of the side and train tackles are chocked, the shifting-men will proceed to the guns commanded by the first captain, unless otherwise ordered by the command, *Man port* (or *starboard*) *battery*!

Shifting-men are all those who are not captains, loaders, or spongers.

In beating to quarters at night-time, the watch on deck will cast loose as commanded by the executive officer, viz : the first part going to their respective guns, and the second part also, on whichever side it may be ;

for instance, if port watch is on deck, the first part will cast loose even guns, and second part the odd guns, and when cast loose they will repair to their respective guns, and the watch coming on deck will repair to their guns.

The call for boarders will be the rattle and verbal order repeated by the officer of the division. On the first call, or order, the first boarders alone will repair on deck. If the call, or order is repeated before the first division of boarders have returned to their guns, the second boarders will repair on deck.

The call for pikemen to repel boarders, will be the gong, or roll of the drum.

At the signal, the pikemen repair on deck.

The call for all boarders and pikemen to repair on deck, will be the springing of the rattle, the beating of the gong, or roll of the drum, and the order.

The call for sail-trimmers will be the passing of the word, and the piping away by the boatswain's mate.

The call for firemen will be the tolling of the bell.

Having stationed the guns' crews, it becomes necessary to station the powder and master's divisions.

The powder division is the most important division of the ship, as upon its efficiency depends quick firing.

If the division is not properly stationed and exercised, it will be an impediment to effective drill. Powder must be furnished in time to provide the divisions when required.

In all ships of war, the powder division is generally intrusted to the youngest line officer, or to subordinate officers. This is owing to the erroneous impression that there is but little glory to be won in passing powder. I say erroneous, as upon the prompt serving of the

division depends quick firing, and also because the crews are directed to fire at the water-line of vessels, and the water-line is about the deck upon which the powder division is stationed.

For stations of *Powder Division*, see *Appendix*.

The following hints will be useful.

Loose powder should never be received on board ship.

Percussion-caps, or any fulminating matter, should never be permitted in a magazine.

Such articles *must* be placed in a dry place, and *under* lock and key.

Fireworks, after removing their primers or caps, if such are used, must be stowed in the passing-boxes on the racks in the passage of the magazine. One chain of passing scuttles is sufficient to supply the guns of vessels commanded by acting masters, or of vessels of which acting masters are the executive officers.

For the chain, there will probably be one man in the magazine (gunner's mate), to deliver cartridges from the tanks; one man in the passage to receive and pass the cartridges through the scuttle in the berth-deck; one man at the passage scuttle *on* the berth-deck, to receive the cartridges and pass them to the screen; one man just outside of the screen, to receive the charges through a flapped hole therein, and put them in the passing-boxes; two or more runner-boys (according to the distance from the hatch), to run on the berth-deck with full passing-boxes from the screen to the scuttle through the grating of the hatch, and back again with the empty boxes to the screen. One man (a very careful one), at the bottom of the canvas shoot to receive the empty boxes, strikes them in an inverted position over the fire-

tub, and inspects them carefully before allowing them to be taken away to be replenished. One man on berth-deck, near the scuttle, under the hatch, to pass up full boxes.

In the small steamers now employed as gunboats, the scuttle for passing full boxes is cut through the grating of the hatch nearest the magazine.

Beside the scuttle for full boxes, there should be a corresponding one, provided with a canvas shoot, for passing the empty boxes below. The grating of the hatch must be covered over with tarpaulings, having flapped holes to pass the boxes through.

In delivering cartridges from the magazine, they are to be passed from the magazine to the berth-deck before they are put into the passing-boxes, which, in time of action, or when exercising with powder, after being once taken out of the magazine, are not on any account allowed to go into it again, or even inside of the screen, during the whole time of such exercise or action. They will be replenished at the screen, but outside of it.

The passing-boxes of the side-guns should be painted black and the pivot guns red or some other color. Generally there are only two calibres on board of the vessels commanded by acting masters.

Empty boxes returned through the shoot are to be landed on wet swabs, and then to be turned upside down, and so struck over a fire-tub, to free them from any loose fire.

A fire-tub nearly filled with water is to be placed near the shoot.

The top of the tub is covered with a copper wire netting.

Shot and shell are whipped up the hatch.

When a magazine is to be opened, the men charged with the duty must take off their shoes and remove all metallic substances from their persons. The magazine dress is a simple worsted shirt reaching to the knees; the shoes have soft soles. The screen that separates the magazine scuttle from the passing scuttle, is of double baize, with a hole to pass the powder through. Before leaving port the magazine is stowed by the gunner of the yard or by the gunner's mate of the vessel if necessary.

Powder-tanks containing charges are to be stowed on their sides, with the lids next to the alleys, and hinges down—the charges for ordinary firing nearest the scuttle.

When tanks are emptied they are to be stowed on the upper shelves, that the powder may be kept as much as possible below the water-line.

The lids of the powder-tanks are painted the same color as the charges they contain, and are marked with the calibre and weight of the gun for which the cartridges are intended.

NOTE:—Color of cartridges, near firing, red; ordinary, blue; distant, white.

The tanks for priming-powder, are marked “priming-powder.”

Coopering *must never* be done in a magazine.

Magazines have light-boxes, through which light is reflected to the passages, to facilitate the passing of powder.

The magazine keys must always be kept in the captain's cabin.

For *Master's Division*, see *Appendix*.

Assembling at Quarters and Clearing for Action.

At the beat to general quarters the wind-sails must be lowered, the air-ports put in, and the hatches leading to the berth-deck covered over by gratings and tarpaulings.

The guns on both sides are cast loose unless otherwise ordered by the executive officer.

The officers of the divisions will repair to their posts, and see that their guns are in perfect fighting condition, and will also see that the following important articles are at hand, viz. :—

One division tub with fresh water.

One spare bed and quoin.

Two spare gun-trucks.

Four spare handspikes.

Two ladles.

Two worms.

Two scrapers.

One bristle sponge.

One wire sponge.

Four wet swabs.

Spare breeching. If guns are on slides, a transporting truck and axle, and a spare pivot-bolt.

The division officers will also take care that the quarter gunner of the division provides the two division boxes marked "Supply" and "Reserve," and that they respectively contain the following articles :—

In Supply-box. Waist-belts for boarders, firemen, sail-trimmers, and pump-men, and thumbstalls for first and second captain of each gun.

The belts for boarders are to be furnished with a frog

for pistol and cutlass, with a cartridge-box and percussion-caps.

The belts for first and second captains, in addition to the above, must also have a box containing fifty primers, fitted to slip on the waist-belt.

The belts for firemen, sail-trimmers, and pump-men, have each a frog for a battle-axe.

In reserve box :

One drill-brace.

Three vent-drills.

One vent-punch.

One gun-lock and string, complete.

Two boring-bitts.

Three priming-wires.

Two thumbstalls.

Four boxes percussion primers.

One box friction primers and spur-tubes.

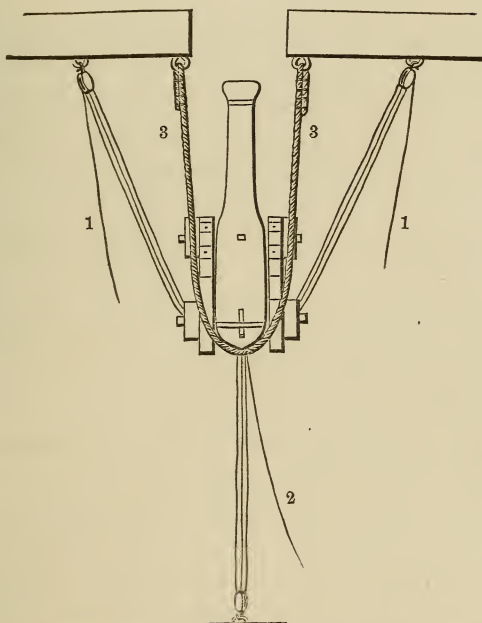
One spare lock-string for each gun.

One fuze-wrench, and the requisite number of tourniquets to be distributed to the men, who will be instructed by the surgeon as to their use.

The master will see that stoppers, preventer-braces, and all other articles needed for securing spars and rigging, are at hand and ready for use.

MANUAL EXERCISE.

EXERCISE of broadside guns on one side only. The guns are supposed to be loaded and run out.



1. Side-tackles. 2. Train-tackles. 3. Breeching.

Fig. 18.

Words of Command.

1st. *Silence! Man the starboard (or port) guns!*

2d. *Cast loose and provide!*

2*

- 3d. *Prime!*
- 4th. *Point!*
- 5th. *Ready, FIRE!*
- 6th. *Serve vent, and sponge!*
- 7th. *Load with cartridge!*
- 8th. *Load with shot (or shell)!*
- 9th. *Run out!*
- 10th. *Secure!*

FIRST COMMAND—*Silence! Man starboard (or port) guns.*

At this order the strictest silence is to be observed. The captains face the port, the men face the gun, and look to the captain for further orders.

SECOND COMMAND—*Cast loose and provide!*

The captains have general supervision. The captains take off the selvagee straps and toggles, place them amidships, and middle the breeching.

The first captain takes off the lock-cover, the second captain the sight-covers, and hands them to the train-tackle men, who place them amidships.

The second captain provides the thumbstalls and waist-belts, with priming-boxes and priming-wires.

The first sponger and first loader take out the upper half-port and pass it to the men on the left of the gun, and place the chocking-quoins near the ship's side.

The handspike-men with their handspikes lower the breech of the gun, the second captain handling the quoin, or if the gun has an elevating screw, the second captain lowers the breech.

The first loader and first sponger push out the lower half-port, the first sponger takes off the muzzle-bag, takes out the tampion and passes them to the men on the right of the gun, who place them amidships.

NOTE.—The handspike men, when raising or lowering the breech, stand between the ship's side and the handspike.

The second sponger and second loader hook the side-tackles to the training-bolts; the second loader places a shot-grommet in the rear to the left of the gun; the second sponger provides the sponge and rammer, which he places to the right of the gun, head amidships, on a damp swab.

The first train-tackle man hooks the double block of the train-tackle to the bolt in the rear of the gun, and the second train-tackle man hooks the single block to the bolt amidships. Where there is only one train-tackle man, he performs both duties.

The shotmen provide one shell and ten shot, a sufficient supply of selvagee, and six junk-wads; and, during the action, supply the gun with shot and shell.

The balance of the gun's crew assist in casting loose. The powder-boy provides an empty passing-box, providing no powder is to be used; otherwise, he is to present himself at the appointed place to receive a full box.

The quarter-gunners provide the supply and reserve boxes, and the fireman places the fire-bucket near at hand.

THIRD COMMAND—*Prime!*

The first captain clears the vent with a priming-wire,

which he inserts into the cartridge, opens the primer-box with the left hand, takes therefrom a primer with his right hand, closing the box with his left, inserts the primer into the vent, pressing the wafer down on the vent-piece with his thumb.

NOTE.—At times the primer tubes are enlarged. In that case, reject them. Never attempt to force a primer into the vent.

FOURTH COMMAND—*Point!*

The captain steps back the length of the lock-string, bringing his eye in range with the sights and the object; the handspike-men take up their handspikes and await the orders of the captain; the gun's crew man the side-tackles, and the first train-tackle man attends the train-tackles; the second captain attends the quoin, or elevating screw, and adjusts the breech-sight bar to the given elevations.

The first captain commands *Right!* or *Left!* for lateral training, and *Lower!* or *Raise!* (meaning the breech), for the depression or elevation.

The officer of the division gives the elevation; the first captain brings the apex of the reinforce-sight, the bottom of the notch in the breech-sight bar, and the object to be struck in range, to coincide. Always aim at the water-line of a vessel. When the exact distance of an object is known, or in a heavy sea, have recourse to direct firing; but in a smooth sea, at an elevation of less than four degrees, it is advisable to adopt ricochet firing, particularly when firing at boat expeditions.

In a heavy sea, the proper time to fire is when the

ship is on the crest of the sea, about to roll toward the object.

NOTE.—If the ship is rolling slowly, the gun must be so laid, after the sight is set for the distance, that this coincidence may be obtained, if possible, at the most favorable part of every roll which the ship makes.

With rifled guns, always fire direct. By direct firing is meant to fire directly at an object, without touching any intervening point. By ricochet firing, is meant to cause the shot to graze on the water short of the object, so that the object may be reached by successive bounds. The sight-bar itself is the best instrument for approximating unknown distances. Fire one shot, then elevate or depress, to correct error of aim, if any.

The thread of the elevating screw is so adjusted, that *ONE complete turn* is equal to one degree of a quadrant.

In exercising the pivot guns, when pointing at objects beyond 1,700 yards, the trunnion-sight is used.

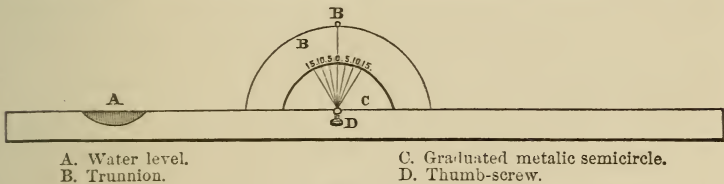


Fig. 19.

The trunnion-sight consists of a bar of wood, with a water-level and a graduated metallic semicircle on its centre. It is secured to the trunnion by a thumb-screw. When the cipher on the trunnion coincides with the cipher of the graduated scale, and the air-bulb of the water-level is visible, the gun is level.

To give the elevation in degrees, adjust the number

of degrees required on the semicircle to the cipher of the trunnion, and elevate or depress until the water-bubble of the level is visible.

In practice, it has been found that there is, in bullets fired with rifled motion, a constant deviation, due to the rotary motion itself, which depends on the manner of cutting the grooves. For example, when the ball rotates from left to right, it will deviate to the right of plane of fire. If the ball rotate from right to left, the deviation will be to the left.

This deviation, termed by the French “*dérivation*,” is translated “*drift*.”

FIFTH COMMAND—*Ready, FIRE!*

At the word ready, the first captain throws up his left hand, as a signal for the gun's crew to drop every thing and stand clear of the recoil. The side-tackles are dropped, the handspikes laid down, the first train-tackle man hauls taut the train-tackle; and when all is ready, the command, *Fire!*

NOTE.—If the gun does not recoil to a taut breeching, the gun's crew, excepting first captain, first loader, and first sponger, man the train-tackle and run in, then level the gun before proceeding to sponge, when the gun is in, “*chock the luff*” of side and train tackles. The first loader and first sponger placing the chocking-quoins obliquely forward of the trucks.

SIXTH COMMAND—*Serve vent, and sponge!*

The first sponger and first loader step inside of the

breeching, taking their respective positions; the first captain steps up to the breech, lays back the hammer and clears the vent with the priming-wire; the second sponger, facing from the gun, passes the sponge to the first sponger, who receives it with the palm of his right hand up and left hand down, inserts it into the bore, seizes the rod at arm's length with his right hand, the left resting on the muzzle.

The first loader, in assisting the first sponger, receives the rod in his left hand (palm up), and his right resting on the muzzle. When the sponge is nearly at the bottom of the bore, the first captain serves the vent with his left thumb, the sponge being turned from the first sponger in order to bring the worm into action, and to clear the bore from all adhering fragments. The sponge is then withdrawn. The first sponger strikes the sponge-head under the muzzle, and presents it to the first loader for inspection. If there are any burning fragments adhering, the first loader extinguishes them with a wet hand-swab, and the sponging is renewed.

When the sponge is withdrawn, the first captain again clears the vent with his priming-wire, and then serves it until the cartridge is home.

The first sponger returns the sponge to the second sponger, and receives from him the rammer.

The second handspike-man examines the sponge-head.

SEVENTH COMMAND—*Load with cartridge!*

The powder-boy, with a passing-box under his left arm, and his right hand on the lid, goes to the first loader, who takes out the cartridge and inserts it into the

bore, seam down, tie out, thrusting it in the length of his left arm ; the first sponger, assisted by the first loader, rams home the cartridge ; the first sponger having his left hand, and the first loader his right, resting on the muzzle ; when they believe the cartridge is home, they drop the rammer and fall clear of the muzzle. The first captain then unserves the vent, and feels with the priming-wire if the cartridge is home. If it is home, he says, *Home* ; if it is not home, he says *Set home*.

When the cartridge is home, the rammer is withdrawn.

NOTE.—The captains of guns should be very careful not to insert the priming-wires into the vent while ramming home the charges, for the priming-wires are liable to be bent, thus spiking the gun.

EIGHTH COMMAND—*Load with shot or shell !*

The shotman provides the shell, the second loader takes it from the box and passes it to first loader, who inserts it into the bore, sabot in and fuze out ; the first sponger takes off the leaden patch and passes it to the captain, by the men on the right of the gun, to show that the priming of the fuze is clear, and also to indicate the number of shells fired. The first sponger, assisted by first loader, sends the shell gently home, and returns the rammer to the second sponger, who places it near the sponge, head amidships. If loading with shot, the second loader will pass the shot from the rack or grommet to the first loader.

In using the percussion projectile for the rifled guns, the cap must not be put on the plunger until its service is required ; but should the cap be put on, place

some cotton between it and the screw-cap. Before using the shell, *be sure* and remove the cotton.

NINTH COMMAND—*Run out!*

The gun's crew man the side-tackles, the handspike-men ship the handspikes in the training-loops, and then assist at the side-tackles, the captains of the gun guiding the gun out to the midship of the port by the handspikes. The first train-tackle man attends the train-tackle to ease out the gun, the first sponger and first loader step outside of the breeching, and having removed the chocking-quoins from forward of the trucks, bear the breeching clear of the gun forward of the trucks. When the gun is out, the captains of the gun unship the handspikes and hand them to the handspike-men, who retain them in hand until the gun is *pointed*, and the command is given, *Ready!*

NOTE.—When guns are mounted on the Marsilly carriage, the roller handspike is used for running in and out and training the gun, as the carriage has no rear truck, and the brackets rest on the deck. In training the *muzzle* to the left, the handle of the handspike should be carried to the left, and the contrary way in training the *muzzle* to the right.

NOTE to *Fifth Command*.—In case the priming should not explode, recourse will be had to friction primers, or to the spur-tubes. In using the friction primer the captain of the gun will raise the twisted wire loop until it is on a line with the spur, place the tube in the vent with the spur toward the muzzle of the gun, and so that the spur will rest on the vent-piece and hook the lanyard fitted

for the purpose, and pull it as though it was a lock-string, but using less force.

When the spur-tube is used, the priming is exposed, and the second captain uses a match.

TENTH COMMAND—*Secure!*

The gun is laid fair in the port, the breech lowered, the double-blocks of side-tackle hooked to eye-bolts at the side of the port, and hauled taut, and the fall hitched around the bracket and expended over its parts, securing it with rope-yarns. The train-tackle men hook the blocks to the bolts on the side of the port, the double block on the left side of the gun and the single block on the right side, expending the parts around the breech, in the jaws of the cascabel, securing the parts with rope-yarns. The breeching is hauled through the jaws of the cascabel on the port side of the gun, and forming with the bite a turn over the breech, and first reinforce, and securing the parts on each side with selvagee and heavers. I should advise the bite of breeching be secured on the port side, and not heave the bite over the breech. These duties are performed by the parties that cast the gun loose, each man performing his respective duties.

Quick Firing.

In order to insure the great advantage of rapid firing when the enemy is near, and consequently when nicety of aim becomes of secondary importance, officers are enjoined to frequently exercise their crews of the unchambered guns, in setting the cartridge and shot home together, with one motion.

To prevent the shot from rolling on the tie of the cartridge, the tie should be shortened as much as possible. The French plan is to cut that part of the bag beyond the tie to two inches, and make it up in the form of a cockade.

THE COMMAND IS—*Sponge and load, with one motion !*

The first loader receives the cartridge from the powder-boy, and inserts it in the gun as directed under *Load with Cartridge*; he also receives the shot or shell from the shotman, and introduces it in the manner as directed under *Load with Shot or Shell*.

As soon as the whole charge has been introduced, the first sponger, assisted by the first loader, sends the two home smartly with the rammer, as in ordinary loading.

When home, run the gun out as quickly as possible, when the captain pricks, primes, points and fires in the usual manner, and as rapidly as is consistent with effective aim.

Shifting Breeching in Action.

COMMAND—*Sponge, load, and shift breeching !*

The gun's crew, consisting of six men and a powder-boy, that being the least number necessary to perform the evolution, and the gun being discharged and run in, the first captain hauls taut the train-tackle and chocks the luff; the first sponger and the first loader place the chocking-quoins obliquely in front of the forward trucks, and proceed to sponge and load in the usual manner.

The second sponger and second loader haul taut the side-tackles and chock the luff, and then unshackle the old breeching and shackle the new, which is brought to the gun by the second captain. The first captain removes the old breeching from, and places and secures the bight of the new breeching in the jaws of the cascabel.

The second captain passes the old breeching amidships, and the men resume their usual duties at the guns. When there are more than six men at the gun, the second sponger and second loader, after securing the side-tackle falls, will assist to load the gun, and the additional men will assist in unshackling the old and shackling the new breeching.

In Pointing, to obtain the greatest Elevation.

COMMAND—*Extreme Elevation!*

The second handspike-man lays the handspike down on deck as a fulcrum on which to rest the other handspike; the first handspike-man puts the butt of his handspike under the dumb truck and bears down on the handle until the rear trucks are clear of the deck.

The men near the trucks, take out the linchpins, take off the washers and unship the trucks.

The handspike-men raise the breech of the gun, the second captain takes out the quoin and lays it on the deck, clear of recoil, and then bears down the breech of the gun on the bed, thus obtaining the greatest *safe* elevation. After the gun is fired, the handspikes are placed as before for fulcrum and lever, the truck shipped, the gun run in, and levelled when in. For extreme de-

pression raise the breech of the gun, and the quoin being turned on its side is shoved well under it.

NOTE.—Experience has taught, that placing the two handspikes under the rear axle dowel on deck, the extreme elevation can be obtained by raising the handspikes, with less force than by previous methods, and much more expeditiously. I would advise the latter method by all means.

NOTE ON LOADING.—No gun should be loaded with more than a single shot or shell, without the express sanction of the *captain of the vessel*, nor should a solid shot be fired from shell guns.

Although double-shotting may be attended with advantages while in very close action, it should not be permitted with guns which have been weakened by any extraordinary service, nor in others without due consideration of the extra strain upon the guns and their equipments, and a comparison of its probable advantages over rapid firing with single shot by simultaneous loading. When a gun is double-shotted, use ordinary charge, when the gun is cool, and near charge when the gun is heated.

Experiments have shown that two solid or hollow round-shot, when fired from 32-pounder shot guns of 46 cwt. and upward, will range sufficiently near together, and have sufficient penetrating power to produce destructive effect upon the broadside of a ship, when not more than 350 yards distant. Beyond that distance the divergence of shot is so great that, even when they retain sufficient penetrating power, their use becomes improper.

In 32-pounders of less than 46 cwt., the use of two

shot against ships, should be limited to distances not exceeding 250 yards.

Never use two shells in shell guns, as there is danger of breaking one or both shells, and injuring the fuses by the concussion of the discharge. Should the captain order two shells to be fired, it should be done at very short distances, and *then only* with a new firing charge.

Grape-shot should not be used against ships of war beyond 150 *yards*, but when the men on a spar-deck are exposed by the heeling of a ship, grape may be used against them at distances varying from 200 to 300 yards.

Against light vessels and boats, grape may be used at about 400 yards, the dispersion of balls at that distance is about 30 yards.

Fighting both Sides.

At the beat to general quarters, the crew proceed to cast loose the guns on both sides, the starboard watch manning the starboard side, and the port watch the port side.

The first part of the guns' crews of the starboard watch, manning the odd-numbered guns on the starboard side, and the second part the even-numbered guns.

The first part of the port watch will man the even-numbered guns on the port side, and the second part the odd-numbered guns forward on the same side.

When the guns are cast loose, the shifting-men will proceed to the guns commanded by their first captains.

The shifting-men are all those who are not captains spongers, and loaders.

Cast loose both sides!

Shifting-men, CHANGE!

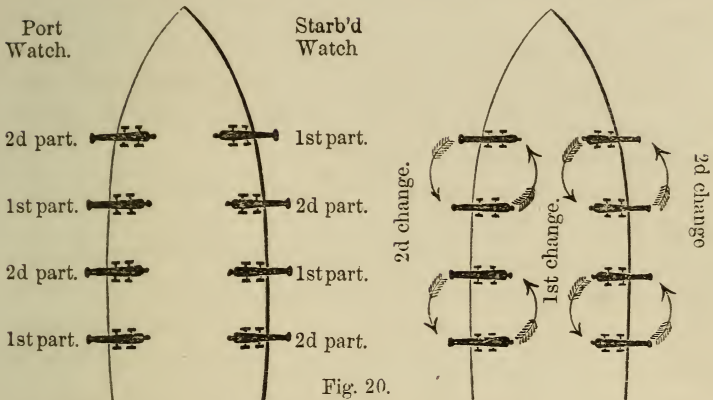


Fig. 20.

In fighting both sides, the guns being loaded and run out, the commands are as follows :*

FIRST COMMAND—*First captains, PRIME!*

SECOND COMMAND—*First captains, POINT!*

THIRD COMMAND—*First captains, Ready, FIRE!*

NOTE.—If the gun does not recoil to a taut breeching, the shifting-men man the train-tackle and run the gun in.

FOURTH COMMAND—*Shifting-men, CHANGE!*

The guns of the first captains having been discharged and run in, the commands are as follows :

First captains, SERVE VENT AND SPONGE! Second captains, PRIME!

First captains, LOAD WITH CARTRIDGE! Second captains, POINT!

First captains, LOAD WITH SHOT (OR SHELL)! Second captains, Ready, FIRE!

* In the *Ordnance Instructions*, the command is given by the executive or officer of the division, *Ready, FIRE!* The command *FIRE!* should be given by the captains of guns, at the most favorable moment for firing, without being subject to orders. It will prevent a useless waste of ammunition.

The gun being run in to a taut breeching, the command is :

Shifting-men, CHANGE !

The shifting-men then proceed to the guns commanded by the first captains, run them out, and assist in pointing, and the command is given :

Second captain, SERVE VENT AND SPONGE ! *First captain*, PRIME ! &c., &c., &c.

The shotmen provide the shot and shell for the guns on the respective sides.

The powder-boys provide the cartridges for the two guns on the respective sides, viz. : for the guns 1 and 2, 3 and 4, &c., &c. ; and on the port side, the powder-boys of the port watch will provide powder for their guns, viz. : 2 and 1, 4 and 3, &c., &c., &c.

In fighting both sides at quick firing, the commands are as follows :

First captains, SPONGE AND LOAD ! *Second captains*, POINT AND FIRE ! *Shifting-men*, CHANGE !

Second captains, SPONGE AND LOAD ! *First captains*, POINT AND FIRE ! *Shifting-men*, CHANGE !

When the commands are thus given, the captains of the guns give the usual commands, *Run out*, *Prime*, *Point* ! &c., &c., &c., executing them as soon as possible.

Another way of fighting both sides is for the two watches to fight their respective guns on their respective sides.

This way of exercising has one advantage: the men are less fatigued.

By the other way, quick firing is obtained, and the guns are thus prevented from becoming heated.

When there is an odd gun on either side, the first part

of the gun's crew will proceed to cast loose the starboard gun, and the second part the port gun.

When the gun is cast loose, the shifting-men will proceed to the starboard gun, which is commanded by the first captain, and at the command, *Shifting-men*, CHANGE! will cross over to the port gun commanded by the second captain, and *vice versa*.

When the guns' crews have become perfect in the performance of their specific duties, they should be exercised at the duties pertaining to the other stations at the gun.

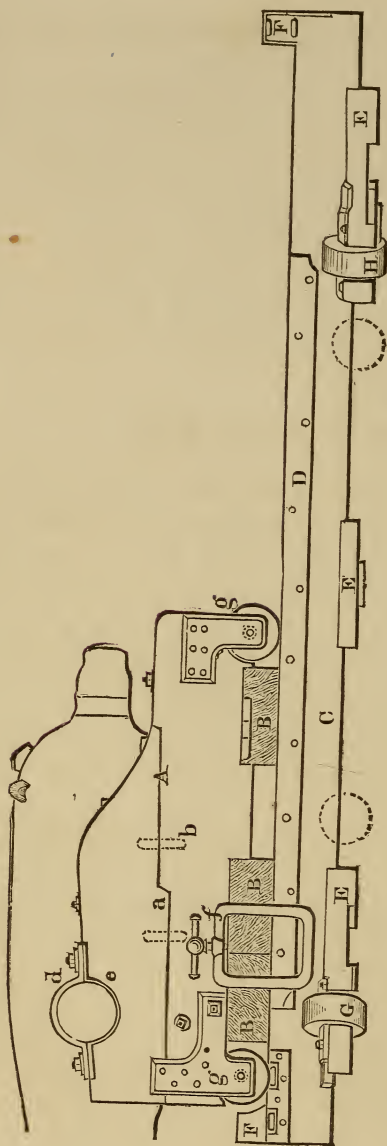
To Load with Hot Shot.

Elevate the gun, to permit the shot to roll down the bore, home. Insert your cartridge as usual, over the cartridge place a dry hay-wad, over the dry hay-wad place a wet hay-wad, or a wad of clay, and *then* ram home. The shot is then brought to the gun, placed in the muzzle, and it will roll home, because of the elevation.

If it is necessary to depress your gun for a close shot, insert a wet hay or a clay wad over the shot. Clay is best if it can be had. It should be potter's clay if possible, and free of gravel.

The wads should be the size of the diameter of the calibre of the gun.

After loading, fire as soon as possible. The charge of powder for hot shot is one-quarter or one-sixth of the weight of the shot. I would advise one-sixth for charge. The charge is thus small for the purpose of giving as slow a velocity as possible to the shot, because with slow velocities the wood is splintered, and thus ignition facilitated.



CARRIAGE.

WOODEN PARTS.

- A. Brackets of two pieces with jog (a), and dowels (b).
 B. Transoms (projecting beyond the rails), front, middle, and rear, jogged into brackets.

METAL PARTS.

- d. Cap-squares.
 e. Trunnion-plates.
 f. Compressor with screw and lever.
 g. Rollers and journal-plates.

WOODEN PARTS.

- C. Rails.
 D. Compressor buttons.
 E. Transoms, front and rear, each in two parts, middle in one part.
 F. Hurters front and rear.

SLIDE.

METAL PARTS.

- G. Shifting-trucks.
 H. Traming-trucks, both with journals and eccentric axles.

Fig. 21.

NOTE ON FIRING.—In practising with shells, as a general approximate rule, the 5-second fuze should not be used with ordinary charges at a distance exceeding three-fourths of a mile, or 1,320 yards; nor should the 10-second fuze be used at a less distance than this, or at a greater distance than 2,300 or 2,400 yards for the 8-inch and 32-pounders, or 2,000 yards for the 9-inch guns, with distant firing charges. The flight of the 15-second fuze, with distant firing charges, from 32-pounders and 8-inch guns, is $1\frac{3}{4}$ miles, or 3,080 yards.

Stations of Pivot Guns.

11-INCH PIVOT GUN—*Stations.*

1st loader and 2d boarder,	3	4—1st sponger and 2d boarder.
2d loader and 1st boarder,	5	6—2d sponger and 1st boarder.
1st front leverman, 2d boarder,	7	8—2d front leverman, 1st do.
1st compressman and pikeman,	13	14—2d compressman and pikeman.
1st shellman and pumpman,	15	16—2d shellman and pumpman.
Tackleman and 2d boarder,	19	18—Tackleman and 1st boarder.
Tackleman and 2d boarder,	21	20—Tackleman and 1st boarder.
Tackleman and pikeman,	23	22—Tackleman and pikeman.
Tackleman,	25	24—Tackleman.
1st rear leverman and pikeman,	9	10—2d rear leverman and pikeman.
1st train leverman and fireman,	11	12—2d train leverman and fireman.
1st captain and 2d boarder,	1	2—2d captain and 1st boarder.
		Powder-man, 17

To reduce a gun's crew from 25 to 20 men, omit the five highest numbers, and No. 20 becomes a pikeman instead of a boarder.

To reduce a gun's crew from 20 men to 17 men, omit the three highest numbers, and no other change is made.

There are new carriages, with one eccentric roller, for pivot guns of light calibre, rifled, introduced into the service. Officers in stationing a crew for a gun thus mounted, must in a measure be guided by their own judgment. They will require from 12 to 14 men.

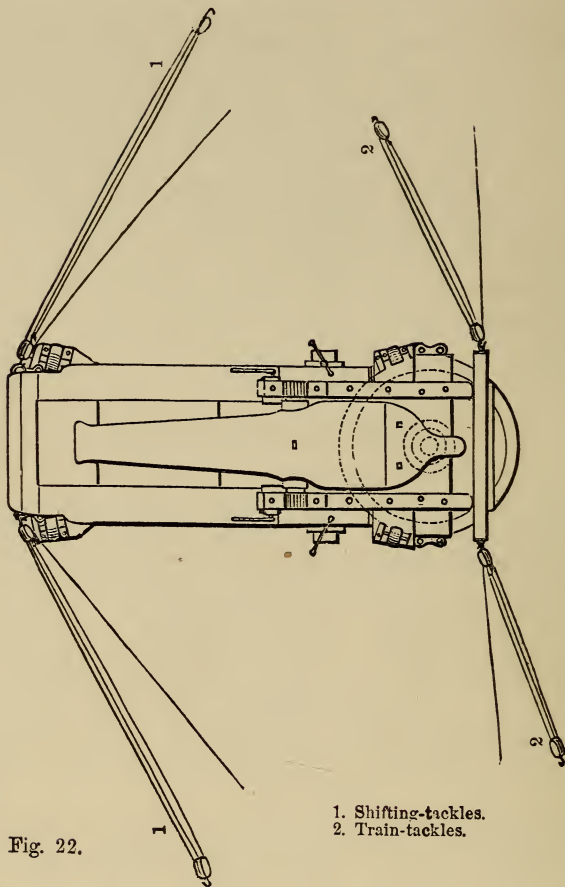


Fig. 22.

1. Shifting-tackles.
2. Train-tackles.

For 14 men, I would suggest the following stations:

1st loader and 2d boarder,	3	4—1st sponger and 2d boarder.
2d loader and 1st boarder,	5	6—2d sponger and 1st boarder.
1st compressman and pikeman,	7	8—2d compressman and pikeman.
1st shellman and pumpman,	13	14—2d shellman and pumpman.
1st leverman and 2d boarder,	9	10—2d leverman, handspike-man and pikeman.
1st train leverman and fireman,	11	12—2d train leverman and fireman.
1st captain, 2d boarder,	1	2—2d captain, 1st boarder.

Powder-boy.

NOTE.—Where there is an elevating screw, No. 10 is relieved from the duty of handspike-man.

Pivot Gun Exercise.

COMMANDS.

- 1st. *Silence!* CAST LOOSE AND PROVIDE!
- 2d. *Run in!* (If the gun is out.)
- 3d. *Shift pivot to the right (or left)!*
- 4th. *Serve vent and sponge!*
- 5th. *Load!*
- 6th. *Run out!*
- 7th. *Prime!*
- 8th. *Point!*
- 9th. *Ready, FIRE!*
- 10th. *Shift to the housing-pivot and secure!*

FIRST COMMAND—*Silence!* CAST LOOSE AND PROVIDE!

The first captain has general supervision, sees the circles clear and swept, the levers properly shipped for bringing the rollers into action, and becketts handy, to retain them in their places while shipped, the compressers in working order. The first captain takes off lock-cover. The second captain takes off sight-covers and lays them clear of the circle, and provides waist-belts and primers.

Nos. 3 and 4 take off muzzle-bag and tompion, and assist in casting loose ;

5 brings the rammer and fills the water-buckets.

6 brings the sponge and wet swabs.

7 and 8 cast loose forward-gun lashings, and ship front-roller levers.

9 and 10 cast loose after-gun lashings, and ship after-roller lever.

11 and 12 cast loose inner tackles, and ship shifting-truck levers.

13 and 14 cast loose outer tackles and sweep the gun circles.

15 and 16 provide shell and assist in removing bulwarks.

17 Provides the passing-box.

18 and 19 cast loose and hook the shifting-tackles to the gun-slide and assist in lowering bulwarks.

20 and 21 cast loose and hook shifting-tackles to deckbolts and also assist in removing bulwarks.

22, 23, 24 and 25 assist in removing bulwarks and casting loose.

SECOND COMMAND.—*Run in!*

NOTE.—The housing or after bolt, is the centre of motion in shifting pivot to the right or left. To facilitate shifting pivot to the right or left, it is necessary to get the weight of the gun over the centre of motion, so as to relieve the shifting-trucks of the friction. The shifting-trucks are the forward trucks of the gun-slide, and are brought into action when shifting pivot. Therefore when the gun is out, the command, *Run in!*

At this command, *Run in!* 13 and 14 will ease up the compressors, 7, 8, 9 and 10 will bring the rollers into action, 3 and 4 will attend the outer tackle, and the balance of the gun's crew, excepting first captain, will man the inner tackles. When the ship is rolling deeply, 5 and 6 will assist at the outer tackles and the after rollers may be thrown out of action.

THIRD COMMAND—*Shift pivot to the right (or left) !*

If the command is, *Shift pivot to the left*, 11 and 12 will bring the shifting-trucks into action, 3 and 4 will unship the forward pivot bolt; after the bolt is unshipped, 4 will attend to lower it into the socket and 3 will attend the chock, 18 will attend the right shifting-tackle, and the balance of the gun's crew, with the exception of the first captain's, will man the left shifting-tackle.

When, *shifting pivot to the right*, 19 will attend the left shifting-tackle, 3 will lower the bolt into the socket, and 4 will attend the chock.

When the gun is pivoted, 18, 19, 20 and 21 will unhook the shifting-tackles, and hook them to the bolt on the rear of the gun-slide, to be used as train-tackles.

FOURTH COMMAND—*Serve vent and sponge !*

Same as in side-guns, No. 6 passing the sponge to No. 4; but No. 20 stands ready to hand the rammer when the sponge is returned, so as to facilitate loading.

FIFTH COMMAND—*Load !* (See *Side-Guns*.)

NOTE.—The rammers of the Dahlgren shell guns are marked to indicate when the loads are home, owing to there being no reduced charges, and the shells are brought to the guns on bearers by the shellmen.

SIXTH COMMAND—*Run out !*

13 and 14 ease up the compressers; 7, 8, 9 and 10 bring the rollers into action; 11 and 12 attend the inner tackles, and the balance of the gun's crew, excepting first

and second captains, man the outer tackles. When the gun is out, 3 and 4 shackle the breeching.

If the ship is rolling deeply, the second captain and quarter gunner will assist at the inner tackles. If rolling very heavily, the after rollers will not be brought into action, and 9 and 10 will assist at inner tackles. When the gun is out, the second captain will unship housing or after bolt. By watching the roll of the ship the guns can be easily worked.

SEVENTH COMMAND—*Prime!* (See *Side-Guns.*)

EIGHTH COMMAND—*Point!*

11 and 12 bring the training or after trucks of the slide into action, the gun's crew, with the exception of 1, 2, 3 and 4, will man the train-tackles on their respective sides, 2 will attend elevating screw, quoin, and sight-bar, while No. 1 points.

NINTH COMMAND—*Ready, FIRE!*

The training-trucks are thrown out of action and the train-tackles are dropped. The compressers *must not be* eased up until the gun is discharged.

TENTH COMMAND—*Shift to housing-bolt and secure!*

(3 and 4 will unshackle the breeching.)

Get the rear of the carriage over the socket for the housing-bolt; insert the bolt, manning your shifting-tackles right or left as necessity requires. Run in, and when your gun is fore and aft, ship your forward pivot bolt and secure.

The tackles and lashings are hauled taut and secured by the same numbers as cast them loose, and the bulwarks are secured by those who unshipped them. The levers are laid aside or pinned back, the rollers being out of action, and compressers screwed down.

Precaution in Loading Shells.

Whenever it shall be necessary to load and fuze shell on board ship—a properly secured place being first prepared, as directed by the captain—the shells being stripped and sabotted, are to be examined to see that they are clean, both inside and out, and thoroughly dry. The prescribed charge of powder is next to be poured into them, through a proper funnel; any grains of it which may remain sticking to the thread of the bouching are to be brushed away carefully, and then, after putting a light coat of lacquer for small arms on this thread and on that of the fuze, the latter is to be screwed in carefully with the fuze-wrench. The lacquer should be of the consistency of cream, and when, from evaporation, it becomes too stiff, should be thinned by adding more spirits of turpentine.

In emptying shell they are to be handled carefully, and placed on a bench with a hole in to receive and support the inverted shell. A wooden vessel placed below will receive the powder. Should the powder have become caked, so as not to be easily removed from the shell, it is to be drowned and removed by washing out the shell.

Charge of powder for shell, as follows :

	32 pd'r. lbs.	xr-in. lbs.	x-in. lbs.	ix-in. lbs.	viii-in.	Boat Howitzers. 24 pd'r. 12 pd'r.
Bursting charge	0.90	6.00	4.00	3.00	1.85	1.00 0.5
Blowing charge	0.25	0.25	0.25	0.25	0.25	

Throwing Guns Overboard.

The gun's crew being at quarters, remove the pin and chock from the cascabel, into the jaws of which place a selvagee strap ; hook the double block of the train-tackle into the bolt over the port, and the single block into the selvagee strap ; remove the cap-squares and place a round block of wood on the side of the port, high enough to let chase bear on it when slightly depressed ; raise the breech as much as possible without lifting the gun out of the carriage ; man well the train-tackle, have the handspike-men ready to assist in raising the breech, and if the vessel is not rolling it will be well to have additional handspikes under the rear of the carriage to lift it also, so as to give free egress to the gun ; all being ready, give the order, *All together ! Launch !*

In a gale of wind, advantage should be taken of a favorable roll to give the order, that the action of the sea and the men at the gun should be simultaneous. If the guns are to be thrown overboard for the purpose of lightening a ship which is aground, they must be buoyed, and care taken that each buoy-rope is of a proper length and strong enough to weigh the gun. The buoy must have sufficient buoyancy to float the rope.

To transport Guns from Side to Side.

The first part of a gun's crew, if of the starboard watch, will prepare the odd gun on the starboard side, and the second part the odd gun on the port side.

The first part of the port watch, will prepare the even gun on the port side, and the second part the even gun on the starboard side.

For instance, in shifting a gun from port to starboard, the gun's crew on the starboard side will unshackle the breeching, run in, unhook the side-tackles and remove the gun clear of the port, to permit the port gun to be transported and run out. The proper part of the gun's crew on the port side, will unshackle the breeching, run in and unhook the side-tackles, and by using one hand-spike under the bracket of the carriage and the other in the muzzle of the gun, a proper slew or direction can be obtained.

To haul the gun ahead, hook the train-tackle (double block) to the forward bolt of the gun-carriage and the single block to the most convenient bolt in the deck. Use the chocking-quoins for checking the gun in case the ship is rolling. An intelligent officer can readily see how to dispose of his men to the best advantage.

To unspike Guns.

If the spike is not screwed or clinched in, and the bore not impeded, put in a charge of powder one-third of the weight of the shot and ram junk-wads over it, laying on the bottom of the bore a piece of wood grooved on the under side, containing a strand of quick-match, by which the fire is communicated to the charge.

Gunnery.

By gunnery, is meant all that relates to the drill of the personnel of a gun, and its skilful and effective use.

Recoil.

By recoil, is meant the reaction upon the bottom of the bore of a force equal to that which drives before it the projectile and the unconsumed portion of the charge itself, for the ignition of the charge is not instantaneous.

Windage.

By windage is meant the difference between the diameter of the projectile, and the bore. Windage impairs the accuracy of firing, and occasions great loss of gas, which diminishes the effect of the charge.

Gunpowder.

Proportions, by regulation, for cannon powder, in United States service:—

Nitre, 75 to 76 per cent.; Charcoal, 15 to 14 per cent.; Sulphur, 10 per cent. By increasing the proportion of nitre, the powder becomes quicker and better fitted for sporting; by increasing the proportion of charcoal, it becomes stronger; but, as this substance absorbs moisture rapidly, powder will not keep so well. Sulphur is not essential to the strength of gunpowder, but it unites the materials, protects them from moisture, and gives to the grains a firmness requisite for transportation.

When powder has been glazed, it resists the effect of the air and transportation better than when unglazed,

but the inflammability of each grain is lessened. Large charges, however, are more rapidly consumed, when glazed, on account of the freedom with which the flame circulates through the interstices, and envelops the whole mass.

Primers.

A quill tube capped by an explosive wafer. The tube is filled with fine grain powder; the wafer is composed of cartridge-paper, enclosing a layer of fulminate of mercury, combined with a small quantity of meal powder. When pressed and perfectly dry, the wafer is coated with uncolored shellac, to preserve it from dampness.

MEAN RANGES

OF U. S. NAVAL GUNS.

The aim is supposed to be taken at the water-line of a ship.

CLASS OF GUN,	82-Pounder.				8-inch Shell Guns.	
	27 cwt.	33 cwt.	42 cwt.	57 cwt.	55 cwt.	63 cwt.
CHARGES,	4 lbs.	4½ lbs.	6 lbs.	9 lbs.	7 lbs.	9 lbs.
Height above Water.	7 feet.	7½ ft.	8½ ft.	9 feet.	7½ ft.	9 feet.
Elevation.	Range.	Range.	Range.	Range.	Range.	Range.
P. B., or level.	250 yds.	287 yds.	313 yds.	360 yds.	283 yds.	330 yds.
1°	545 "	581 "	672 "	760 "	579 "	660 "
2°	800 "	857 "	988 "	1150 "	869 "	960 "
3°	1047 "	1140 "	1278 "	1440 "	1148 "	1270 "
4°	1278 "	1398 "	1505 "	1710 "	1413 "	1540 "
5°	1469 "	1598 "	1756 "	1930 "	1657 "	1770 "
6°	1637 "	1866 "

CLASS OF GUN,	9-inch Shell Gun.	11-inch Shell Gun.
Charge.....	10 lbs.	15 lbs.
Shell	72 "	135 "
Axis of bore above load line.....	10 feet.	10 feet.
ELEVATION.	RANGE.	RANGE.
Level	340 yds.	306 yds.
	700 "	500 "
	900 "	700 "
	1100 "	900 "
	1300 "	1100 "
	1500 "	1300 "
	1700 "	1500 "
	1700 "

HINTS TO AN EXECUTIVE OFFICER.

GIVE your orders on the quarter-deck, avoid doing so at the mess-table or in your apartment.

Do not permit the captain or duties of the ship to be criticised in your presence, as officers should never make remarks as to the captain's mode of doing duty.

A senior officer ought to have professional knowledge, great command of temper, perseverance and patience. He should ever be foremost on trying occasions. His voice and manner should bespeak courage, power, and confidence, as it will never fail to bring forward corresponding exertions from a ship's company.

It often happens that an executive is called during the night. This should not prevent his early rising in the morning, and he should check all slovenliness in the early part of the cruise, and should exact prompt reports as to any chafes and damages.

He should carefully guard against overworking his crew, except in cases of emergency; but he should see that they always have sufficient work to keep a healthy state of body and mind.

Discipline is the proper management of men through a knowledge of their habits and characters, with suavity of manner in the officer in command, and judgment to

insure the full efficiency of the service with the smallest amount of punishment.

The police of the ship ought to be encouraged and well supported in all their duties.

Impress it upon your mind that the good order of your ship depends much upon the proper management of the police.

Any remarks or expressions which have the slightest tendency to create bad feelings between the seamen and the marines, ought to be immediately suppressed. When sentries are not properly supported, they soon become negligent, and much disorder creeps into a ship. This point must be strictly attended to, as serious consequences may arise from sentries not doing their duty strictly.

Beware of "skulkers." They generally begin by trying their strength in opposition to the working petty officers, and if the latter are not upheld, they cannot be expected to do their duty well. Give all complaints, particularly from men, patient investigation, and redress every grievance quickly, but quietly.

Severity of punishment generally defeats its own object, and oftener tends to harden and disgust, than to reclaim the offender. In awarding punishment good character should have its full weight, and a quiet caution to some men will do more good than any amount of punishment. Petty officers should choose their "bumb-boat attendants." Nothing gives an officer more influence over the men, than kindness and attention to the sick. Should an accident happen to the crew, endeavor to be on the spot as soon as possible. Good seamen value and respect officers who have a proper feeling for

their wants. When a man is very ill, be careful that no noise that can possibly be avoided, be permitted in that part of the ship where he is.

Avoid firing guns, and do not permit any noise whatever to be made over the sick-bay, when there are very sick men therein. Air bedding frequently, and select very dry days for so doing, particularly in tropical climates; and never permit clothes of any description to be kept in hammocks, as diseases are frequently engendered by such carelessness. Before piping down clothes, see that they are perfectly dry. Take advantage of rainy days to scrub with fresh water. If any indulgences are required by the petty officers, see them yourself, and grant the request, if practicable. Kindness begets kindness, and the hearts of the crew will be warmed to that officer who pays attention to their wants and comforts. Petty officers should be exempt from all muster of clothes, bags, hammocks, &c.; and as soon as confidence can be placed in them, let them muster the watch.

Permit them certain privileges which will give importance to their rate.

Whenever the petty officers are not supported, the chain of discipline between officers and ship's company is weakened. The captains of the tops mess with the topmen. On rainy days let the men overhaul their bags, or wash clothes.

Examine the sick list daily, so as to provide for important stations in exercising. Give leave frequently to the good men, and refuse it to those who transgress. When a man has been punished, no one on board ought to be permitted to taunt him with such punishment;

having paid the penalty, he should be considered as beginning afresh. If the hope of raising himself again by future good conduct be taken away, he is driven to a disregard of consequences.

When an officer does his own duty cheerfully and conscientiously, it tends much to inspire the crew with the same spirit. Before proceeding to sea, see your spars greased, ropes taut, rigging and sails examined, and that every thing leads clear.

When men are working aloft, do not hail them unnecessarily. Never permit articles to be thrown from aloft, as accidents are liable to occur.

Have a good sea-boat's crew in each watch, composed not only of good boatmen, but of good seamen and good swimmers. Each sea-boat should have several men attached to her, above her proper crew, for emergencies, such as a man overboard.

Always have two boats prepared, breakers of water filled, bread and compasses at hand, and a painter from each boat secured forward.

Never permit her apparel to be taken out, and have the plug near by. A daily inspection of the boats is recommended. Once or twice a month try the life-buoys, and exercise the men at the evolutions of a "Man overboard." In manning boats when towing, see that the boat drops entirely astern of the other towing boats before casting off; accidents are thus avoided. The comfort of officers in harbor depends so much on having a ship's boat at stated times to take them to and from the shore, that nothing but the exigencies of the service should debar them from this advantage. It makes their leave more systematic. When a boat's crew is absent,

have their meals kept for them. The master-at-arms and cooks should be held responsible in carrying out this order. When meal hours have arrived and the boat not returned, the quartermaster will remind the officer of the deck of the fact, who will immediately issue his orders to the master-at-arms. The wash-clothes of boats' crews must be looked out for, and delivered to the master-at-arms until their return. The captain's boat's crew should have no station of importance when the ship is going into or out of port.

When making sail, instead of indulging in such a long string of words, as *Let fall! Sheet home! Haul aboard! Hoist away!* when ready, give the preparatory word *Taut!* and the words, *Make sail!* will bring every thing equally well in its place.

The senior officer should be particular only to relieve the officer of the deck during the morning watches, and at no other time, as it may lessen his authority over the watch officers.

The men should be allowed their bags, to shift their clothes, at meal hours, morning and evening.

Be careful always to wear your proper uniform, and exact the same attention on the part of others; and also exact from all the proper salute; and particularly, when coming on the quarter-deck, salute the officer of the deck.

The berth-deck must be inspected every morning, at about 10 o'clock, and an inspection of the mess-chests and "fixings" once a week, all articles being spread on a mess-cloth on the deck.

In boarding vessels the first relief, or officer of the middle watch, should do the boarding.

Should he be on duty, the second relief, or the officer who follows him in the line of duty, will perform the service. The crew should be inspected at quarters every morning at 9h. 30m., and every evening near sunset. No one should be confined without the authority of the captain. Still it would be well for the captain to permit the executive to confine men for the minor offences. All serious offences should be referred to the commanding officer. There must always be an officer on the quarter-deck.

Galley fires and berth-deck lights must be reported out by the master-at-arms, at 8 P. M. Steerage lights at 9 P. M., and ward-room lights at 10 o'clock, unless permission is granted by the commanding officer to retain them.

Colors (the ship's) are hoisted and hauled down by the flag-ship.

If no flag-ship is at hand, the colors will be hoisted at 9 A. M., during the fall and winter months, and at 8 o'clock during the spring and summer months.

The boats' salutes to the superior officer are regulated by the commanders of the squadrons.

The boat-keepers, on the approach of another boat containing officers, will stand up and touch their caps.

The boat awnings should be spread when the ship's awnings are all out. At sea the gunner's mate will examine the battery, the carpenter's mate sound the pumps, and the boatswain's mate examine the rigging at 7.30 A. M. and 7.30 P. M., and report their condition to the executive officer, who will receive their reports on the quarter-deck.

The keys of all store-rooms are deposited and kept in

the executive officer's room. The keys of the hold and spirit-room are kept in the master's room.

Routine at Sea.

The hammocks of the watch below are piped up at seven bells. Scrub clothes every day except Saturdays and Sundays, and clean decks and bright work as required. Have short and spirited division exercises every day. General exercise twice a week; when the men are well drilled, once a week will do. Inspection at quarters at 9 A. M., and about sunset every day. In the morning inspection the division bright work is also inspected. The bright work is distributed by the officer of the division so as to give each man an equal share.

Scrub hammocks semi-monthly. On Saturday the bags are piped up and the crew permitted to examine, repair, and mark their clothing. On Sundays inspect the divisions at 9 A. M., and muster the men around the capstan at 10 A. M. Any officer may volunteer to read prayers, but it should be optional with the crew whether they attend. On the first Sunday of every month, the Articles of War should be read in presence of officers and crew.

Routine in Port.

Scrub clothes three times a week, and hammocks semi-monthly. On Saturday pipe up the bags and permit the men to examine their clothing. At seven bells, every morning, lower the boats. In the morning all hands are generally called in time to perform the duties of cleaning ship, before breakfast.

Hammocks are piped down at dusk, unless duty prevents it.

All reports are made through the executive to the commanding officer; and, as a general rule, all orders are transmitted by the commander through the executive. Military etiquette exacts it. Discipline is frequently destroyed by commanders endeavoring to make the civil branch of the service independent of the executive. In my judgment there is no better example of an officer's qualifications, than the officer who refuses to his executive the prerogative enjoyed by himself when he was an executive. One of the greatest evils of the service is the levelling system. It leads those who have nominal rank to strive to be independent of the executive. The executive has general superintendance, under the immediate supervision of the commander.

WATCH AND QUARTER BILLS,

FOR SAME CLASS OF VESSELS AS THE U. S. S. HUNTSVILLE.

WATCH BILL.

FORECASTLE.

Ship's Nos.	PORT.			STARBOARD.			Ship's Nos.
	Names.	Rates.	Nos.	Nos.	Names.	Rates.	
	1st Part.	Seaman.....	2	1	1st Part.	Coxswain.....	
		do.	4	3		Seaman.....	
		O. Seaman.....	6	5		Landsman.....	
		Landsman.....	8	7		do.	
	2d Part.	Seaman.....	10	9	2d Part.	Seaman.....	
		O. Seaman.....	12	11		O. Seaman.....	
		do.	14	13		do.	
		Landsman.....	16	15		Landsman.....	

FORE TOP.

	1st Part.	Coxswain.....	18	17	1st Part.	Seaman.....	
		Seaman.....	20	19		do.	
		Landsman.....	22	21		O. Seaman.....	
		do.	24	23		Landsman.....	
	2d Part.	Seaman.....	26	25	2d Part.	Seaman.....	
		O. Seaman.....	28	27		O. Seaman.....	
		do.	30	29		do.	
		Landsman.....	32	31		Landsman.....	

AFTER GUARD.

	1st Part.	Seaman.....	34	33	1st Part.	Seaman.....	
		O. Seaman.....	36	35		O. Seaman.....	
		do.	38	37		do.	
		Landsman.....	40	39		Landsman.....	
		do.	42	41		do.	
		do.	44	43		do.	

GUNNERY INSTRUCTIONS.

AFTER GUARD, *continued.*

PORT.				STARBOARD.			
Ship's Nos.	Names.	Rates.	Nos.	Nos.	Names.	Rates.	Ship's Nos.
	2d Part.	O. Seaman.....	46	45	2d Part.	O. Seaman.....	
		do.	48	47		do.	
		Landsman.....	50	49		Landsman.....	
		do.	52	51		do.	
		do.	54	53		do.	

MESSENGER-BOYS.

	Boy.....	56	55		Boy.....
			57		do.....

PETTY OFFICERS.

	B. Mate.....	58	59		B. Mate.....
	Qr. Gunner....	60	61		Gunner's mate..
	Qr. Master....	62	63		Qr. Master.....

PETTY OFFICERS.

Idlers.

	Carpenter's mate	64	65		Capt. hold.....
	Officers' steward	66	67		Officers' steward
	do.'s cook...	68	69		do. cook...
	Ship's steward..	70	71		Surgeon's stew'd
	Master-at-arms	72	73		Yeoman.....
	Ship's cook.....	74			

MARINES.

	Private.....	76	75		Corporal.....
	do.	78	77		Private.....
	do.	80	79		do.

FIREMEN.

		82	81		
		84	83		
		86	85		
		88	87		
		90	89		
		92	91		

COAL-HEAVERS.

		94	93		
		96	95		
		98	97		
		100	99		

QUARTER BILL OF THE U. S. S. HUNTSVILLE.

QUARTER-DECK.

	Lieutenant Commanding. Executive. Master. Captain's Clerk.
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FIRST DIVISION.

	Acting Master. Master's Mate. Quarter Gunner.
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THIRTY-POUNDER PARROTT.

Ship's Nos.	PORT WATCH.				STARBOARD WATCH.				Ship's Nos.
	Names	Rates.	Stations.	Gun Nos.	Gun Nos.	Stations.	Names	Rates.	
	Seam'n		1st Loader, 2d Boarder, ..	3	4	1st Sponger, 2d Boarder,			Seam'n
	O. Sea.		2d Loader, 1st Boarder, ..	5	6	2d Sponger, 1st Boarder,			O. Sea.
	do.		1st Compress- man & Pike.	7	8	2d Compress- man & Pike.			do.
	Land'n		1st Leverman & Pikeman.	9	10	2d Leverman & Pikeman.			Land'n
	do.		1st Shellman & Fireman.	11	12	2d Shellman & Pumpman..			do.
	B. mate		1st Captain, 2d Boarder,	1	2	2d Captain, 1st Boarder....			Seam'n

Powder-Boy.

TEN-INCH PIVOT.

STARBOARD WATCH.				PORT WATCH.					
	Seam'n		1st Loader, 2d Boarder ...	3	4	1st Sponger, 2d Boarder,			Seam'n
	Seam'n		2d Loader, 1st Boarder...	5	6	2d Sponger, 1st Boarder,			O. Sea.
	O. Sea.		1st Front Leverman, 2d B.	7	8	2d Front Leverman, 1st B.			Land'n
	do.		1st Compress- man & Pike.	13	14	2d Compress- man & Pike.			O. Sea.
	do.		1st Shellman & Pumpman .	15	16	2d Shellman & Pumpman .			do.

GUNNERY INSTRUCTIONS.

TEN-INCH PIVOT, *continued.*

STARBOARD WATCH.					PORT WATCH.				
Ship's Nos.	Names	Rates.	Stations.	Gun Nos.	Gun Nos.	Stations.	Names	Rates.	Ship's Nos.
					18	Tackleman, 1st Boarder, . . .		Land'n	
	O. Sea.		Tackleman, 2d Boarder, . . .	19	20	Tackleman & Pike		do.	
	Land'n		1st Rear Leverman & Pike	9	10	2d Rear Leverman & Pike		do.	
	do.		1st Train Leverman & Fire	11	12	2d Train Leverman & Fire		do.	
	Cox'n,		1st Captain, 2d Boarder,	1	2	2d Captain, 1st Boarder. . . .		Seam'n	

17 Powder-Boy.

SECOND DIVISION.

PORT WATCH.	STARBOARD WATCH.
	Acting Master.
	Master's Mate.

THIRTY-TWO POUNDER OF 57 CWT.

	Seam'n	1st Loader, 2d Boarder. . . .	3	4	1st Sponger, 2d Boarder,		Seam'n
	do.	2d Loader, 1st Boarder. . . .	5	6	2d Sponger, 1st Boarder,		O. Sea.
	O. Sea.	1st Shotman & Pikeman. . . .	7	8	2d Shotman & Pump.		do.
	do.	1st Train tackle & Firer. . . .	11	12	2d Train tackle & Sail-trimmer		Land'n
	Land'n	1st Handspike man & Pike.	9	10	2d Handspike man & Pike.		do.
	Cox.,	1st Captain, 2d Boarder. . . .	1	2	2d Captain, 1st Boarder. . . .		Seam'n

Powder-Boy.

Have an Acting Quarter Gunner for this Division.

MASTER'S DIVISION. (THIRD.)

STATIONS.	RATINGS.
At the wheel.	1 Quarter-Master, 1 Seaman.
On the Forecastle.	1 Boatswain's Mate.
At the Pumps.	Carpenter's Mate.
At the Foremast.	2 Ordinary Seamen.
At the Mainmast.	1 Ordinary Seaman, 1 Landsman.
At the Signals.	1 Quarter-Master.

FOURTH DIVISION.

Powder.

} Master's Mate.

STATIONS.	RATINGS.
In the Magazine.	Gunner's Mate.
In the Shell room.	Yeoman, 1 Landsman.
Receive, whip, shell, and pass up shot.	Ship's Cook, Captain Hold; 4 Landsmen.
Light Magazine and Shell room.	Master-at-arms.
In the passage to receive and pass charges.	Officers' Cook.
In passage scuttle to receive charges thereat and pass them to screen.	Officers' Steward.
Outside of screen to receive charges and put them into passing-box.	Officers' Steward.
At the lower extremity of the canvas shoot, to receive empty boxes, strike them over fire-tub, and deliver them to runner-boys.	Officers' Cook.
To pass up full boxes through the scuttle on deck.	1 Landsman.
On deck at scuttle, to receive and deliver full boxes to powder-boys.	1 Landsman.
To run with full boxes from screen to passing scuttles, and then back again.	3 Landsmen or boys.

PASSING POWDER.

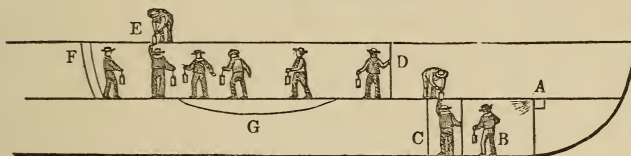


Fig. 23.

A. Light-Box. B. Magazine. C. Magazine Passage. D. Screen. E. Passing Scuttle. F. Canvas Shoot for Empty Boxes. G. Three Runners.

Remarks.

Permit the chief engineer to station his crew in the most convenient way for firing up, going ahead and backing, and for repairing damages. If one watch of firemen and coal-heavers can perform said duties, employ the other watch or the spare hands, as

small-arm men, to act as sharpshooters, and to assist in repelling boarders. The marines are stationed aft, on the quarter-deck, or in the most convenient place for picking off the enemy's men. One or two marines should be stationed to defend the colors.

The landsmen of the powder division are generally selected from ward-room and steerage servants.

At the call for boarders, or pikemen, the executive will order, *Boarders on port or starboard bow!* (or *quarter,*) always mentioning the part of the ship from whence he designs boarding. He also orders, *Pikemen and marines, cover boarders!* or simply, *Pikemen and marines, stand by to repel boarders!* mentioning the part of the ship threatened by the enemy's boarders. The boarders stand near the bulwarks, below the hammock-rail, protected from the enemy's sharpshooters, except when ordered on forecastle or poop.

The pikemen, small-arm men, and marines, form in the rear of the boarders, the pikes resting on the hammock netting, the points just above it. The men who are not pikemen or boarders, will defend the ports, with battle-axes or pikes provided for that purpose. At the beat to quarters, the officer of the powder division will repair to the captain's cabin and obtain the magazine, shells and light-box keys, or he will receive them from the executive officer. The magazine must not be opened until ordered by the executive.

The master-at-arms will light the light in the light-box. The executive repairs on deck to the most convenient part of the ship, to superintend the exercise. When the divisions are provided for and ready for action, the officers commanding will report to the execu-

tive, who in turn reports the ship ready for action, to the commanding officer. As there is but one quarter-gunner on board of vessels of the class of the Huntsville, he will provide for both divisions, unless an acting quarter-gunner provides for second division. The petty officers of the master's division, excepting the quarter-master at the con and the seamen at the wheel, are boarders; the other men are pikemen or small-arm men. On board of the Huntsville they should be made pikemen.

The surgeon will select the most appropriate place for operating, dressing wounds and attending to the wounded.

He will be assisted by his steward. It is optional with the paymaster whether he assists the surgeon or not. If not, he attends to his chest. The executive indicates to the magazine department the charges to be used. When the magazine is open, all fires and lights must be extinguished.

FOR THE SAME CLASS OF VESSELS U. S. S. CURRITUCK.

WATCH BILL.

FORECASTLE.

Ship's Nos.	PORT.			STARBOARD.			Ship's Nos.
	Names.	Ratings.	Nos.	Nos.	Names.	Ratings.	
	1st Part.	Seaman.....	2	1	1st Part.	Seaman.....	
		do.	4	3		do.	
		O. Seaman.....	6	5		O. Seaman.....	
		do.	8	7		Landsman.....	
	2d Part.	Seaman.....	10	9	2d Part.	Seaman.....	
		O. Seaman.....	12	11		O. Seaman.....	
		do.	14	13		Landsman.....	
		Landsman.....	16	15		do.	

GUNNERY INSTRUCTIONS.

AFTER GUARD.

Ship's Nos.	PORT.			STARBOARD.			Ship's Nos.
	Names.	Ratings.	Nos.	Nos.	Names.	Ratings.	
	1st Part.	Seaman.....	18	17	1st Part.	Seaman.....	
		O. Seaman.....	20	19		O. Seaman.....	
		do.	22	21		do.	
		Landsman.....	24	23		Landsman.....	
	2d Part.	Seaman.....	26	25	2d Part.	Seaman.....	
		O. Seaman.....	28	27		O. Seaman.....	
		Landsman.....	30	29		Landsman.....	
		do.	32	31		Boy.....	
		Boy.....	34	33		Boy.....	

PETTY OFFICERS AND ACTING PETTY OFFICERS.

	Quarter-Master.	36	35		Quarter-Master.
	Seaman, Acting	38	37		Gunner's Mate..
	Qr. Gunner...				
	Seaman, Acting	40	39		Seaman, Acting
	Captain Hold.				Boat'n's Mate.

PETTY AND ACTING PETTY OFFICERS.

Idlers.

	Ship's Cook,...	42	41		Master-at-arms.
	Landm's Acting	44	43		Landm's Acting
	Off's Steward,				Officer's Cook,

FIREMEN.

		46	45		
		48	47		
		50	49		

COAL-HEAVERS.

		52	51		
		54	53		

QUARTER BILL OF THE U. S. S. CURRITUCK.

QUARTER-DECK.

	Master Commanding. Executive. Master. Clerk.
--	---

FIRST DIVISION.

	Acting Master. Master's Mate. do. Quarter Gunner.
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TWENTY-POUNDER PARROTT.

On ordinary carriage

Ship's Nos.	Names	Rating.	Stations.	Nos.	Nos.	Stations.	Names	Rating.	Ship's Nos.
		O. Sea.	1st Loader, 2d Boarder....	3	4	1st Sponger, 2d Boarder,		O. Sea.	
		O. Sea.	2d Loader & Pike.....	5	6	2d Sponger & Pikeman...		Land'n	
		Land'n	Shotman and Pumpman..	7	8	Train-tackle'n Sail-Trimmer & Fireman..		Land'n	
		B. mate	1st Captain, 2d Boarder....	1	2	2d Captain, Handspik'n 1st Boarder		Seam'n	

Powder-Boy.

THIRTY-TWO POUNDER OF 57 CWT.

Gun No. 1 and opposite.

	Seam'n	1st Loader, 2d Boarder...	3	4	1st Sponger, 2d Boarder.		Seam'n
	O. Sea.	2d Loader, 1st Boarder...	5	6	2d Sponger, 1st Boarder		O. Sea.
	do.	1st Shotman & Pikeman...	7	8	2d Shotman & Pumpman.		do.
	do.	1st Train-tackle man and Fireman....	11	12	2d Train-tackle man and Sail-trimmer		Land'n
	Land'n	1st H'dspike'n & Pikeman.	9	10	2d H'dspike'n & Pikeman.		do.
	Seam'n	1st Captain, 2d Boarder.	1	2	2d Captain, 1st Boarder		Seam'n

Powder-Boy.

THIRTY-TWO POUNDER OF 57 CWT.

Gun No. 2 and opposite.

Ship's Nos.	Names	Rating.	Stations.	Nos.	Nos.	Stations.	Names	Rating.	Ship's Nos.
		Seam'n	1st Loader, & 2d Boarder.	3	4	1st Sponger, 2d Boarder.		Seam'n	
		do.	2d Loader, & 1st Boarder	5	6	2d Sponger, 1st Boarder		O. Sea.	
		O. Sea.	1st Shotman & Pikeman...	7	8	2d Shotman & Pumpman..		do.	
		do.	1st Train tack-leman and Fireman...	11	12	2d Train Tack-leman and Sail trimmer		Land'n	
		Land'n	1st H'dspike'n & Pikeman	9	10	2d H'dspike'n & Pikeman.		do.	
		Seam'n	1st Captain, 2d Boarder.	1	2	2d Captain, 1st Boarder		Seam'n	

Powder-Boy.

MASTER'S DIVISION.

	Master.
	Master's Mate.
Con.....	Quarter-Master.
Wheel.....	Seaman.
Forecastle.....	Quarter-Master.
Signal and Relieving Tackles.....	Ordinary Seaman.

POWDER DIVISION.

MASTER'S MATE.

Magazine.....	Gunner's Mate.
Shell Room.....	Captain Hold.
To light Magazine.	Master-at-arms.
Magazine Passage.....	Officer's Steward.
To receive Cartridge at Scuttle and pass them to screen.....	} Officers' Steward.
To whip and pass up Shot and Shell.	
Outside Screen to fill Passing-Boxes..	1 Fireman, 1 Coal-Heaver.
Runner-Boy.....	1 Fireman.
Lower extremity of Canvas Shoot...	1 Landsman.
Pass up full boxes to scuttle.....	Ship's Cook.
To receive and deliver full boxes to Powder-Boys.....	1 Landsman.

PIVOT.

ELEVEN-INCH PIVOT.

25 *Men.*

STATIONS.

1st Loader.....	2d Boarder	3	4. 1st Sponger	2d Boarder.
2d do.	1st do.	5	6. 2d do.	1st do.
1st Front Leverman.	2d do.	7	8. 2d Front Leverman.	1st do.
1st Compressman...	Pikeman	13	14. 2d Compressman ..	Pikeman.
1st Shellman.....	Pumpman	15	16. 2d Shellman	Pumpman.
Tackleman.....	2d Boarder	19	18. Tackleman	1st Boarder.
do.	2d do.	21	20. do.	1st do.
do.	Pikeman	23	22. do.	Pikeman.
do.		25	24. do.	
1st Rear Leverman..	Pikeman	9	10. 2d Rear Leverman.	Pikeman.
1st Train do.	Fireman	11	12. 2d Train do.	Fireman.
1st Captain.....	2d Boarder	1	2. 2d Captain	1st Boarder.

17. Powder-Man.

TEN-INCH PIVOT.

20 *Men.*

STATIONS.

1st Loader.....	2d Boarder	3	4. 1st Sponger	2d Boarder.
2d do.	1st do.	5	6. 2d do.	1st do.
1st Front Leverman.	2d Boarder	7	8. 2d Front Leverman	1st do.
1st Compressman...	Pikeman	13	14. 2d Compressman ..	Pikeman.
1st Shellman.....	Pumpman	15	16. 2d Shellman.....	Pumpman.
Tackleman.....	2d Boarder	19	18. Tackleman	1st Boarder.
			20. do.	Pikeman.
1st Rear Leverman..	Pikeman	9	10. 2d Rear Leverman.	do.
1st Train do. ..	Fireman	11	12. 2d Train do.	Fireman.
1st Captain.....	2d Boarder	1	2. 2d Captain	1st Boarder.

17. Powder-Man.

NINE-INCH PIVOT.

17 *Men.*

STATIONS.

1st Loader.....	2d Boarder	3	4. 1st Sponger.....	2d Boarder.
2d do.	1st do.	5	6. 2d do.	1st do.
1st Front Leverman.	2d do.	7	8. 2d Front Leverman	1st do.
1st Compressman...	Pikeman	13	14. 2d Compressman ..	Pikeman.
1st Shellman.....	Pumpman	15	16. 2d Shellman.....	Pumpman.
1st Rear Leverman..	Pikeman	9	10. 2d Rear Leverman.	Pikeman.
1st Train do. ..	Fireman	11	12. 2d Train do.	Fireman.
1st Captain.....	2d Boarder	1	2. 2d Captain	1st Boarder.

17. Powder-Man.

GUNNERY INSTRUCTIONS.

EIGHT-INCH PIVOT.

17 Men.

STATIONS.

1st Loader	2d Boarder	3	4. 1st Sponger	2d Boarder.
2d do.	1st do.	5	6. 2d do.	1st do.
1st Front Leverman.	2d do.	7	8. 2d Front Leverman	1st do.
1st Compressman . . .	Pikeman	13	14. 2d Compressman . .	Pikeman.
1st Shellman	Pumpman	15	16. 2d Shellman	Pumpman.
1st Rear Leverman . .	Pikeman	9	10. 2d Rear Leverman.	Pikeman.
1st Train do.	Fireman	11	12. 2d Train do.	Fireman.
1st Captain	2d Boarder	1	2. 2d Captain	1st Boarder.

17. Powder-Man.

THIRTY-POUNDER PARROTT.

When allowed 14 Men and Boy.

STATIONS.

1st Loader	2d Boarder	3	4. 1st Sponger and 2d Boarder.
2d do.	1st do.	5	6. 2d do. and 1st do.
1st Compressman and Pikeman . .		7	8. 2d Compressman and Pikeman.
1st Shellman and Pikeman		13	14. 2d Shellman and Pumpman.
1st Leverman and 2d Boarder . . .		9	10. 2d Leverman, Handspikeman, and Pikeman.
1st Train Leverman and Fireman		11	12. 2d Train Leverman and Fireman.
1st Captain and 2d Boarder.		1	2. 2d Captain and 1st Boarder.

Powder-Boy.

THIRTY-POUNDER PARROTT.

12 Men and Boy.

STATIONS.

1st Loader and 2d Boarder	3	4. 1st Sponger and 2d Boarder.
2d do and 1st do.	5	6. 2d do. and 1st do.
1st Compressman and Pikeman . .	7	8. 2d Compressman and Pikeman.
1st Leverman and Fireman	9	10. 2d Leverman and Sail Trim- mer.
1st Shellman and Pikeman	11	12. 2d Shellman and Pumpman.
1st Captain and 2d Boarder	1	2. 2d Captain and 1st Boarder.

Powder-Boy.

SIDE-GUN.

SIXTY-FOUR POUNDER, 106 CWT.

16 Men and Boy.

STATIONS.

1st Loader.....	2d Boarder	3	4. 1st Sponger.....	2d Boarder.
2d do.	1st do.	5	6. 2d do.	1st do.
1st Shotman	Pumpman	7	8. 2d Shotman	Pumpman.
1st Side-tackle man..	Pikeman	13	14. 2d Side-tackle man,	Pikeman.
1st Port do. ..	do.	15	16. 2d Port do.	do.
1st Train do. ..	Fireman	11	12. 2d Train do.	Sail-Trimmer.
1st Handspikeman ..	2d Boarder	9	10. 2d Handspikeman	1st Boarder.
1st Captain.....	2d Boarder	1	2. 2d Captain	1st do.

Powder-Boy.

9-inch side-gun, 16 men and boy. Same stations as 64-pounder

EIGHT-INCH SIDE-GUN, 63 CWT.

14 Men and Boy.

STATIONS.

1st Loader	2d Boarder	3	4. 1st Sponger	2d Boarder.
2d do.	1st do.	5	6. 2d do.	1st do.
1st Shotman	Pumpman	7	8. 2d Shotman	Pumpman.
1st Side-tackle man..	Pikeman	13	14. 2d Side-tackle man,	Pikeman.
1st Train do. ..	Fireman	11	12. 2d Train do.	Sail-Trimmer.
1st Handspikeman ..	2d Boarder	9	10. 2d Handspikeman.	Pikeman.
1st Captain	2d do.	1	2. 2d Captain.....	1st Boarder.

Powder-Boy.

32-pounder, 61 cwt.; 14 men and a boy. Same stations as 8-inch side-gun, 63 cwt.

EIGHT-INCH SIDE-GUN, 55 CWT.

12 Men and Boy.

STATIONS.

1st Loader	2d Boarder	3	4. 1st Sponger.....	2d Boarder.
2d do.	1st do.	5	6. 2d do.	1st do.
1st Shotman.....	Pikeman	7	8. 2d Shotman.....	Pumpman.
1st Train-tackle man.	Fireman	11	12. 2d Train-tackle	
			man	Sail-Trimmer.
1st Handspikeman...	Pikeman	9	10. 2d Handspikeman	Pikeman.
1st Captain	2d Boarder	1	2. 2d Captain	1st Boarder.

Powder-Boy.

32-pounder, 57 cwt.; 12 men and boy, same stations as above.

THIRTY-TWO POUNDER, 42 CWT.

10 *Men and Boy.*

STATIONS.

1st Loader.....	2d Boarder	3	4. 1st Sponger.....	2d Boarder.
2d do.....	Pikeman	5	6. 2d do.....	1st do.
1st Shotman.....	Fireman	7	8. 2d Shotman.....	Pumpman.
Handspikeman.....	Pikeman	9	10. Train-tackle man.	Sail-Trimmer.
1st Captain.....	2d Boarder	1	2. 2d Captain.....	1st Boarder.
			Powder-Boy.	

Parrott's rifled gun, 30-pounder, weight, 3,520 lbs.; ten men and a boy
Stations same as above—32-pounder, 33 cwt.

THIRTY-TWO POUNDER, 33 CWT.

8 *Men and Boy.*

STATIONS.

1st Loader.....	2d Boarder	3	4. 1st Sponger.....	2d Boarder.
2d do.....	Pikeman	5	6. 2d do.....	Pikeman.
Shotman.....	Pumpman	7	8. Train-tackle man.	Sail-Trimmer. and Fireman.
1st Captain.....	2d Boarder	1	2. 2d Captain, Hand- spikeman.....	1st Boarder.
			Powder-Boy.	

THIRTY-TWO POUNDER, 27 CWT.

6 *Men and Boy.*

STATIONS.

1st Loader.....	2d Boarder	3	4. 1st Sponger.....	Pikeman.
2d do.....	Shotman and Pumpman	5	6. 2d do.....	Fireman.
1st Captain.....	2d Boarder	1	2. 2d Captain, Handspikeman, Train- tackle man, and 2d Boarder.	
			Powder-Boy.	

Parrott's rifled 20-pounder, weight, 1,795 lbs.; six men and a boy.
Stations same as 32-pounder: 27 cwt.—above.

Parrott's rifled 100-pounder, side-gun, weight, 9,688 lbs.; 16 men and boy. Stations same as 9-inch side-gun.

Parrott's rifled 200-pounder *Pivot*, weight, 16,700 lbs.; 25 men. Stations, same as 11-inch pivot.

TWENTY-POUNDER PARROTT PIVOT.

10 *Men.*

STATIONS.

1st Loader	2d Boarder	3	4. 1st Sponger	2d Boarder.
2d Loader, Compressman, Pike-			6. 2d do. Compress-	
man		5	man	1st Boarder.
1st Shellman and Fireman		7	8. 2d Shellman and Pumpman.	
1st Leverman and Fireman.		9	10. 2d Leverman and Sail-trimmer.	
1st Captain	2d Boarder	1	2. 2d Captain and 1st Boarder.	

FIRE BILL.

FOR SAME CLASS OF VESSELS AS U. S. S. HUNTSVILLE.

THE alarm for fire will be the rapid tolling of the ship's bell, when every one will repair to his station at quarters without arms.

The drums will beat as soon as possible.

The executive will immediately visit that part of the ship where the fire is, and report it to the captain. The officers commanding the gun divisions will cause the firemen to fill their buckets, to be used as occasion requires.

If the ship is at anchor, the first part of the crew of forward pivot will prepare slip ropes and buoys for the cables, and then be in readiness for any other service that may be directed. At sea, the crew of No. 1 side-gun, excepting firemen and pump-men, will assist in clearing away, and hoisting out boats and providing them with provisions. Breakers of water should always be kept ready in the hold for that purpose.

The master's division will lower the windsails, and then assist in leading along the hose, and connecting

it to the force-pump, a petty officer directing the pipe. The second part of the forward pivot gun's crew, assisted by the master's division will man the pumps. The master-at-arms, assisted by a part of the powder division will close the air-port; and the acting carpenter's mate, assisted by a part of the powder division will proceed to cover such hatches as may be directed. The powder division will then assist in breaking out and striking up provisions, and prepare to strike up and throw the shells overboard.

The quartermaster will provide compasses for the boat. The carpenter's mate will open the bilge-cock. The marines, with loaded muskets, will be placed as sentries over the boats, and not permit them to be lowered unless ordered by the executive.

Place a sentry over the spirit-room.

The master-at-arms will release the prisoners that may be confined in the cells or hold.

The surgeon will see the sick removed to a safe place, and be prepared to destroy any inflammable matter in his department.

Should the construction of a raft be ordered, the master will have spare spars launched overboard, and provide the necessary material. The crew of No. 2 side-gun, excepting firemen and pump-men, will accompany the executive, armed with axes and cutlasses, and act as a clearing party, and be prepared to open the hammocks that the blankets may be used for smothering the fire.

The engineer will direct the spare firemen and coal-heavers to rig their hose and pipes.

The gunner's mate will prepare to flood the magazine and shell-room.

The balance of the crew will be distributed in the most advantageous manner.

Every officer is expected to use his best efforts to preserve order and enforce silence.

Three rolls of the drum, return to quarters.

RANGES OF PARROTT'S RIFLE CANNON.

EIGHT-INCH, TWO-HUNDRED POUNDER, WEIGHT, 16,000 LBS.

Elevation.	Charge.	Projectile.	Range.	Time of Flight.
5 $\frac{1}{8}$ °	15 lbs.	shell 155 lbs.	} 2,100 yds.	} 6 $\frac{1}{2}$
5°	16 "	" 155 "		
5 $\frac{1}{2}$ °	16 "	" 200 "		

ONE HUNDRED-POUNDER

Elevation.	Powder.	Charge.	Projectiles.	Range.	Deviation.
10°	Dupont, No. 5.	10 lbs.	shell 100 lbs.	3680 yds.	32.08 feet.
10°	" "	10 "	" 100 "	3450 "	20.05 "
10°	" "	10 "	" 100 "	3532 "	20.52 "
10°	" "	10 "	shot 84 "	3855 "	50.45 "
10°	" "	10 "	" 84 "	3940 "	51.56 "
15°	" "	10 "	shell 100 "	4949 "	28.75 "
15°	" "	10 "	shot 84 "	5480 "	55.78 "
20°	" "	10 "	shell 100 "	5776 "	151.21 "
20°	" "	10 "	" 100 "	5809 "	118.27 "
20°	Hazard, No. 5.	10 "	" 100 "	5780 "	142.86 "
20°	" No. 2, caked	10 "	shot 84 "	6305 "	201.76 "
20°	" " "	10 "	" 84 "	6490 "	207.87 "

TWENTY-POUNDER.

Elevation.	Charge.	Range.	Projectile.	Remarks.
0°	2 lbs. No. 7 powder.	230 yds.	cas'd shot, 19½ lbs.	} axis of gun 6 ft. above water.
1°	2 " " "	560 "	" " 19½ "	
2°	2 " " "	950 "	" " 19½ "	
3 ⁵ / ₈ °	2 " " "	1500 "	shell, 18 ³ / ₄ "	time, 4.75
3 ¹ / ₂ °	2 " Doremus' com- pressed powder. }	1500 "	" 18 ³ / ₄ "	" 4.50
6°	2 " No. 7 powder.	2200 "	" 18 ³ / ₄ "	" 7.00
10°	2 " " "	3300 "	" 18 ³ / ₄ "	" 11.87
10°	2 " Doremus' com- pressed powder. }	3400 "	" 18 ³ / ₄ "	" 11.80
15°	2 " " "	4500 "	" 18 ³ / ₄ "	" 17.20

THIRTY-POUNDER SIEGE-GUN.

Elevation.	Charge.	Range.	Projectile.	Remarks.
3 ¹ / ₂ °	3½ lbs., No. 7 powder.	1500 yds.	shell, 29 lbs.	time of flight, 4.5
5 ¹ / ₄ °	" " "	2200 "	" 29 "	" " 6.82
10°	" " "	3640 "	" 29 "	} average time 12.19
10°	" " "	3649 "	" 29 "	
10°	" " "	3649 "	" 29 "	
10°	" " "	3649 "	" 29 "	
10°	" " "	3664 "	" 29 "	
15°	" " "	4874 "	" 29 "	time of flight, 17.68



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