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# ORDNANCE INSTRUCTIONS

FOR THE

## CONFEDERATE STATES NAVY

RELATING TO THE

PREPARATION OF VESSELS OF WAR FOR BATTLE,

TO THE

DUTIES OF OFFICERS AND OTHERS WHEN AT QUARTERS,

TO

ORDNANCE AND ORDNANCE STORES,

AND TO

GUNNERY.

*THIRD EDITION.*

Published by Order of the Navy Department.



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To Captain John De Camp. U. S. Navy.

From

Wm W. Mills

Nieut: Gov: Florida

Pensacola Bay 30th 1865.

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ORDNANCE INSTRUCTIONS

FOR THE

CONFEDERATE STATES NAVY.





# CHAPTER I.

## GENERAL DUTIES

OF OFFICERS IN RELATION TO ORDNANCE AND GUNNERY,  
AND TO MILITARY EQUIPMENTS AND EXERCISES.

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### CAPTAIN.

1. The CAPTAIN or COMMANDING OFFICER will be careful to require that all the ordnance instructions are strictly enforced on board the vessel under his command; and although particular duties are assigned, and various instructions given to the other officers of the vessel, yet he is to see that the duties are performed, and the instructions obeyed, by the officers to whom they are respectively addressed.

2. As soon as the crew is received on board the vessel, he shall see that it is duly stationed at quarters for battle (*see articles 78 to 103*), and exercised at general quarters, or by divisions, including the powder division (*see articles 104 to 315*), unless other pressing duties shall prevent, until each officer and man is thoroughly instructed in his duties; after which the exercises are to be frequently repeated during the cruise. Exercises which are short and spirited are considered preferable to those which are long and fatiguing. Judicious distinctions and indulgences to those who excel may be found very useful, and are recommended.

When the men have become well acquainted with their duties at the guns *and in passing powder*, or when the general duties of the ship are unusually fatiguing, the divisional exercises may be confined to those belonging to one watch.

3. He will, *at least once* in two months for the first year of the cruise, and once in three months for the remainder thereof, assemble the crew at quarters in the night, without any previous intimation of his intention to do so, and have a general exercise. He will inspect the ship throughout, and cause an entry to be made in the log-book of the length of time required between the *beginning* of the call to quarters and the complete preparation for commencing action.

4. In order to ascertain whether the equipments are complete and their uses understood, as soon after the ship has been commissioned as

circumstances will permit, he will cause at least one round to be fired, with shot or shell, according to the nature of the gun; and, when practicable, at targets at known distances and with the appropriate service charges. (*See article 489.*)

5. He will immediately endeavour to discover whether defects or deficiencies in the armament or equipment exist, and, if any be found, will remedy them as far as in his power consistently with instructions, representing them to the Commandant of the yard of outfit, if near it; and, if important, to the Chief of the Bureau of Ordnance and Hydrography.

6. When practicable, he will, in each quarter of the first year of the cruise, expend in target practice six rounds, and in each succeeding quarter-year, six broadsides.

He will not, however, either for this purpose or for saluting, reduce his supply of ammunition below fifty rounds.

7. In order to accustom the men to the use of loaded shells, they are frequently to be used in preference to shot. For this purpose, however, empty shells, or those that are 'bouched' only, will be carefully fitted, filled, and fuzeed on board, in season, according to the directions (*chap. vii.*), and first expended.

8. The relative proportions of 'distant,' 'ordinary,' and 'near-firing' charges are to be preserved (*see article 490, chap. vii.*) as nearly as practicable, and after action or exercise, deficiencies caused by the expenditure of any particular kind of charge will be made up, without unnecessary delay, from the others on hand.

9. Allowances for practice are not to be exceeded without authority from the Bureau of Ordnance, unless, from the special nature of the service on which vessels may be ordered, the Commanding Officer of a fleet or squadron may direct more frequent firing on board such particular vessels; in which case a copy of the order is to be appended to the periodical returns of expenditure transmitted to the Bureau.

10. The allowances for target-practice are not to be expended in one or two exercises, but are to be divided in such proportions as to allow target-practice once a fortnight, or at least once a month, when practicable; and at least three-fourths of the charges allowed shall be expended in practice at sea, when it can be conveniently done, opportunities being chosen for that purpose under all the circumstances of wind and weather in which vessels of war are liable to engage in battle.

11. When in port, and circumstances will admit, such places are to be selected for practice as are favourable to the recovery of the projectiles; and at such times, when the effect of the bursting charge is not important, a blowing charge may be used in shells, to test the efficiency of the fuze without destroying the shell.

In *practice* the service charges for which the sights are marked are alone to be employed. (*See article 489, chap. vii.*)

Distances within half a mile are preferable for *solid shot*, as best showing the results. Targets of ten feet high by twenty long will afford the means of general comparison, and with the practice at the experimental battery. For *shells* the distances should suit the ranges of their fuzes, or time of burning. (*See article 301.*)

12. The whole crew are to be exercised in the use of the musket, carbine, pistol, and sword, and in firing at a target with small arms, by suitable persons, each division under the superintendence of its respective commanding officer. The company and the battalion drill is recommended as often as convenient opportunities of exercise present themselves.

13. He will cause the boats' crews to be exercised in all the preparations for attacking an enemy, either by land or water, and in the use of 'boat and field howitzers,' and small arms, under all the various circumstances likely to arise in such service, and particularly in embarking and disembarking the 'boat and field' guns and ammunition. (*See chap. iv.*)

14. At the expiration of each quarter he will cause to be prepared, and forward, by the earliest favourable opportunity, to the Bureau of Ordnance and Hydrography, a report of all firing, with or without projectiles, according to the detail given in Appendix C.

15. He will cause frequent and thorough examinations to be made into the condition of the armament, shot, and shells; and will see that care is taken to keep the shot and shell-lockers dry; that the shot and shells stowed therein are clean and free from rust, and, also, that the diameter of shot kept on deck is not increased above the high gauge by injudicious lacquering or painting. Shot of '1st class' are to be preferred when great accuracy of fire is important.

16. He is to take care that especial attention is paid to the fuzes, whether spare or in the shell; and if there be reason to suspect injury from dampness or any other cause, he will have one or more fuzes burned for trial.

17. He will not permit shells to be filled, or their fuzes to be shifted or shortened, without his order; and whenever these operations are to be performed, he will see that a suitable and properly secured place is selected for the purpose. On such occasions, the fires and lights are to be extinguished, and also the further precautions are to be observed, as to the manner of performing the work, contained in the directions for filling and emptying shells. (*See articles 455 to 458, chap. vii.*)

18. He is not to dismount, strike below, or otherwise render unfit for immediate use, any of the guns on board the ship he commands, except imperative necessity should require it for the safety of the vessel, without the express permission of the Secretary of the Navy, or of the Chief of the Bureau of Ordnance, or the written order of the Commander-in-Chief of the squadron to which the vessel belongs. When such order shall be given by the Commander of a squadron, it must state minutely the circumstances which required its issue. Should the Commander of a vessel be obliged to give such an order of his own authority, for the safety of the vessel, the particular circumstances of such necessity are to be immediately entered at large in the log, and in all cases the earliest possible information is to be given to the Commander of the squadron, and to the Secretary of the Navy.

When guns are to be struck below, or when shipped for transportation, he shall cause all the precautions to be taken to guard them from injury, prescribed in article 46 of these instructions, and such others as circumstances require.

19. He is prohibited, under any circumstances, from giving away the arms of any description belonging to the vessels under his command.

20. He will keep the keys of the magazines and shell-rooms, and of the receptacles for percussion caps and primers, and of the cocks for flooding magazines and shell-rooms, in the cabin, where they may be obtained by the Executive Officer in case they should be wanted when the Captain is absent from the vessel, and they are only to be delivered to the Executive Officer, the Officer of the Powder Division, or the Gunner.

21. Before entering any friendly port, he will cause every species of projectile to be drawn from the guns.

22. He will not permit friction-matches to be on board under any circumstances.

## EXECUTIVE OFFICER.

23. The SENIOR LIEUTENANT, or the COMMANDER, when acting as Executive Officer, will, under the orders and direction of the Captain, ascertain that all the ordnance stores and equipments ordered or allowed for the vessel, are received on board in good order, that they are properly distributed and stowed, that they are only used or expended according to directions from proper authority, and that they are duly accounted for according to the directions and forms which are or may be prescribed by the Bureau of Ordnance and Hydrography.

24. He will be particularly attentive to the state of the batteries, small arms, magazines, shell-rooms and shot-lockers; to the passages leading to and scuttles connected with them, and take care that they are kept clear and ready for action.

25. He will cause convenient places to be assigned for the stowage of spare articles which may be required in action, and see that shot for at least twenty broadsides for shot-guns, and one shell for each shell-gun, are always in readiness upon the respective decks, unless directed to be temporarily removed for some special cause.

26. When salutes are to be fired he is either personally to examine or to direct one of the Officers Commanding a Division to examine and ascertain that the necessary preparations are made and precautions taken to avoid accidents. The guns, if loaded, are to be drawn, wormed, sponged, and reloaded. They are, *nevertheless*, to be so laid as to prevent the possibility of mischief even in the contingency of a shot or wad being left in any of them. Wads are not to be used in firing salutes, nor are port-fires. The guns are to be fired either with percussion or friction primers, as the Captain may prefer. These, when in good order, are not apt to fail if the lock-string be properly pulled; as, however, a slight deterioration may interfere with the regularity of salutes, the precaution of dropping a few grains of gunpowder into the vent will be found effectual.

Guns of the lowest calibre and class, when sufficient in number, are to be used for saluting; and no heavier than their *near-firing* charge is to be used. (*See article 489, chap. vii.*) *Two boats' howitzers* will be found quite sufficient for saluting from vessels armed with a few guns of large calibre only. 'Saluting powder' to be used in all guns for this purpose, in preference to 'service powder.'

27. In large vessels he will cause a cot with a spare sacking-bottom, or such other apparatus as may be approved by the Surgeon, to be prepared and kept for the purpose of lowering the wounded to the orlop or berth deck.

28. Before the powder is received on board, he, with the Gunner, will carefully inspect the magazines and shell-rooms, their passages and light-rooms, and have them thoroughly cleaned, dried, and aired, and will see that the pipes and stop-cocks, and everything connected with flooding the magazines, are in order; the lighting apparatus cleaned and dried, and particularly that the glasses for transmitting light into the magazines and shell-rooms are clear and without fracture. (*See chap. vi.*)

#### OFFICERS IN CHARGE OF DIVISIONS.

29. OFFICERS IN CHARGE OF DIVISIONS OF GUNS are required to make themselves thoroughly conversant with every particular relating to the equipment, exercise, and management of the guns, as set forth in these instructions, and especially to familiarise themselves with the charges prescribed and the ranges given in the tables; the principles and practice of pointing guns under all circumstances, and also with every precaution connected with the use of shells.

30. They are carefully to inspect their divisions when called to quarters for inspection or exercise, and see that everything is, *at all times*, in place, and in order for service, and in case of discovering any defect or deficiency will report it immediately to the Executive Officer.

31. They will be careful, when instructing the men at quarters, to require a strict adherence to the prescribed mode of performing their duties, and to all the details of execution, in order that general uniformity, and the efficiency dependent on it, may be secured. When the individuals of the guns' crews have become expert in the performance of their particular duties, then each man shall be instructed, by the officer of his division, until he shall have become acquainted with the special duties of every station at the gun. (*See chapter iii. article 205.*)

32. They are frequently to examine the guns and all the iron work of the carriages, and see that they are kept free from rust, and especially the eccentric axles, elevating screws, and pivot bolts, which must be protected by tallow or other similar coating. The cap-squares must be frequently removed, the guns lifted, and the trunnions cleaned.

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Once a quarter *at least* all the connecting bolts, such as cap-square, bracket, breast, and transom bolts, are to be tightened if they require it. To do this it is necessary, after lifting the gun, to turn the carriage bottom up. The threads of the screws of the bolts above named must be kept coated habitually with the 'lacker for small arms.'

33. The OFFICER OF THE POWDER DIVISION will, in like manner, carefully instruct and drill his men, and test the efficiency of the arrangements for passing powder, shot, and shell, in order to insure a full and equal supply of each to all parts of the batteries, without the danger of misdirection or of accumulations in any part thereof. To this end blocks of proper shapes and colours may be provided in the appropriate tanks of the magazines, and passed up instead of powder, when that is not used. These are to be counted and reported by the Officers of the Gun Divisions, and will enable the Executive Officer, and the Officers of the Powder Division, to detect and remedy defects or deficiencies in the system or its details, and to be sure that the right men are in the right places.

#### MASTER.

34. The MASTER will see that the number of fighting-stoppers, preventer-braces, slings for yards and gaffs, relieving-tackles, and other articles in his division, which are directed, are all fitted and ready for use in action. At general quarters his division must be regularly drilled in fishing masts and spars, stoppering and knotting rigging, trimming sails, &c.

#### CHIEF ENGINEER.

35. The CHIEF ENGINEER will ascertain that all the tools and implements necessary for the prompt and effectual repair of injuries, which the engine and its dependencies may receive in action, are received on board and placed at hand.

#### GUNNER.

36. The GUNNER shall attend personally to the reception on board, and proper distribution, of all ordnance equipments and stores. He is to be especially careful that the equipments and stores belonging to the magazine are arranged therein in conformity to Ordnance Instructions.

37. The powder tanks containing charges for each class of guns are to be stowed on their sides, with their lids next the alleys, and hinges down, near the magazine scuttles through which these charges are to be delivered; 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.

38. In time of war, passing-boxes are to have charges for '*ordinary firing*' kept in them ready for passing up at once.

39. The different charges for all classes of guns are distinguished by the colour of the cartridge bags; *white* being used for distant firing, *blue* for '*ordinary*' firing, and *red* for '*near*' firing. (*See art. 489.*)

The lid ends of the powder tanks for service charges are to be painted of the same colours as the cartridge bags which they contain, and are also to be distinctly marked with the calibre and weight of the gun for which the cartridges are intended. Tanks for priming powder must be marked PRIMING POWDER; and this powder may be put up in either of the kind of charges allowed which will make the best stowage, and in bags of the colour used to distinguish such charges.

Tanks containing *saluting* powder are to be marked '*SALUTING.*' It is to be kept in *red* or '*near firing*' bags.

40. No loose powder is ever to be taken or carried on board ship, and all, whether public, or private belonging to officers, must be safely stowed in the magazines. (*See chap. vi.*)

41. All percussion caps and percussion or friction primers, or other articles containing fulminating matter, must be kept in boxes prepared for the purpose, and the boxes must be stowed separately from other articles, in a dry, secure and safe place, under lock and key, and are on no account to be put in the magazine.

42. The fireworks, after *carefully removing all fulminating matter, such as caps or primers*, if any such be used to ignite them, are to be stowed in their proper packing boxes on the racks in the passages of the magazines.

43. All ammunition packing boxes and metal cases are to be preserved and returned into store at the end of the cruise.

44. No coopering is ever to be done in the magazines of ships. Should powder be received on board in barrels, the hoops and heads must be started on the orlop or berth deck before entering the magazine.



45. In stowing shell-rooms, filled shells are to be stowed together in boxes, those having fuzes of different times of burning will be placed in tiers or ranges distinctly separate. (*See art. 464, on fuzes, chap. vii.*) Empty shells are to be stowed by themselves, unsabotted, in bulk, in a dry place.

46. Whenever he is directed to strike guns below, or to prepare them for transportation, he will see the bore washed with fresh water, carefully sponged, thoroughly dried, and coated with melted tallow, and a wad dipped in the same material inserted, and connected with a tompion by a laniard. He is to see that the tompion is put in securely, and the vent stopped by a greased leather vent-plug, and puttied over.

47. He is to examine and satisfy himself frequently whether the guns and all their equipments; the whips for supplying shot and shells; the arm-chests, armoury, and small arms; the supply and reserve division-boxes, and other articles furnished as ordnance and ordnance stores, are in good order and in place, and make immediate report to the Commanding or Executive Officer of any defects or deficiencies which he may discover.

48. The guns and their equipments are to be kept as dry as possible, and no salt water used in cleaning them.

49. Unless prevented by special causes, he will report to the Executive Officer daily before 10 A. M. and 8 P. M., and at any other time when he finds anything out of order.

50. Whenever the magazines or shell-rooms are opened, he is to take every precaution to guard against accidents by fire, to examine particularly that all the men stationed in any way in or about the magazine, embracing all stationed within the magazine screen, put on the magazine dress and shoes, and on no account have anything metallic about them, and that no improper articles are introduced. He will also see that all the articles required for sweeping and removing loose powder are at hand, and that those operations are performed before the magazine is closed.

51. The tanks are never to be opened unless by special order, or when powder is actually required for service; and then no more of the lids are to be unscrewed than is necessary for immediate supply. The strictest attention to this regulation is required of the Gunner, as experience has proved that the preservation of the powder in good condition depends upon the entire exclusion of damp air.

52. When the guns are ordered to be drawn before entering into a friendly port, the Gunner is to be particularly attentive to assure himself that no shot or wad is left in any gun.

53. In saluting he is to guard against accident in loading, pointing, and firing, and to be particularly careful in *reloading*, where that operation is unavoidable.

54. In the absence or illness of the Gunner, his general duties will devolve on a Gunner's Mate.

55. When a vessel returns from a cruise and is to be placed in ordinary, and her officers and crew are to be paid off, the Gunner is not to leave the ship, unless specially authorised by the Secretary of the Navy, until all the guns, powder, small arms, ammunition and other articles under his charge, shall have been examined and landed, in proper condition, and turned over to the Assistant Inspector of Ordnance; but in case there be no Ordnance Officer, then to the Navy Storekeeper.

#### CARPENTER.

56. The CARPENTER shall ascertain and report to the Executive Officer that there are a sufficient number of tarpaulins to cover all the hatches leading to the fore and after orlops; that the pump-gear of every description is ready and in order for rigging the pumps, and that every preparation can be promptly made before going into action to free the ship, in case of receiving injuries below the water-line.

57. He is also to examine and keep in order the force and channel pumps, the fire-engine, the division tubs, and, in short, all the apparatus necessary to give a good and speedy supply of water in case of fire in action.

58. He is specially charged with the care and distribution of articles for stopping shot-holes or repairing other injuries to the hull, which may be received in action, viz.: shot-plugs and mauls; pieces of pine board from eighteen inches to three feet long, and from twelve to fifteen inches wide, covered with felt or fearnought, previously coated with tar or white lead; patches of sheet lead with nail-holes punched; and trowser-slings for lowering men outside the vessel, to be provided with a pouch or pocket to contain a hammer and nails. Tarred canvas or oakum should be prepared to shove into the shot-holes before the patches of board or lead are nailed on. Although shot-plugs are still to be allowed, the means just described are most to be relied on.

59. In case it shall not have already been done, the Carpenter, under the direction of the Commander or Executive Officer of the ship, will draw a black line two inches broad on the ceiling of the ship to correspond with the ordinary height of the water-line. On this is to be marked, by corresponding intervals and numbers, the position of the ports on the lowest of the gun decks. By this arrangement the position of a shot-hole can be easily ascertained and communicated, through the Officer Commanding the Powder Division, and a remedy promptly applied. To this end he is to pay habitual attention to keeping the wings clear.

#### YEOMAN.

60. The YEOMAN is to charge himself with, and is to be accountable for, all articles of ordnance stores which may be placed in the store-room under his charge, and is not to issue or expend any article, except by order of, or authority from, the Captain or Executive Officer.

61. On the return of a ship to be laid up at a yard, the Yeoman will be retained to deliver the ordnance stores in his charge into the hands of the Ordnance Officer, or Navy Storekeeper of the yard if there be no Ordnance Officer of the yard. And if these stores be found in good order, and to correspond with the books of invoice and expenditure, it shall be the duty of the Commandant of the yard to give him a certificate to that effect, and the Commandant will then direct the Purser to discharge and pay him the wages which may be due him. But if, on the contrary, a deficiency in the stores under his charge be discovered, or that they are in bad order, the Ordnance Officer will report the same to the Commandant of the yard, who will order a survey to ascertain the nature and extent of the deficiency, or injury, and whether either were caused by the Yeoman's negligence or fault.

62. Should the Commandant of the yard be satisfied that the alleged injuries or deficiencies proceed neither from culpable neglect nor dishonesty on the part of the Yeoman, the Commandant will direct the wages due the Yeoman to be paid him, and that he be discharged with a certificate of good conduct; but if the Commandant shall find just cause for suspecting fraud or negligence, he shall suspend the payment and discharge of the Yeoman until he shall report the case to the Bureau and receive the orders of the Department.

63. No person is to be knowingly *appointed* Yeoman who has already served in that capacity, in any vessel of war of the Confederate States, and cannot produce a satisfactory certificate of his former good conduct as Yeoman.

## CHAPTER II.

GENERAL DISTRIBUTION OF OFFICERS AND MEN AT QUARTERS.

---

64. The following directions for the general distribution of a ship's company at quarters, or for action, are intended to secure, upon the most important points, a degree of uniformity which will promote efficiency, and at the same time leave to the Captains the selection and arrangement of many individuals under their command, according to their own views of the particular qualifications of each.

65. The CAPTAIN's station, in action, is upon the quarter deck, unless some urgent cause should require his temporary presence elsewhere.

66. The Executive Officer, the Midshipmen acting as *aids* to the Captain, and the Signal Officer, are also to be stationed on the quarter deck.

67. The stations of the other Officers are to be regulated by divisions, as follows:—

The guns upon each deck are to be numbered from *forward*, beginning with No. 1, and continuing aft in succession, each gun and its opposite being designated by the same number, excepting pivot and shifting guns, each of which is to have a separate number. The guns on each deck are then to be divided as equally as possible into three or two divisions, according to the number of Lieutenants or other Watch Officers on board, so that each division of guns and the persons belonging to it may be commanded by a Lieutenant or other Watch Officer. These divisions are to be numbered consecutively, designating the forward division on the lowest gun deck as the first division, and passing from the after division of one deck to the forward division of the next deck above it.

68. The command of these divisions of guns is to be assigned, in the order of their numbers, to the Lieutenants or other Watch Officers, according to their rank, assigning the first division to the officer next in rank to the Executive Officer. In case of a deficiency of Watch Officers, the

quarter-deck division may be assigned to a Passed or other Midshipman, who will act under the general supervision of the Executive Officer. When the number of officers on board of vessels having pivot guns will permit, each pivot gun will be placed under the special charge of a suitable officer of the division of which it forms a part.

#### MASTER'S DIVISION.

69. This division will comprise all those stationed in the tops, and those appointed to attend to the rigging, sails, steerage and signals. The Master is to be stationed on the quarter deck, and to be assisted by the Boatswain, whose station will be on the forecastle. (*For arms, see table in article 101.*)

#### POWDER DIVISION.

70. This division will be under the direction either of a Lieutenant or of a Passed or other competent Midshipman. It will consist of all those stationed below the gun decks, except persons belonging to the Surgeon's Division, and the Purser and his Clerk.

The Gunner is to be stationed in the main magazine, and a Gunner's Mate or Quarter Gunner in the other magazine, when there are two; and those persons of this division who may be stationed in the magazines and passages are to be under the immediate direction of the Gunner and his Mate, respectively. Those of the Carpenter's crew stationed in the hold or wings are to be under the immediate direction of the Carpenter's Mate, who will be stationed with them. All reports, however, are to be made through the Commanding Officer of the division.

*The construction of magazines and shell-rooms, and also the arrangements for delivering and distributing powder and projectiles, will be found in chapter vi.*

#### DIVISION OF MARINES.

71. All the Marines who may not be distributed to other divisions for action, are to compose a Division of Marines, to be under the immediate command of the Superior or Senior Officer of Marines on board. He will form his division on such part or parts of the spar or upper deck as the Captain may direct.

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### SURGEON'S DIVISION.

72. The SURGEON or senior Medical Officer will have the direction of this division, which shall comprise all the Medical Officers and such other persons as may be designated by the Captain to assist in the care of the wounded in action. This division will occupy the cockpit or such other convenient place as the Captain of the vessel may direct.

### THE CHAPLAIN.

73. The CHAPLAIN will be in attendance to perform the duties of his sacred office, and to render such other service as may be in his power.

### PURSER.

74. The PURSER's station will be in the ward room and on the berth deck, in charge of the money, books, and stores belonging to his department. The Purser's Clerk will be stationed in the steerage, to aid the Purser in taking care of the property in his custody, and especially to see that the spirit-room is kept perfectly secure.

### ENGINEER DIVISION.

75. The Engineer Division shall be under the direction of the Chief Engineer, and shall comprise the Assistant Engineers and such of the Firemen and Coalheavers as may be detailed for the purpose.

76. Passed and other Midshipmen, Captain's and other Clerks, the Sailmaker, and other officers not enumerated, are to be assigned to the different divisions at the discretion of the Captain.

77. In distributing the Petty Officers, Seamen and others to the guns and other stations in the several divisions, it is desirable, as a general rule, that those stationed at the same gun or near each other at quarters, should be drawn from different stations for working ship; so that a great loss at any one gun may not fall too heavily on any watch station.

Exceptions to this general rule may be advantageously made where the duties of men require their habitual attendance on particular decks. In such cases it will generally be advisable to station them at quarters near to the places of their ordinary duties.

78. TABLE showing the number of men for the service of each kind and class of gun in use in the Navy, assuming the vessel to have the established complement.

POSITION OF GUNS	PIVOT-GUNS			SHELL-GUNS			SHOT-GUNS			
	XI-INCH OF 16,000 LBS.	X-INCH OF 12,000 LBS.	64-PDR. OF 106 CWT.	IX-INCH OF 9,000 LBS.	VIII-INCH OF 63 CWT.	VIII-IN. OF 56 CWT. AND 32-PDR. OF 57 CWT.	32-PDR. OF 57 CWT.	32-PDR. OF 42 CWT.	32-PDR. OF 33 CWT.	32-PDR. OF 27 CWT.
On lower decks of ships of the line	—	—	—	—	16	14	—	—	—	—
On all other decks .....	24	20	16	16	14	12	12	10	8	6

To the XI, X, and IX-inch and 64-pounder pivot guns, a Powderman, and to all other guns a Powderboy is to be added.

The number of men to form crews of guns mounted on carriages of special character, is to be regulated as may be found most advantageous, by the Commanding Officer.

79. In designating the Petty Officers and others for particular stations, it is assumed that the intelligence, skill, and force of the men have been equally divided between the two watches, and that the men in the starboard watch have all odd numbers, as 1, 3, 5, &c., and those of the port watch even numbers, as 2, 4, 6, &c.

To preserve this equality and to secure the ability of those who may be upon deck to prepare the ship for action at night, whilst the watch below are bringing up and stowing the hammocks, all the *odd* numbered guns will be *entirely manned* by men belonging to the starboard watch, and all the *even* numbered guns by those belonging to the port watch, as far as practicable.

80. Where ports on opposite sides of the same deck are numbered the same, and are both provided with a gun, gun's crews are only to be furnished for the guns on one side. Pivot and shifting guns are each to have full gun's crews.

81. When the complements allowed to vessels of the Navy will permit, it is recommended as a general arrangement that the gun's crews be formed

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of about one-third Petty Officers and Seamen, one-third Ordinary Seamen, and one-third Landsmen and Boys, and that this system be observed as nearly as practicable.

82. At least one Quarter Gunner should be stationed at each division of guns; and a Gunner's Mate or Quarter Gunner in the smaller magazine, and in each shell-room.

If there be more shell-rooms than there are disposable Quarter Gunners to attend them, other careful and suitable persons are to be selected to supply the deficiency.

83. Forms of Quarter Bills for different classes of vessels, arranged upon this plan and with reference to stations and watches, and to arrangements for passing powder, are placed in the Appendix.

Though it is not proposed to require an exclusive adherence to these forms, yet their adoption, where practicable, and the application of the same principle to all vessels, is strongly recommended, that as near an approach to uniformity may be secured as circumstances will permit.

84. Before permanently assigning the individuals which form a gun's crew, to the performance of particular duties connected with its service in action, it is important to ascertain their respective qualifications, as far as may be practicable, by questioning them or by exercising them at the guns.

The Captains, especially, should be selected from those in whose skill, coolness, and judgment the greatest reliance can be placed, without regard to their ratings, though at the same time care should be taken to avoid stationing men of a higher rating than the Captains of the guns, to perform subordinate duties at the same guns.

Spongers and Loaders rank next in importance, and with activity and coolness should possess the necessary physical strength and stature. For Handspikemen, weight is important in addition to strength and coolness.

85. Very careful men should be selected for attending the Powder-scuttles on the different decks, as well to prevent noise and contention among the Powderboys as to guard against accidents and speedily to repair such as may occur.

86. Unless some special reason should require a different arrangement with regard to Boarders, Pikemen, Firemen, Sailtrimmers, and Pumpmen, the following will be observed :



## BOARDERS.

87. Half the men composing a gun's crew (excluding the Powderman or Boy) are to be Boarders. When this rule gives an odd number of men, the odd one is to be a Second Boarder.

88. The Boarders are to constitute two divisions, called First and Second Boarders.

89. First Boarders are, generally, to be taken from the second part of a gun's crew; and Second Boarders from the first part.

90. All Petty Officers on the spar deck, except the Quartermaster at the conn and the Quartermaster at the wheel, are to be First Boarders. (*For arms of Boarders, see Table, article 101.*)

## PIKEMEN.

91. One fourth of the number of men composing a gun's crew (rejecting fractions, and excepting the Powderman or Boy), and all the men of the Master's division on the spar deck, except those designated as Boarders and those at the wheel and conn, are to be Pikemen, and are to compose but one division.

92. When called away, they are all to assemble on deck with pikes; but for each *Pikeman at a gun* there is to be a musket provided with the bayonet reversed, which, in action, when not in use, is to be kept hooked securely at the side of a carling or beam nearest in rear of his gun; or, in case of a spar deck, placed conveniently at hand. He is not, however, to arm himself with this weapon unless particularly ordered so to do; but he is to wear a musket cartridge-box supplied with cartridges and caps, buckled around his waist, whenever at general quarters or in action.

Should it become necessary, *in an emergency*, to call '*all hands*' from below to repel an enemy, the Pikemen will arm themselves with these muskets, leaving their pikes to be used by those whose arms are not designated—that is, by the Powder division.

93. One boarding pike for each gun on covered decks is always to be kept triced up conveniently near it, and this is to be used by the Powderman, or any other person left at the gun to guard the port.

94. Pikemen are to be covered by the Marines with their bayonets fixed.

#### FIREMEN.

95. With broadside guns, one Fireman is to be taken from each gun's crew, and from pivot guns two. Each Fireman is to have a fire-bucket at hand near his gun, and to wear his battle-axe in a belt around his waist.

#### SAILTRIMMERS.

96. In *all* vessels there will be two divisions of Sailtrimmers, composed of all the men at the spar-deck guns, except 1st Captains, 1st Spongers, 1st Loaders, and Powderboys. The 1st Sailtrimmers are to be taken from the guns on the forward half, and the 2nd Sailtrimmers from those on the after half of the spar deck.

97. In vessels carrying guns on more than one deck there are to be three divisions of Sailtrimmers, called 1st, 2nd, and 3rd Sailtrimmers, and the third division is to be made up of one man from each gun's crew on the other deck or decks, as designated in the tables. (*Art.* 101.)

This third division of Sailtrimmers is to be regarded as a reserved force, and is not to repair on deck at the *general call* for Sailtrimmers, nor except when specially ordered. Besides serving to reinforce the other two divisions when absolutely necessary, it is also to serve to reinforce either the Firemen or the Pumpmen in cases of need.

98. The third division of Sailtrimmers, and all the Pikemen of the gun's crews, and others armed with muskets (*see Tables, article* 101), may be made to assemble together as a body of Musketeers, either for landing or otherwise. No one gun more than another will be weakened by so doing; and this suggests the propriety of preferring these men ordinarily for the crews of boats.

#### PUMPMEN.

99. Each gun's crew composed of as many as 14 men is to furnish two, but when of less than 14 men, one Pumpman only.

100. When Pumpmen are sufficiently numerous to admit of working the pumps well with one half their force, they should compose two divisions, to be called 1st and 2nd Pumpmen.

## DISTRIBUTION AND ARMS OF MEN AT THE GUNS.

101. The annexed tables show the stations of guns' crews at pivot guns, and at broadside guns, when composed, respectively, of the following numbers of men : 24, 16, 14, 12, 10, 8, or 6 ; how each man of a gun's crew is to be armed, and the number of small arms of all kinds required for each gun's crew.

N.B. To these tables is annexed another, showing the SMALL ARMS of the MASTER'S DIVISION.

PIVOT GUN'S CREW *composed of 24 MEN and a POWDERMAN.*

TITLES OF GUN'S CREW ON LEFT SIDE OF GUN	GUN Nos.	TITLES OF GUN'S CREW ON RIGHT SIDE OF GUN	ARMS					
			SWORDS	REVOLVERS	PISTOLS	PIKES	MUSKETS	BATTLE-AXES
1st Loader, 2 B.....	3	4 1st Sponger, 2 B.....	1	1	—	★	—	—
		.....	1	1	—	—	—	—
2d Loader, 1 B.....	5	6 2d Sponger, 1 B.....	1	—	1	—	—	—
		.....	1	—	1	—	—	—
1st Front Lever., 2 B.....	7	8 2d Front Lever., 1 B.....	1	1	—	—	—	—
		.....	1	1	—	—	—	—
1st Compressor., Pike....	13	14 2d Compressor., Pike....	—	—	—	1	1	—
		.....	—	—	—	1	1	—
1st Shellman, Pump.....	15	16 2d Shellman, Pump.....	—	—	—	—	—	1
		.....	—	—	—	—	—	1
Tackleman, 1 B.....	19	18 Tackleman, 2 B.....	1	1	—	—	—	—
		.....	1	1	—	—	—	—
Do. 1 B.....	21	20 Do. 2 B.....	1	—	1	—	—	—
		.....	1	—	1	—	—	—
Do. Pike.....	23	22 Do. Pike.....	—	—	—	1	1	—
		.....	—	—	—	1	1	—
Do. ....	25	24 Do. ....	—	—	—	—	1	1
		.....	—	—	—	—	1	1
1st Rear Lever., Pike.....	9	10 2d Rear Lever., Pike....	—	—	—	1	1	—
		.....	—	—	—	1	1	—
1st Train Lever., Fire....	11	12 2d Train Lever., Fire...	—	—	—	—	—	1
		.....	—	—	—	—	—	1
1st Captain, 2 B.....	1	2 2d Captain, 1 B.....	1	1	—	—	—	—
		.....	1	1	—	—	—	—
Powderman .....	17	.....	—	—	—	—	—	—
Total number of Arms.....			12	7	5	6	8	6

GUN'S CREW *composed of 16 MEN and a POWDERMAN.*

TITLES OF GUN'S CREW ON LEFT SIDE OF GUN	GUN Nos.	TITLES OF GUN'S CREW ON RIGHT SIDE OF GUN	ARMS					
			SWORDS	REVOLVERS	PISTOLS	PIKES	MUSKETS	BATTLE-AXES
1st Loader, 2 B.....	3	4 1st Sponger, 2 B.....	1	1	-	-	-	-
		.....	1	1	-	-	-	-
2d Loader, 1 B.....	5	6 2d Sponger, 1 B.....	1	-	1	-	-	-
		.....	1	-	1	-	-	-
1st Shotman, 2d Pump...	7	8 2d Shot and 1st Pump...	-	-	-	-	-	1
		.....	-	-	-	-	-	1
1st Side Tackle. & Pike.	13	14 2d Side Tackle. & Pike..	-	-	-	1	1	-
		.....	-	-	-	1	1	-
1st Port Tackle. & Pike.	15	16 2d Port Tackle. & Pike..	-	-	-	1	1	-
		.....	-	-	-	1	1	-
1st Train Tackle. & Fire.	11	12 2d Train Tkl. & Sailtrim.	-	-	-	-	1	1
		.....	-	-	-	-	-	1
1st Handspike., 1 B.....	9	10 2d Handspike., 2 B.....	1	-	1	-	-	-
		.....	1	-	1	-	-	-
1st Captain, 2 B.....	1	2 2d Captain, 1 B..	1	1	-	-	-	-
		.....	1	1	-	-	-	-
Powderman .....	...	.....	-	-	-	-	-	-
Total number of Arms.....			8	4	4	4	5	4

N.B.—On other than lower decks, for Port Tacklemen substitute 3d and 4th Side Tacklemen.

GUN'S CREW *composed of 14 MEN and a POWDERBOY.*

TITLES OF GUN'S CREW ON LEFT SIDE OF GUN	GUN Nos.	TITLES OF GUN'S CREW ON RIGHT SIDE OF GUN	ARMS					
			SWORDS	REVOLVERS	PISTOLS	PIKES	MUSKETS	BATTLE-AXES
1st Loader, 2 B.....	3	4 1st Sponger, 2 B.....	1	1	-	-	-	-
		.....	1	1	-	-	-	-
2d Loader, 1 B.....	5	6 2d Sponger, 1 B.....	1	-	1	-	-	-
		.....	1	-	1	-	-	-
1st Shot. & 2d Pump...	7	8 2d Shot. & 1st Pump...	-	-	-	-	-	1
		.....	-	-	-	-	-	1
1st Side Tackle. & Pike.	13	14 2d Side Tackle. & Pike..	-	-	-	1	1	-
		.....	-	-	-	1	1	-
1st Train Tackle. & Fire	11	12 2d Train Tkl. & Sailtrim.	-	-	-	-	1	1
		.....	-	-	-	-	-	1
1st Handspike., 2 B.....	9	10 2d Handspike. & Pike...	-	-	-	1	1	-
		.....	1	-	1	-	-	-
1st Captain, 2 B.....	1	2 2d Captain, 1 B.....	1	1	-	-	-	-
		.....	1	1	-	-	-	-
Powderboy .....	...	.....	-	-	-	-	-	-
Total number of Arms.....			7	4	3	3	4	4

GUN'S CREW *composed of 12 MEN and a POWDERBOY.*

TITLES OF GUN'S CREW ON LEFT SIDE OF GUN	GUN Nos.	TITLES OF GUN'S CREW ON RIGHT SIDE OF GUN	ARMS					
			SWORDS	REVOLVERS	PISTOLS	PIKES	MUSKETS	BATTLE-AXES
1st Loader, 2 B.....	3	4 1st Sponger, 2 B .....	1	-	1	-	-	-
		.....	1	1	-	-	-	-
2d Loader, 1 B .....	5	6 2d Sponger, 1 B.....	1	-	1	-	-	-
		.....	1	-	1	-	-	-
1st Shotman and Pike....	7	8 2d Shotman and Pump...	-	-	-	-	-	1
		.....	-	-	-	1	1	-
1st Train Tackle. & Fire.	11	12 2d Train Tkl. & Sailtrim.	-	-	-	-	1	1
		.....	-	-	-	-	-	1
1st Handspike. & Pike...	9	10 2d Handspike. & Pike ...	-	-	-	1	1	-
		.....	-	-	-	1	1	-
1st Captain, 2 B.....	1	2 2d Captain, 1 B.....	1	1	-	-	-	-
		.....	1	1	-	-	-	-
Powderboy.....	...	.....	-	-	-	-	-	-
Total number of Arms .....			6	3	3	3	4	3

GUN'S CREW *composed of 10 MEN and a POWDERBOY.*

TITLES OF GUN'S CREW ON LEFT SIDE OF GUN	GUN Nos.	TITLES OF GUN'S CREW ON RIGHT SIDE OF GUN	ARMS					
			SWORDS	REVOLVERS	PISTOLS	PIKES	MUSKETS	BATTLE-AXES
1st Loader, 2 B.....	3	4 1st Sponger, 2 B.....	1	-	1	-	-	-
		.....	1	1	-	-	-	-
2d Loader and Pike .....	5	6 2d Sponger, 1 B.....	1	-	1	-	-	-
		.....	-	-	-	1	1	-
1st Shotman and Fire.....	7	8 2d Shotman and Pump...	-	-	-	-	-	1
		.....	-	-	-	-	-	1
1st Handspike. & Pike...	9	10 Train Tackle .....	-	-	-	-	1	1
		.....	-	-	-	1	1	-
1st Captain, 2 B.....	1	2 2d Captain, 1 B.....	1	1	-	-	-	-
		.....	1	1	-	-	-	-
Powderboy.....	...	.....	-	-	-	-	-	-
Total number of Arms .....			5	3	2	2	3	3

GUN'S CREW *composed of 8 MEN and a POWDERBOY.*

TITLES OF GUN'S CREW ON LEFT SIDE OF GUN	GUN Nos.	TITLES OF GUN'S CREW ON RIGHT SIDE OF GUN	ARMS					
			SWORDS	REVOLVERS	PISTOLS	PIKES	MUSKETS	BATTLE-AXES
1st Loader, 2 B.....	3	4 1st Sponger, 2 B.....	1	-	1	-	-	-
		.....	1	-	1	-	-	-
2d Loader and Pikeman..	5	6 2d Sponger and Pike.....	-	-	-	1	1	-
		.....	-	-	-	1	1	-
Shotman and Pumpman..	7	8 T. T., Fireman .....	-	-	-	-	1	1
		.....	-	-	-	-	-	1
1st Captain, 2 B.....	1	2 2d Capt. & Handsp., 1 B.	1	1	-	-	-	-
		.....	1	1	-	-	-	-
Powderboy.....	...	.....	-	-	-	-	-	-
Total number of Arms .....			4	2	2	2	3	2

GUN'S CREW *composed of 6 MEN and a POWDERBOY.*

TITLES OF GUN'S CREW ON LEFT SIDE OF GUN	GUN Nos.	TITLES OF GUN'S CREW ON RIGHT SIDE OF GUN	ARMS					
			SWORDS	REVOLVERS	PISTOLS	PIKES	MUSKETS	BATTLE-AXES
1st Loader, 2 B.....	3	4 1st Sponger & Pikeman...	-	-	-	1	1	-
		.....	1	-	1	-	-	-
2d Ldr., Shot. & Pump...	5	6 2d Sponger, Fireman.....	-	-	-	-	1	1
		.....	-	-	-	-	-	1
1st Captain, 2 B.....	1	2 2d Capt., Hdspk., Train Tackle., 1 B.	1	1	-	-	-	-
		.....	1	1	-	-	-	-
Powderboy.....	...	.....	-	-	-	-	-	-
Total number of Arms .....			3	2	1	1	2	2

## SMALL ARMS OF MASTER'S DIVISION.

STATIONS	RATINGS	ARMS
Conn .....	Quartermaster.....	Pistol and Sword
Wheel.....	Qr. Mr. and Seamen.....	.....do. do.
Signals.....	Quartermaster.....	.....do. do.
Do. ....	Boys.....	Pikes
Relieving Tackles.....	Qr. Mr. and O. S. ....	Swords
Main Braces .....	C. A. G.....	Pistol and Sword
Mastmen.....	B. M. ....	.....do. do. and Battle-axe
Do. ....	Sea and O. S.....	Pikes and Battle-axes
Topmen.....	...do.....do.....	Muskets
Forecastle .....	C. F.....	Pistol and Sword
Bell.....	S. C.....	... do. do.

102. The Captain will designate the different hatchways which shall be used by the Boarders and others from each gun, when they are called upon deck at quarters.

103. The use of *fire arms* in the tops being considered dangerous, and only advisable under very peculiar circumstances, they are never to be used there without the express direction of the Captain.

## CHAPTER III.

DUTIES AT QUARTERS, IN BATTLE OR EXERCISE.

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## CAPTAIN.

104. The CAPTAIN, when at general quarters, either for exercise or in action, is to superintend and take the general direction of everything connected with the management of the ship and the service of her armament.

105. He will from time to time carefully inspect the ship, in order, before commencing a general exercise, to ascertain that all the required and proper preparations have been made for battle. When time and other circumstances will permit, he will always make this inspection before going into action, and when prevented from making it personally, he will direct it to be made by the Executive Officer, unless more important duties should interfere.

106. When engaged with an enemy at so great a distance as to require the guns to be elevated, he will, if practicable, cause the distance to be ascertained by observation, and when that cannot be done, will estimate the distance, and from time to time send directions to the Officers of gun divisions for what distances the sights of their guns should be set, and the nature of the projectile, and, if a shell be used, the time of the fuze (*see Article 301*), and also the cartridges to be used, whether for 'distant,' 'ordinary,' or 'near' firing.

107. He will determine and direct when two shots may be fired; when 'quick-firing' may be permitted; when small arms shall be distributed and loaded; when Boarders shall be called up, and when they shall assail an enemy. He will receive, through the Executive Officer, the reports from all Officers commanding divisions.



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 EXECUTIVE OFFICER.

108. The EXECUTIVE OFFICER, under the direction of the Captain, and with the aid of the Master, will work the ship when in action or at general quarters.\* He will receive the reports of the Officers of the different divisions and others, and communicate them to the Captain of the ship.

## SIGNAL OFFICER.

109. The SIGNAL OFFICER is to see that everything is prepared for making and answering signals promptly, and will make all such as the Captain may direct.

110. He will note and report to the Captain all signals that are made to or by other vessels of the squadron, or other vessels in sight, and also note the time at which each signal was made. He will observe and report any material change which may take place in the positions of the vessels of the squadron, or of other vessels, and every event of moment that may occur.

## MASTER'S DIVISION.

111. The MASTER will cause the persons in his division to sling the yards and gaffs, to stopper the topsail sheets, to lead out the preventer and other braces, and will see that they are clear, and toggled to prevent them from unreeving.

112. He will have the *fighting stoppers* at hand in the chains and tops for stoppering the rigging; hatchets and axes ready for clearing away any casual incumbrances from the guns; and will cause proper arrangements to be made for applying and securing grapnels, if they should be required.

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\* This arrangement continues to the Executive Officer his usual duties when all hands are called for other special purposes; it also places him where he will always be immediately informed of all the evolutions ordered by the Captain, as well as of the objects proposed to be accomplished by them, and in case any accident should disable the Captain, the Executive Officer will be ready to carry out his views without mistake or delay.

By employing the Master as an assistant to the Executive Officer, additional security is given against any confusion or delay, which might otherwise be caused by the inability of either of the superior officers to continue the performance of their duties.

113. He will see that the hammocks are properly stowed and covered, and will cause the boat and boom covers to be hauled over and securely stopped down; the relieving tackles to be hooked and ready for use; a compass to be placed to steer by; and see the spare tiller at hand, and the chronometer and other instruments put out of the reach of shot.

114. In case the Captain should give orders for sending small arms and ammunition into the tops he will attend to having them sent there, and will be watchful that they are not so used as to expose the sails and rigging to danger from taking fire; and in order to furnish a sufficient supply of water, in case of accident, he will have four fire-buckets fitted for each top, with laniards long enough to reach the water from the yard arms.

115. Should there be a probability of engagement, when the ship is on soundings, the Master will have the ground-tackling ready and clear; boats ready for getting out, and every preparation made for towing, warping, anchoring and getting springs upon the cables; and have leads and lines in the chains. If at anchor, he will have the boats dropped astern and the oars secured to the thwarts, and, if directed, have the plugs taken out that the boats may fill, and also cause the spare spars to be put overboard.

116. Whenever the cables are bent they shall be kept stoppered until wanted for use.

117. In action, besides aiding the Executive Officer in working ship, the Master is to pay special attention to the steerage of the vessel, and to the rigging, sails and spars, and will see that the stoppers are properly applied and damages repaired as speedily as possible.

In vessels where there is no Signal Officer, the Master, in action or general exercise, may be directed to perform the duties of Signal Officer.

118. The Boatswain, being the assistant of the Master, is to see that the rigging, especially forward, is kept clear, and that all damages are promptly reported and repaired.

#### ENGINEER'S DIVISION.

119. The CHIEF ENGINEER will see all proper preparations made for repairing damages to the engine and its dependencies, and will have the apparatus for extinguishing fire ready for immediate use. As soon as

these preparations are made and his men mustered, he will report his division ready to the Executive Officer. He will also report such damages as may be received in action, and what assistance is required to repair them.

### POWDER DIVISION.

120. The Officer commanding this division, when called to quarters for general exercise or action, will receive from the Captain the keys of the magazines and shell-rooms, and of their respective water-cocks, and will deliver them to the persons in charge, who are not to open them without his special order.

121. He will have the fire screens let down, and the light rooms and the deck under his charge lighted.

122. He will see that the shot and shell whips are in place and in working order, and that shot-troughs are placed for conveying shot where required; that the Gunner and his Mates at the magazine hatches and scuttles, and the persons stationed at the shell-room scuttles, are ready to open them when the order is given.

123. That all the precautions mentioned in the duties of Gunner and Carpenter have been taken against fire, namely, that the division tubs are filled with water, and that wet swabs are placed by them and under all the lower scuttles through which passing-boxes are returned; that a *fire-tub* is placed at the bottom of each shoot for the return of empty boxes; that it is nearly filled with water and has its wire grating shipped; that a proper supply of fresh water is provided for the use of the men; that the hatchways of the decks next above that on which the Powder Division is stationed are properly covered; that the air-ports are closed and secured; and that the hose is screwed to the force pumps and ready for use.

124. He is to see that the means which are provided for lowering the wounded are ready and properly fitted, and that the wounded, when lowered down, are conveyed to the part of the vessel set apart for the Surgeon's Division.

125. He will also see that all obstructions to the safe and rapid passage of powder, shot, and shells are removed, and when every preparation for action has been made in his division, will report it ready to the Executive Officer.

126. When the order is given from the Captain to open the magazines, shell-rooms and scuttles, he will direct the Gunner and Gunner's Mate to repair to their respective scuttles, put on their magazine dresses and shoes, divest themselves of every article of metal, and see that the men stationed with them do the same; they are also to see that wet swabs and cans of fresh water are provided.

127. The magazines being opened, the lids of the tanks are not to be unscrewed until orders are given to that effect. Then the Gunner and his Mate, and their assistants in their respective magazines, will open as many, and no more tanks than are necessary to supply charges of the kind ordered by the Captain, which they will pass up to the men stationed on the deck above to receive them. These men will be particularly careful to observe the orders transmitted from time to time designating the kind of charges required at the guns.

128. While at general quarters he will see that the men preserve their proper stations in silence, order, and coolness; and he will give particular attention to the sufficient and correct supply of powder and projectiles to the various divisions, and that in time of action, or of exercise with powder, the passing-boxes, after being once taken out of the magazine, are not passed into it again, *or even inside of the screen*, during the whole of such action or exercise.

These duties are of the highest importance.

129. In exercise where no powder is used he will see that such substitutes for the various charges as the Captain may direct are passed up in their proper boxes, so that the number of rounds and the kind of charge, whether 'distant,' 'ordinary,' or 'near,' may be ascertained and compared with those ordered. Should any defect or deficiency in the arrangement for giving a full supply to the guns be discovered, it is to be reported immediately to the Captain, in order that a remedy may be applied as speedily as possible by additional men or other proper means.

130. The CARPENTER will see that the hatches on the deck next above the berth deck or orlop are properly covered with gratings and tarpaulins, and that the air-ports are closed and secured.

131. He will then cause all the pumps to be rigged, namely, the main pumps, for freeing the ship in case of leaks, and the force and channel pumps. He will have the engine also rigged and filled to supply water for extinguishing fire.

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132. He will attend particularly to the preparations for stopping shot-holes, and see that all the articles enumerated in his general duties (*article 58*) are distributed among his mates and crew.

133. He will, when directed, cause the cabin and other bulkheads to be taken down, and every other obstruction removed which comes within his department, and may interfere with the working of the guns or the passage of ammunition, and, having performed this service, will report to that effect to the Officers of the Divisions in which such obstructions existed.

134. When these preparations are completed he will see that the men under his direction are in their proper stations, and, when all their preparatory duties have been performed, will so report to the Executive Officer, and to the Officer commanding the Powder Division what relates to that division.

135. During an action the Carpenter will attend the pumps, sound the well frequently, and, should he discover indications of serious injury below the water-line, will immediately make them known personally, either to the Captain or to the Executive Officer, *and to them only*.

136. During an action, such of the Carpenter's crew as are stationed in the wings, or on the orlop, in line-of-battle ships, or on the berth deck in other vessels, will be constantly on the look out for shot-holes.

When a shot enters they are to make its position known by reference to the numbers of the ports under or near which the hole is found, and its distance below or above the water-line, as shown by the interior line corresponding to it, already described in the general duties of the Carpenter (*article 59*); and are also to apply promptly such remedy themselves as may be in their power.

137. The MASTER-AT-ARMS, assisted by the Ship's Corporals, will see the galley fire and all unauthorised lights put out; that the lamps are in their places, properly trimmed and lighted; and that the lenses and reflectors are cleaned.

After the magazines have been swept, closed and secured, and the retreat has been beaten, the Master-at-arms will see that the lights in the light-rooms are extinguished, and apply to the Executive Officer for permission to renew the usual lights and fires.

## SURGEON'S DIVISION.

138. The SURGEON or senior Medical Officer will see that all necessary preparations are made for the reception and treatment of the wounded, in the part of the ship which may have been set apart by the Captain for that purpose, and report to the Executive Officer when such preparations are completed.

139. He will cause a sufficient number of *tourniquets*, or temporary substitutes for them, to be distributed to the Quarter Gunners of the different divisions, and to such men in each top as may be appointed to receive them; and he will take care that the persons in his division, and such others as the Captain may direct, are instructed in the use of *tourniquets*, to prevent, as far as possible, any dangerous loss of blood before the Surgeon or his Assistants can attend to wounded men.

## OFFICERS COMMANDING DIVISIONS OF GUNS.

140. Each Officer commanding a Division of Guns is to see that all persons belonging to it are present; that all the prescribed arrangements are duly and promptly made; that every article designated for use in the division is in order, and in place; that the decks are wet and well sanded; that the hand swabs at the guns are wet; and that any small arms that may be distributed among the men of his division are properly loaded at the time directed by the Captain.

141. In action he will cause the wounded of his division to be promptly and properly conveyed to the Surgeon.

142. On the lower deck of line-of-battle ships, or the main deck of frigates and spar deck of single-deck vessels, he will see the hatchways in the range of his division properly covered by the Carpenter's crew, and the scuttles and whips duly prepared for passing powder, shot, and shells.

143. He will be particularly careful to prevent the men from loading the guns improperly, or otherwise than may be specially ordered.

144. He will see that the guns are very carefully pointed and properly elevated, to avoid too high firing or other waste of shot, and that all unnecessary noise is prevented. In case of accident to the Powder Passers he will promptly supply their places by such men as can be best spared from his division.

145. He will also take care to prevent confusion at the powder scuttles in the range of his division, and that all orders which require to be repeated are duly passed.

146. He will take care that each gun in his division is provided with all the 'Equipments and Implements' prescribed for its use; and that the 'spare' articles which may be required in his division in action are in place. (*Article 148.*)

147. He will report to the Executive Officer when all preparations have been made for action, and also, after action or exercise, when the guns have been properly secured, and the stores and implements belonging to his division have been returned to their places.

#### EQUIPMENTS AND IMPLEMENTS.

148. Those for broadside guns, whether mounted on two or four truck carriages, or on slides, are to be as follows, viz. :

ARTICLES FOR EACH GUN	WHERE THEY ARE TO BE PUT WHEN THE GUN IS SECURED
Carriage complete, with bed and quoin, or elevating screw.	} At its port.
Breeching with shackle-bolts and pins.	} At the gun.
Compressors and levers, pivot-bolt and housing chock, for Friction Carriages.	} do.
Two side-tackles.	{ Hooked to the side-tackle bolts on each side of the port and of the carriage.
One train-tackle.	{ Hooked to the side-tackle bolts in the side, with the parts of the fall round the breech of the gun.
Two handspikes.*	Resting on the bed and bed bolt.
One tompion with laniard and wad.	In the muzzle of the gun.

\* *Marsilly* carriages require a roller handspike each.

ARTICLES FOR EACH GUN	WHERE THEY ARE TO BE PUT WHEN THE GUN IS SECURED
One sponge and cap.*	{ On the beam or carling over the starboard side of the gun. } { On the beam or carling over the port side of the gun. } } On movable brackets.
One rammer.*	
One lock with string and vent plug complete, with cover and strap.	} In place on the gun.
One breech sight with cover.	do.
One reinforce sight with cover.	do.
One priming wire and one boring-bit, with becketts for the wrist.	} Inside of the brackets of the carriage, near the breech.
One fire bucket with laniard.	{ On gun-decks, close to the side, near the beam over the gun ; { on spar-decks, round the capstan and the boats forward. }
One battle lantern, with candle or lamp trimmed and primed, but provided for gun decks only, none for spar-decks.	} In the fire buckets. The candle in supply box.
Battle-axes. { As prescribed according to the number of men at gun. (See art. 101.) }	} Inside of the brackets.
One hand swab.	} On the breast piece of the carriage.
Two chocking quoins, for truck carriages.	} When not in use, between the brackets and the bed.
Two laniards for each half port.	In place.

\* The rammers and sponges belonging to the broadside guns of spar-deck divisions of all ships having topgallant forecastles, or other light decks, may be kept under the forecastle or light deck, when not in use. In ships not provided with these decks they are to be kept at the guns, inside the brackets; or, if that cannot be done, triced up overhead on the next deck below.



ARTICLES FOR EACH GUN	WHERE THEY ARE TO BE PUT WHEN THE GUN IS SECURED
Laniards, chain pendants, runners and tackles for tricing up, and bars and keys for securing lower deck ports.	In place.
Ten shot, for shot guns.	In racks round the waterways and hatches nearest abreast of the gun.
For shell guns, one shell in its box.	Between the trucks, on the port side of the gun.
Ten selvagee wads for shot guns.	On the breast piece of the carriage, for shells one in each shell-box.
Two housing chocks for lower deck guns.	Placed before the <i>front trucks</i> , when the gun is run in for housing.

149. He will also assure himself that the following articles, which may be required, are in readiness in his division, and prepared for use, namely: one rattle for calling Boarders; one division tub for fresh water; one spare bed and quoin; two spare gun trucks; four spare handspikes; one worm; one ladle; one scraper; one bristle sponge; two spare breechings; four swabs, and, if any of the guns be on slides, a spare pivot-bolt. Of these articles, the worm, ladle, scraper, sponge, and spare breechings, are to be becketted up between the beams and carlings on the gun-decks, as far as practicable, and those which cannot be so placed will be kept at hand in the storeroom, or other convenient place.

The above allowance of articles designated as 'spare,' including worm, ladle, scraper, sponge, and swabs, is upon the supposition that each division is composed of five guns and their opposites. In case the number of guns should be either more or less, the articles will be increased or diminished proportionably, to the nearest whole number.

150. He will take care that the Quarter Gunners of his division keep the two division boxes marked 'supply' and 'reserve' constantly provided with the following articles, all in good order, viz. :—

The '*Supply*' box, with a waist-belt for each Boarder, Fireman, Sail-trimmer, and Pumpman; a primed candle for each battle-lantern, a thumbstall and vent-guard for the 1st and 2nd Captains of each gun. The

belts of Boarders to be furnished with a frog for a pistol, with its cartridges and percussion caps; those of 1st and 2nd Captains of guns, with a box containing fifty primers, fitted to slip on the waist-belt. Those for Firemen, Sail-trimmers, and Pumpmen, have each a frog for the battle-axe.

The 'Reserve' box, with one drill-brace; three vent-drills; one vent-punch; one gun-lock and string complete; two boring bits; three priming-wires; two thumbstalls; four boxes of percussion primers; one box of friction primers; one spare lock-string for each gun, and one fuze-wrench. These boxes are to be placed by the Quarter Gunners in their respective divisions, near the mast, and on the opposite side to that engaged.

In vessels of the class of frigates and upward, these boxes are to be, on covered decks, kept in their several divisions, and secured overhead.

On spar decks they are to be kept under the break of the poop and the topgallant forecastle, and, in vessels having neither poop nor topgallant forecastle, between the beams on the berth deck. They will be kept under lock and key.

151. He will see that the Quarter Gunners of divisions, and others appointed for the purpose, obtain the requisite number of tourniquets and distribute them to the men selected to use them. (*See article 139.*)

## BROADSIDE GUNS.

### STATIONS AND GUN NUMBERS.

152. The following are to be the *gun numbers and stations* for a gun's crew composed of sixteen Men and a Powderman, when working broadside guns on lower decks; *on other decks*, 15 and 16 are 3rd and 4th Side Tacklemen.

LEFT SIDE	GUN NOS.		RIGHT SIDE
First Loader . . . . .	3	4	First Sponger.
Second Loader . . . . .	5	6	Second Sponger.
First Shotman . . . . .	7	8	Second Shotman.
First Side Tackleman . . . . .	13	14	Second Side Tackleman.
First Port Tackleman . . . . .	15	16	Second Port Tackleman.
First Train Tackleman . . . . .	11	12	Second Train Tackleman.
First Handspikeman . . . . .	9	10	Second Handspikeman.
First Captain . . . . .	1	2	Second Captain.

Powderman near the midships, and on the left of the gun.

For a gun's crew of *fourteen men* and a Powderboy, or of *twelve men*, the higher numbers are those to be omitted, and the stations and duties of all the others remain unchanged. (*See diagrams A and C.*)

With a gun's crew of *ten men*, all the numbers continue with the same stations and duties excepting No. 10, who becomes Train Tackleman, and the 2nd Captain handles the handspike. (*See diagrams B and D.*)

With a gun's crew of *eight men*, numbers from 1 to 7 inclusive retain the same stations and duties; No. 2 will, in addition to his duties as 2nd Captain, also attend to the handspike, and No. 8 becomes Train Tacklemán.

With a gun's crew of *six men*, all the numbers retain the same stations and duties, excepting that No. 5 also acts as Shotman, and No. 2 attends to the handspike and train tackle in addition to the duties of 2nd Captain.

153. This arrangement exhibits the gun's crew placed as the men should stand when first assembled at quarters, either for inspection or any ordinary exercise. It is intended that the men are then to stand parallel with the gun, and facing inboard.

#### CALLS FOR ASSEMBLING AT QUARTERS.

154.

##### **BEATS OF DRUM :**

1st. THE ORDINARY BEAT, will be the call for INSPECTION at general quarters ;

2nd. The ordinary Beat, followed by ONE ROLL—EXERCISE at general quarters, *without powder* ;

3rd. The ordinary Beat, followed by two rolls,—ACTION ; or, EXERCISE at general quarters *with powder*, as though engaged IN BATTLE.

155. On assembling at quarters for inspection or general exercise, unless directed otherwise, *in port*, the men are first to go to the starboard guns on the spar deck ; the port guns on the main deck ; the starboard guns on the next deck below, and so on. *At sea* they are first to go to the weather guns, or, if the ship be dead before the wind, to the same sides as in port.

156. When assembled for *inspection*, besides seeing that all the guns and articles belonging to them are in order and in place, it is suggested that occasionally the men, without arms or implements, or casting loose the guns, shall be called away *and mustered* in their stations as Boarders, Pikemen, Sailtrimmers, and Firemen ; and also practised in shifting from one side to the other, and in taking their places for fighting both sides at once.

157. On assembling for exercise at general quarters without powder, after the men have been mustered and the divisional reports made, the order will be given : ‘ CAST LOOSE AND PROVIDE ! ’

Then the starboard watch will *provide and cast loose* the starboard guns, and the port watch will *provide and cast loose* the port guns.

The 1st parts of guns’ crews on the *starboard side* providing and casting loose the *odd*, and the 2nd parts the *even* numbered guns. The 1st parts of guns’ crews on the *port side* the *even*, and the 2nd parts the *odd* numbered guns. In securing guns the same order of distributing the men is to be observed.

When both these services of providing and casting loose have been performed, and the luffs choked or hitched and trucks choked, the men are all to return to the guns at which they were mustered, and, taking their places, await in silence further orders, if not already given.

158. When assembled for exercise as though actually engaged in battle, besides what is prescribed for an exercise at general quarters without powder, the further preparations indicated hereafter will be made. *The guns’ crews will proceed at once to provide and cast loose both sides without waiting to be mustered, or for any further orders.*

159. The call for *Boarders* to repair to the spar deck will be by the *rattle* and verbal order, repeated by the Officer of each division of guns.

On the first call or order the first division only will repair to the spar deck. If the call or order should be repeated before the first division shall have returned to their guns, the second division will immediately repair to the spar deck.

160. The call for ‘ *Pikemen* ’ to ‘ *repel boarders* ’ will be by *sounding the Gong*. At this signal *all* the Pikemen will assemble on the spar deck with their pikes.

161. ‘ *All hands* ’ will be summoned to *repel boarders* (see article 92) by springing the rattles and sounding the gong together, and by verbal orders.

162. 'Sailtrimmers.' The particular division that may be wanted at a time will be called by *passing the word for it*.

163. The call for 'Firemen' to repair to the spar deck will be given *verbally* and by *striking the ship's bell rapidly*. The *rapid* ringing of the bell will be the FIRE ALARM at all times, when the crew will immediately assemble at quarters.

164. *Boarders, Pikemen, and Sailtrimmers* of the *spar-deck guns*, or any portion of them, and of the Master's division, as well as the Marines, may be ordered from their quarters to perform a particular service, *without any call*, whenever the Captain may deem proper.

165. Men called from any of the foregoing duties will, on reaching the spar deck, form on the gangway, upon the side not engaged with the enemy, unless otherwise directed at the time.

166. When called to quarters every person is to repair to his station promptly and without unnecessary noise; and on the order 'to your quarters' all will return to their stations in the same manner.

## PREPARATIONS FOR EXERCISE.

### AT GENERAL QUARTERS WITHOUT POWDER.

167. Sling the topsail yards and gaffs and put the preventer braces in place; distribute fighting stoppers and jiggers; stopper the clews of the topsails; get whips on each side of the lower masts for tricing up the pendant tackles, and also the mast bands and fishes required for securing a crippled mast. Make arrangements for using grapnels; get hauling lines ready for sending small arms and ammunition into the tops; if not on soundings, haul over boat and boom covers and stop them down; bring up and stow hammocks, if down\*; haul over and secure the hammock-

\* The Executive Officer of the ship should appoint a sufficient number of men in each watch for the purpose of stowing the hammocks of the watch below in case of being called to quarters in the night, so as to prevent confusion and insure the greatest possible despatch in clearing for action. The requisite number of men for this purpose is as follows:

For a Ship of the line, twelve men in each watch.

„ Frigate,	ten	„	„	„
„ Sloop of War,	eight	„	„	„

By this arrangement four men will always be at hand to stow each netting. The

cloths; hook and mouse the relieving tackles; place the spare tiller and compass at hand; put the chronometers, and other instruments of navigation, out of the reach of shot; distribute the small arms, together with their accoutrements and a supply of filled cartridges, to the men appointed to use them; place axes and hatchets at hand on the spar deck for clearing away incumbrances at guns.

If underway and on soundings, get the boats ready for hoisting out; the ground tackle ready for use and keep it clear, and make every preparation for towing, warping, and anchoring with springs on cables; stopper the chains; get lights in the light rooms, including those of the shell rooms; light powder division, and gun-decks if at night and it be ordered by the Captain; drop magazine screens; get shot and shell whips, and buckets or nets, in place; rig canvas shoots for returning empty passing-boxes; remove every obstruction to the free passage of powder; clear away and open shot-lockers; see the hatchways of the next deck above the powder division properly covered; division and fire-tubs in place, with wet swabs by them, and at the landing of each line of scuttles through which the passing-boxes pass; rig main, force, and channel pumps and fire engine, which fill with water; get slings ready for lowering the Carpenters outside and materials for stopping shot-holes; take down cabin and other bulkheads, when directed, and pass them below; sand the decks; place a bucket of water and a wet swab in rear of each gun; have spare breechings at hand; rope ladders for hatchways in place; a bag containing a flask of priming powder and the following *spare* articles: two locks, four lock-strings, eight thumbstalls, two boring-bits, two priming-wires, a shackle-punch and pins and some old rags, to be slung round the neck of each Quarter Gunner of each division of guns; rammers and sponges placed, and the latter uncapped; one ladle and one worm in place, on each side of the deck, for each division; pistols, in frogs, furnished with cartridges and caps, and cutlasses and battle-axes, belted round the respective persons designated to wear them; marines accoutred and under arms, and distributed as the Captain may direct; tourniquets to be distributed, as may be judged necessary, to each Quarter Gunner of a division, or otherwise. (*See articles 139 and 151.*)

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stowage should commence in the middle and at each end at the same time, the men placed in the middle standing face to face and stowing towards the ends, while the others stow towards the middle of each netting. Hammocks make the best stowage on the bight and perpendicular, when that method can be followed.

## PREPARATIONS FOR EXERCISE

AT GENERAL QUARTERS WITH POWDER, OR AS THOUGH ENGAGED IN BATTLE.

168. In this case, besides what has just been prescribed for a General Exercise *without powder*, the following further preparations will be made : Put out galley fire and all unauthorised lights ; light match and place it in manger ; open magazines and powder tanks, and also shell-rooms, when ordered ; close and secure air-ports ; fill division and fire tubs with fresh water ; place cans of fresh water and wet swabs in magazines and shell-rooms ; light up the cockpit, or other place, for the wounded ; place mattresses, and, if there be room, sling spare cots ; get ready the amputating table, instruments, bandages, lint, medicines ; have the requisite supply of fresh water and swabs, and sprinkle the decks.

## PROVIDING BROADSIDE GUNS.

169. When the exercise of broadside guns is to be confined to one side only, each *gun's crew* is to provide its own gun, on the side at which it is ordered to assemble, as follows : but when the guns on both sides are to be exercised at once, each *part* of a gun's crew is to provide its own gun ; each Captain, Loader, Sponger, &c., doing separately what is done by both himself and his second when the exercise is confined to one side only.

170. Captains of guns to provide themselves with percussion primers, thumbstalls, and priming-wire, and to see that the men of their respective parts of the gun's crew discharge their several duties promptly and carefully.

171. Spongers provide sponges and rammers ; and, *when both sides are manned*, shift them and their brackets to the left of the gun.

172. Loaders provide a bucket of water and a wet swab.

173. Shotmen provide a sufficient supply of selvagee and six-junk wads, and, after placing the shot-rack in rear and to left of the piece, supply it with shot from the lockers.

174. Handspikemen see the handspikes in place, and then assist in getting up shot for the guns.

175. The Powderman or Boy is to provide an empty passing box, if no powder is to be used ; otherwise he is to present himself at the appointed place to receive a full one.

176. The Fireman is to take down the fire bucket and place it and the battle lantern in their appointed places. On gun-decks the lantern should be hung up at the ship's side, or in rear of and between the guns, as may be directed, and lighted when ordered by the Captain, and the fire bucket directly in rear of the gun. On spar decks the bucket may be laid on the deck, or hung up in any convenient place in rear of and near the gun.

177. Side-tacklemen provide sand and water, and sprinkle and sand the decks, if directed.

178. Quarter Gunners of divisions, besides equipping themselves, as already directed (*article 167*), with a bag of spare implements, will attend to the 'Supply' and 'Reserve' boxes of their divisions (*see article 150*), and distribute the belts, primer boxes, and other articles which they contain, to the guns' crews, as soon as practicable, and then keep themselves ready to furnish any reserved or spare articles which may be required, such as spare breechings, ladles, and worms, and will see the battle lanterns provided with candles with primed wicks, ready for lighting when ordered by the Captain.

179. The swords and pistols should be always available for the Boarders, at the shortest notice ; but their particular disposition at quarters, and at what time the pistols shall be loaded, will be determined by the Captain, as in his judgment circumstances at the time may require.

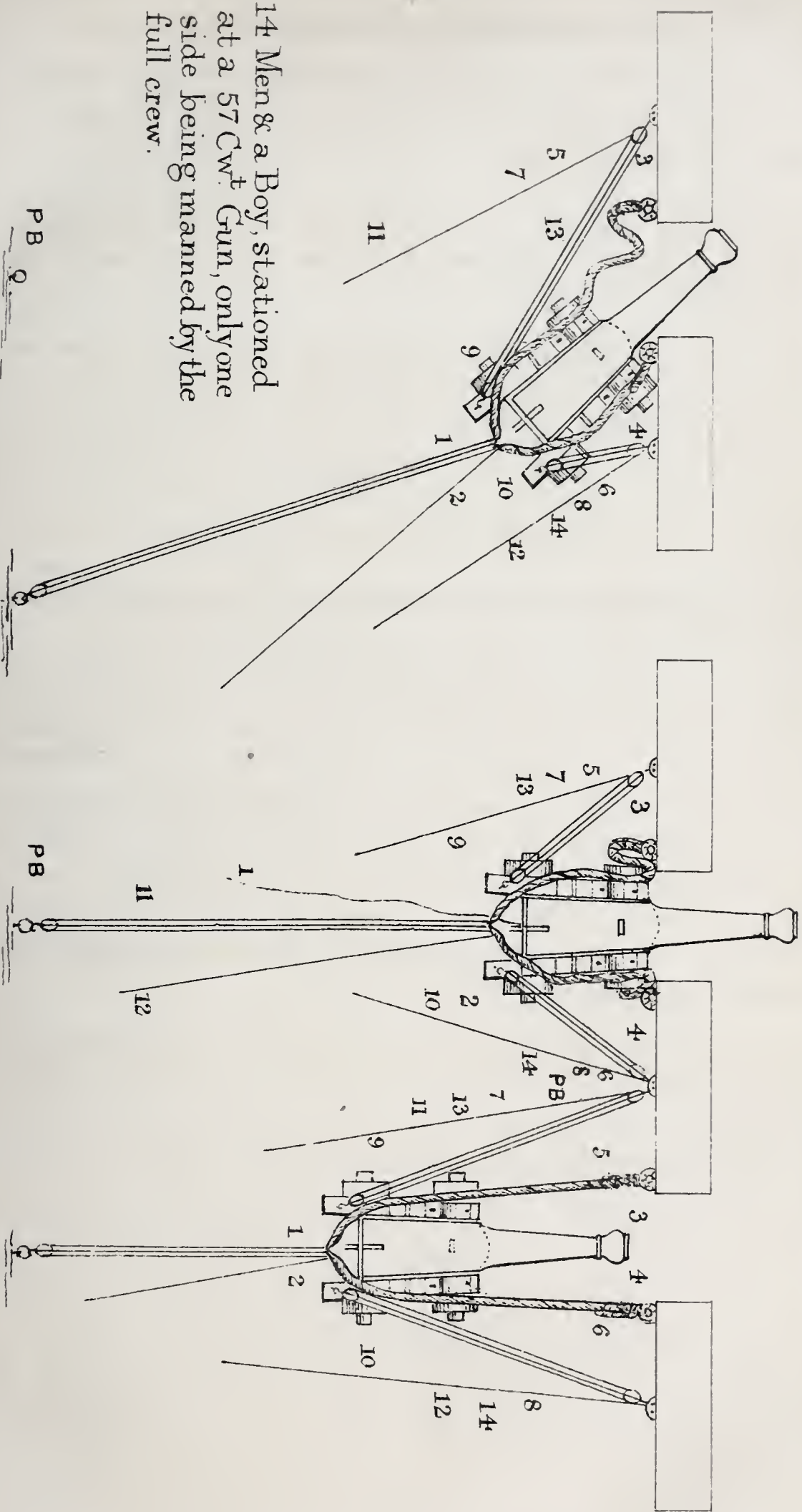


# Diagram A.

## POINTING

## FIRING

## LOADING.



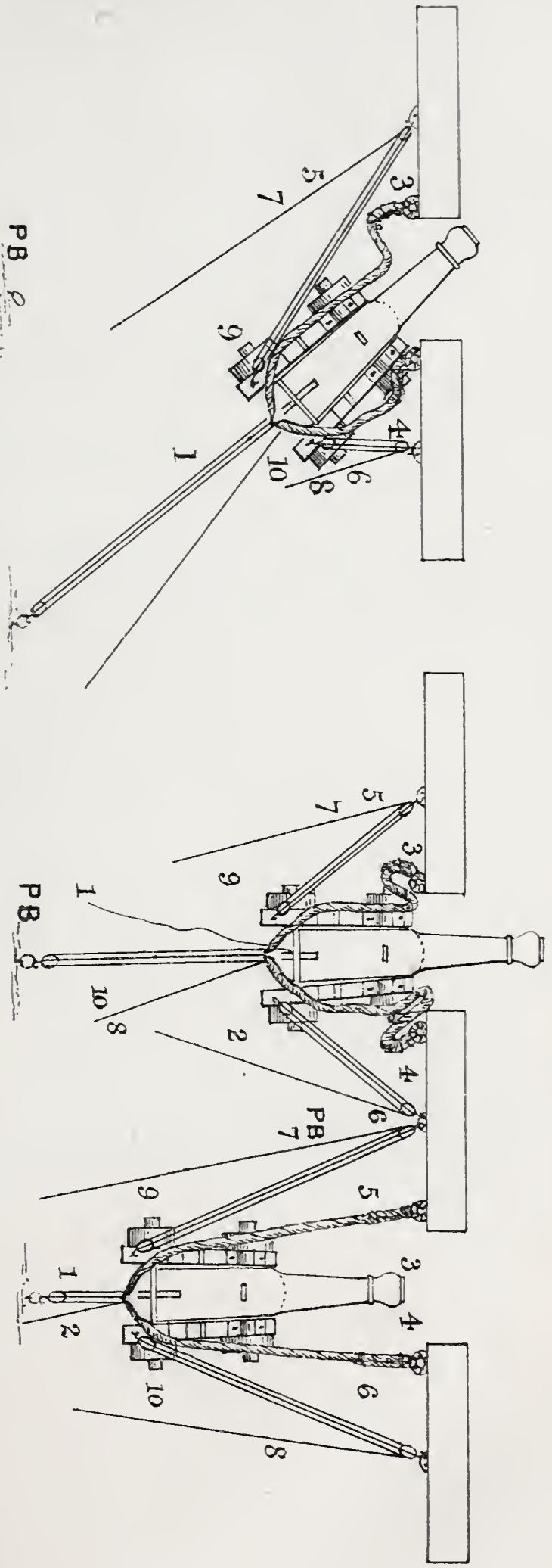


# Diagram B.

POINTING.

FIRING

LOADING



10 Men & a Boy, stationed at a 42 Cwt Gun, only one side being manned by the full crew.



## MANUAL EXERCISE.

EXERCISE OF BROADSIDE GUNS, ON ONE SIDE ONLY.

180.

**WORDS OF COMMAND:**1st. SILENCE! 'MAN THE STARBOARD (*or Port*) GUNS!'

2nd. 'CAST LOOSE AND PROVIDE!'

3rd. '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!'

The Exercise commences on the supposition that the guns are loaded and run out, but the order of the Commands may be varied to suit any other state of the case. The following is to be the mode of executing each of the above orders:

I. 'SILENCE! MAN THE STARBOARD (*or port*) GUNS!'

181. At this preparatory order the strictest silence is to be observed. The Captain faces the port, the men, on the right and left, stand facing the gun; all fix their eyes on the Captain and attentively wait for orders.

## II. 'CAST LOOSE AND PROVIDE!'

182. The 1ST CAPTAIN commands, sees his gun cleared and cast loose, portlid unbarred ready for tricing up, or half ports taken out; side and traintackle hooked, the sidetackle to the side training bolt, and the traintackle to the eye bolt in the deck in the rear of the gun; casts loose and middle breeching and places selvagee straps and toggles amidships; takes off lock cover and hands it to the train-tackleman, who places it amidships; buckles on his waist-belt, (*furnished as directed in article 150;*) provides himself with a priming wire; puts on and secures his thumbstall; and sees that the gear and implements for the service of the gun are all in place and ready for use, and that the men are properly equipped.

When the gun is ready for action he sees that the men take their proper positions, and reports to the Officer of the sub-division to which he belongs.

183. 2ND CAPTAIN assists in casting loose and middling breeching; takes off and places amidships sight covers, selvagee straps, and toggles; handles quoin; provides thumbstalls, priming wires, and boring-bit, and equips himself with the first two; clears lock-string and lays it in a loose coil round the lock, convenient for use, and buckles on his waist-belt, furnished as 1st Captain's. At Friction Carriages he removes the housing chocks.

184. 1ST LOADER, aided by 1st Sponger, casts loose port-laniards, removes upper half port, and passes it to the men on the left side of the gun, who lay it amidships; lets down the lower half port. On *lower decks* casts off port-laniards and muzzle-lashing; removes port-bar and passes it to the men at the left side of the gun, who lay it amidships; bears out port. On all decks places hand swab and chocking quoin near the ship's side on the left side of the gun; aids 1st Sponger in taking out tompion.

185. 2ND LOADER assists in casting loose; places shot grommet and shot on the left side and in rear of the gun when the gun is run in; sees the

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wads in place; hooks double block of sidetackle to side training bolt, on the left side of the gun; and at *Friction Carriages* sees the compressor clear and in working order.

186. 1ST SPONGER casts loose port-laniards and aids 1st Loader in removing upper half-ports and letting down lower ones, and on lower decks in removing the port bar, bearing out the port and taking off the muzzle-lashing; takes out tompion and passes it to 2nd Sponger, who hangs it amidships; places chocking quoin on the right side of the gun, near the ship's side.

187. 2ND SPONGER assists in casting loose; hooks double block of side tackle to the side training bolt, on the right side of the gun. At *Friction Carriages*, where there are two compressor bars, attends right compressor bar.

The spongers take down the sponges and rammers; take off the sponge-cap and hang it up out of the way; place sponges and rammers together, on the right side of the gun, heads toward the breech, in the brackets overhead on covered decks, otherwise on deck.

The SIDE-TACKLEMEN assist in casting loose; on lower decks, aid Port-tacklemen.

188. SHOTMEN assist in casting loose.

189. TRAIN-TACKLEMEN lead out and hook traintackle.

190. HANDSPIKEMEN take out the handspikes on their respective sides, each standing between his handspike and the side of the ship, place the heels of their handspikes on the steps of the carriage and under the breech of the gun, and raise it so that the quoin may be eased and the lower half port let down, or, when housed, the bed and quoin adjusted. Then each Handspikeman will lay his handspike on deck, on his own side of the gun, parallel with its axis, clear of the trucks and butt to the rear.

191. POWDERBOY repairs to his proper scuttle for his passing-box, which having received he returns and stands a little to the left and in rear of the gun, keeping the passing-box under his left arm, and the cover closely pressed down with his right hand.

192. When there are *fourteen or more* men at a gun, the PORT-TACKLEMEN and SIDE-TACKLEMEN, on lower decks, lead out port-tackle falls and assist in tricing up the port, and when high enough belay the fall.

193. In the temporary absence of the first Captains, Loaders, or Spongers, *when at quarters on one side*, their Seconds will take their places and perform their respective duties.

194. With a gun's crew of *ten or more* men, No. 7 will take the place of No. 5, and No. 8 of No. 6, when Nos. 5 or 6 are absent temporarily.

III. 'PRIME!' (*See notes on Manual, and Diagrams A and B.*)

195. The Captain of the gun lays back the hammer, clears the vent with the priming-wire, and feels that the cartridge is home; then takes a primer from the box, and, shutting the box, puts the primer into the vent, with the wafer flat upon the vent field, turning down the hammer upon it to keep it in place.

IV. 'POINT!' (*See Diagrams A and B, and notes on Manual.*)

196. At this command the Handspikemen, standing abreast of the rear trucks and facing from the gun, take up their handspikes and then face inboard, ready to apply them as may be required.

All the other men, at each side of the gun, man the sidetackles, except the 1st Train-tackleman who attends the train-tackle.

The Captain of the gun adjusts the bar of the breech sight to the distance given by the Officer of the division and to the charge, and taking the lock-string in hand, and stepping back clear of the recoil, brings his eye in range with the sights and the object—the water line always, if a ship. He then directs the men at the side-tackles and the Handspikemen, if required, to train the gun until the sights are in a line with the object, giving the word '*right*' when the right tackle and '*left*' when the left tackle is to be bowsed upon.\* [When mounted on a *Friction Carriage* the gun is trained with train-ropes.] When the gun is properly elevated and trained on the object, the Captain of the gun signifies it by the word '*well*,' and the Handspikemen unship the handspikes and lay them on the deck parallel to the gun, flat side down and butts to the rear. The men at the side-tackles keep them in hand and taut. [At *Friction Carriages* the Compressormen tighten the *compressor*.]

\* If the gun be square in the port and it be requisite to train sharp, forward or aft, the object will be more readily effected by running the gun in to a taut breeching, and then running it out on the forward side of the port, to train sharp aft, and the contrary to train sharp forward.



Should it be necessary to alter the elevation of the gun, the Captain of the gun gives the order to raise or lower the breech, and the Handspikemen immediately place their handspikes on the steps of the carriage (keeping between the handspikes and the side of the ship) and raise the breech. As soon as the quoin is free the 2nd Captain takes hold of it with both hands, while the 1st Captain regulates the elevation by giving the word 'raise' or 'lower,' always cautioning the Handspikemen to lower steadily and slowly when the gun has nearly the proper elevation.\*

When the proper elevation is given, the 1st Captain gives the word 'well,' and the 2nd Captain forces the quoin tight under the breech, giving the word 'down' as soon as he perceives the quoin supports the gun; he then throws back the hammer.

The Captain of the gun, retaining his position for aiming, directs further alterations, if necessary, and then having the lock string taut, and his eye in range, waits until the line of sight is brought on with, or in proper position for, the object, when he gives the word—

V. 'READY—FIRE!' (See Diagram and notes.)

197. At the word 'Ready' the men drop the sidetackles and lay down their handspikes, and the Train-tacklemen, keeping out of reach of the recoil, attend the train-tackle to take in the slack at the moment of firing, or, in case the recoil be too rapid for this, to jerk all parts of the tackle out of the way of the carriage.†

At the word 'Fire!' the Captain of the gun pulls the lock-string with a strong pull, without allowing his attention to be divided by any attempt to move from his position, unless obliged to do so.

The command should be accompanied by a corresponding sign, made by raising the left hand at the word 'Ready' and by lowering it smartly at the word 'Fire!'

If the gun recoil to a taut breeching, the Train-tacklemen haul taut the train-tackle and secure it, either by choking the luff or by a half hitch

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\* If the gun be provided with an elevating screw, or with a screw quoin, it will be unnecessary to use the handspikes, unless considerable changes of elevation are required, as the 2nd Captain, directed by the 1st Captain, can adjust the elevation by the screw.

† In moderate weather and smooth sea, or with Friction Carriages, it will not be necessary to keep the double block of the train-tackle hooked, except when the gun does not recoil sufficiently for loading. The chocking quoins will then be sufficient to prevent the gun from running out.

round the strap of the single block; but if not, all the men, excepting 1st Captain, 1st Loader, 1st Sponger, and Powderboy, assist the Train-tacklemen in running the gun in. If the ship be rolling deep, or in working the lee guns when there is much heel, the 1st loader and 1st Sponger chock the fore trucks with the chocking quoins as soon as the gun is in, placing the quoins under the trucks somewhat obliquely, so that they may be more easily removed.

If necessary the Handspikemen level the gun for loading.

In firing lower-deck guns, when it is necessary to lower the ports while loading the gun, the Port-tacklemen stand with the port-tackle falls clear and ready to lower as soon as the gun is fired. The loader hauls the port-lid to its place by a laniard, which he hitches to the breeching-shackle bolt. The Handspikemen, directed by the Captain of the gun, lay the gun fair for working the sponge and rammer through the port-scuttle.

VI. 'SERVE VENT AND SPONGE!' (*See notes.*)

198. The Captain of the gun steps up to the breech, lays back the hammer, places the lock-string over it in a loose coil, and clears the vent with his priming-wire.

The 1st Sponger and 1st Loader get inside of the breeching and place themselves by the muzzle on their respective sides. The 2nd Sponger, facing from the gun, takes up the sponge with both hands and passes it to the 1st Sponger, who puts it into the muzzle of the gun and shoves it well down. The Captain of the gun then stops the vent closely, taking care to keep it stopped until the men are clear of the muzzle in loading.

Then the Sponger and the Loader push the sponge home, and *pressing* it *firmly* against the bottom of the bore, turn it *from* the Sponger two or three times, that the worm may free the bottom of the bore from any substance which may have adhered thereto. They then draw out the sponge and the Sponger strikes the staff several smart taps against the swell of the muzzle to shake off any adhering substance. Should any burning fragments be drawn out, the Loader extinguishes them with the wet swab, and the operation of sponging is repeated.\* Then the 1st Sponger returns the sponge to the 2nd Sponger, who hands him the rammer and lays the sponge in place. The 2nd Handspikeman examines and clears the sponge-head and worm.

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\* The Spongers and Loaders are to be careful to keep their bodies within the ports as much as practicable. (*See notes on this Command, relative to the use of the moist sponge.*)

After sponging, the Captain of the gun will try the vent with his priming-wire. If at any time he should be unable to clear it with the wire he will use the boring-bit\* or vent-punch, and if these should fail, he will have recourse to the vent-drill and brace in charge of the Quarter Gunner.

In every case of this kind, the obstruction after it has been pushed down into the bore, should be removed by the sponge before loading.

VII. 'LOAD WITH CARTRIDGE!' (See note.)

199. The Powderboy moves up to the 1st Loader with the passing-box under his left arm, and his right hand on the lid, which he removes as he presents the mouth of the box.

The 1st Loader, facing towards the gun, takes the cartridge from the Powderboy and puts it in the bore, tie outward and seams from the vent, and shoves it well down with his left hand.

The 1st Sponger receives and enters the rammer, and, assisted by the 1st Loader, shoves the cartridge down steadily and *without violent ramming*, until it is perceived by the mark on the rammer to be home; then the Sponger and Loader, letting go the staff, fall back clear of the muzzle and wait for the word of command from the Captain of the gun.

The Captain unstops the vent and feels if the cartridge be home, and if so, gives the word 'Home;'; but if it be not home, he *withdraws the priming-wire*, stops the vent, and gives the order 'Set home!'† when the 1st Sponger and 1st Loader resume their positions and repeat the operation until the cartridge is home; at the word 'Home' the rammer is withdrawn.

The Powderboy having delivered his cartridge repairs immediately to the supply-scuttle from which he receives his powder, passing on the opposite side of the deck to that which is engaged; carrying his box uncovered, with the mouth downward, and striking it with his hand that any combustible matter may be dislodged before another cartridge is put in.

\* The boring-bit should be used with great care, as, being of steel, it is liable to be broken off in the vent, and thus to spike the gun.

† Particular attention should be paid to the directions given for sponging the gun and setting home the cartridge, which have in view the safety of the men, and the risk of spiking the gun by bending the priming-wire.

VIII. 'LOAD WITH SHOT (OR SHELL)!' (*See notes.*)

200. *When loading with a shot* the 2nd Loader passes it and a selvagee wad to the 1st Loader, who puts the shot into the bore of the gun, with the wad over it, and shoves them well down with his left hand.

The 1st Sponger then introduces the rammer, and, assisted by the 1st Loader, pushes the wad and shot down and sets them home, as in loading with cartridge. The Sponger withdraws the rammer and returns it to the 2nd Sponger, who lays it in place.

*When loading with a shell*, the time of the fuze having been designated by the Officer of the division, the 2nd Loader takes the shell out of the box and passes it to the 1st Loader, who enters it fairly into the bore, sabot first and fuze outward, or up and outward, according as the shell is strapped, and keeps his hand on it to prevent its falling out. The 2nd Loader covers the box again and passes it to the shotman, who, on his return for another shell, sends the empty box below.

The 1st Loader strips the leaden patch off the fuze by taking hold of its projecting flap with the thumb and forefinger of his right hand, first raising it a little and then giving it a jerk, and passes the patch to the 1st Captain as an evidence that the priming has been exposed.\* Unless the patch be removed to expose the priming, the fuze will not ignite, and, consequently, the shell cannot explode. He is to be careful not to touch the priming with his fingers for fear of injuring it by moisture.

The 1st Sponger, assisted by the 1st Loader, *pushes* the shell home firmly and carefully, without either ramming, which might injure the priming of the fuze, or turning the rammer, which might alter the position of the fuze in the bore.

No wad is to be used over the shell, except when the vessel rolls so heavily as to render it necessary, in which case it should be a selvagee wad.

*When two solid shot* are used together no wad is to be placed between them, and no wad will be required over grape.

If, in loading, a shot should stick in the bore, no attempt should be made to force it down, but it should be withdrawn. This may be done with the ladle, by striking the muzzle hard against the lower sill of the port, or by striking the breech, the muzzle being depressed, with a heavy wooden maul.

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\* The 1st Captain is to be instructed to preserve the patches he receives from the 1st Loader and to account for them at the end of the exercise.

If the impediment is caused by the shot it should be thrown overboard at once.

The shot or shell being home, the 1st Sponger and 1st Loader step over and take their places outside of the breeching, with their hands on the handles of the chocking-quoins, ready to remove them.

The Handspikemen will ship their handspikes in the training-loops, ready to assist in giving the gun the required direction in running out.

The side-tackles, hooked to the side of the ports, or to middle bolts, as occasion requires, are now to be manned, and, if in a seaway, the Train-tackleman will stand ready to unchoke the luff and ease the gun out.

#### IX. 'RUN OUT!'

201. If the gun be mounted on the ordinary truck carriage the 1st Captain will take the left handspike, and the 2nd Captain the right handspike, and place themselves in position to guide the gun in the proper direction for the object.

The 1st Loader and 1st Sponger remove the chocking-quoins, which they place behind them against the side of the ship, and lift the breeching to prevent it from getting foul of the trucks.\*

At Friction Carriages the 2nd Loader slacks up and attends the compressor.

The Train-tacklemen clear the train-tackle and attend it, as the case may require.

The rest of the gun's crew, † except the Powderboy, man the side-tackles and unite to run out the gun, training it as ordered at the same time. When the gun is out and trained the Handspikemen unship the handspikes from the training loops, use them under the breech as required, and lay them on deck, *as directed in article 190.*

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\* When the gun's crew consists of less than twelve men only the *left* handspike is used in guiding, and the 2nd Captain keeps through the slack of the breeching, which will be facilitated by a span over the chase.

† When working the lower deck guns, and the port-lids are lowered, the Port-tacklemen will man the port-tackle falls, when the order is given to 'run out.' The port-lid must be triced *considerably above the level* to prevent its being injured by the explosion of the charge, and the falls secured to the cleats on the beam over the gun. The motions of tricing up and lowering the port-lids should never be omitted *in exercise*, in order that the men may be accustomed to them.

## THE MARSILLY CARRIAGE,

202. Used for mounting the IX-inch shell guns in broadside, requires some modification of the foregoing exercise, as it has no rear trucks, but is worked by a roller-handspike, hooked in a loop in the rear transom, and is elevated by a screw through the neck of the cascable instead of a bed and quoin. The roller-handspike is used by the 2nd Captain, either to facilitate or moderate the running *in* and *out*, and in training. The elevating screw is used by the 2nd Sponger.

If the exercise is to be continued it will be resumed at the word 'prime;' but if not the order will be given,

## x. 'SECURE!'

203. The Powderboy returns the spare powder and the passing-boxes to the magazine. The Shotmen return the shells and empty shell-boxes, if any remain on deck, to the shell room and the spare shot to the lockers.

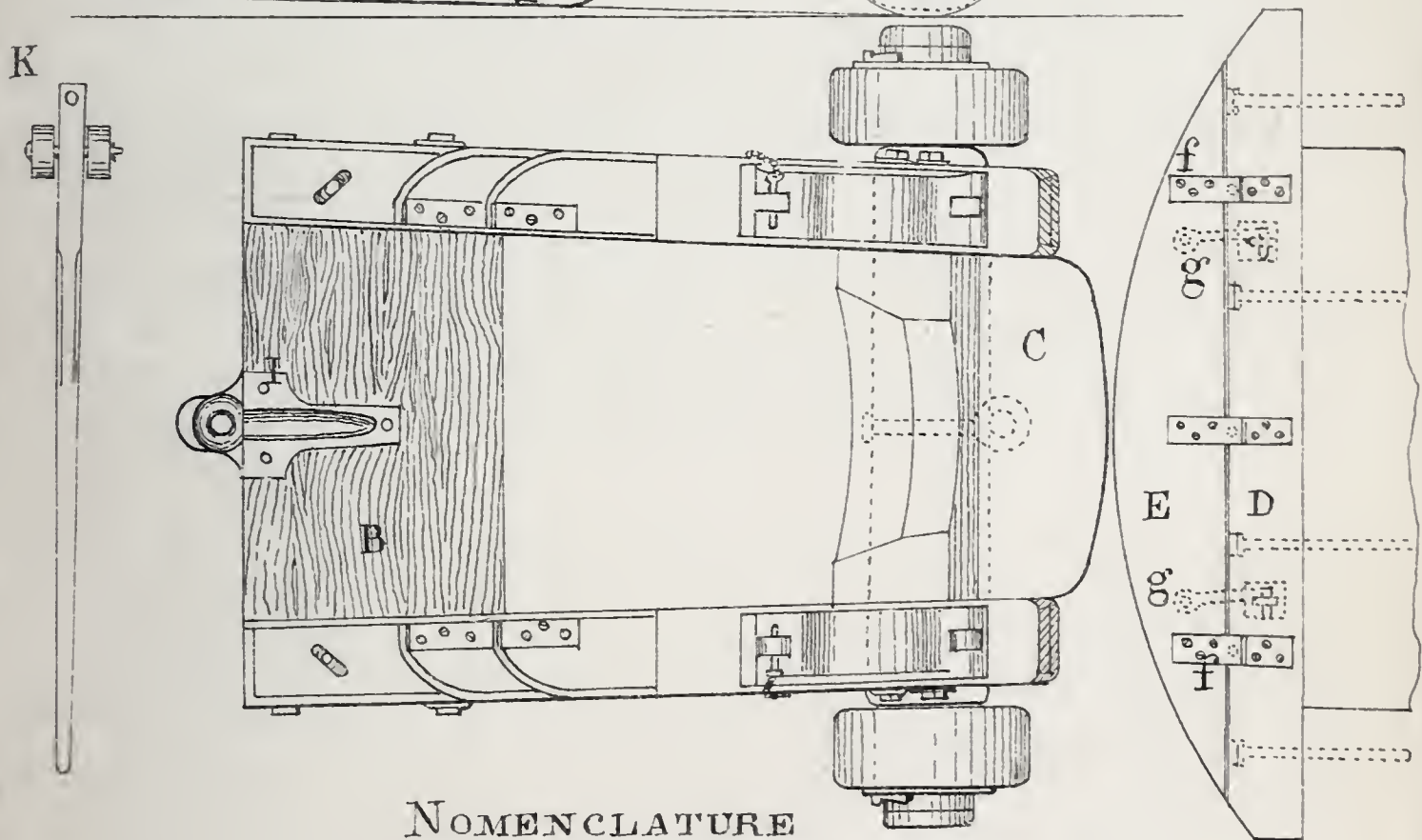
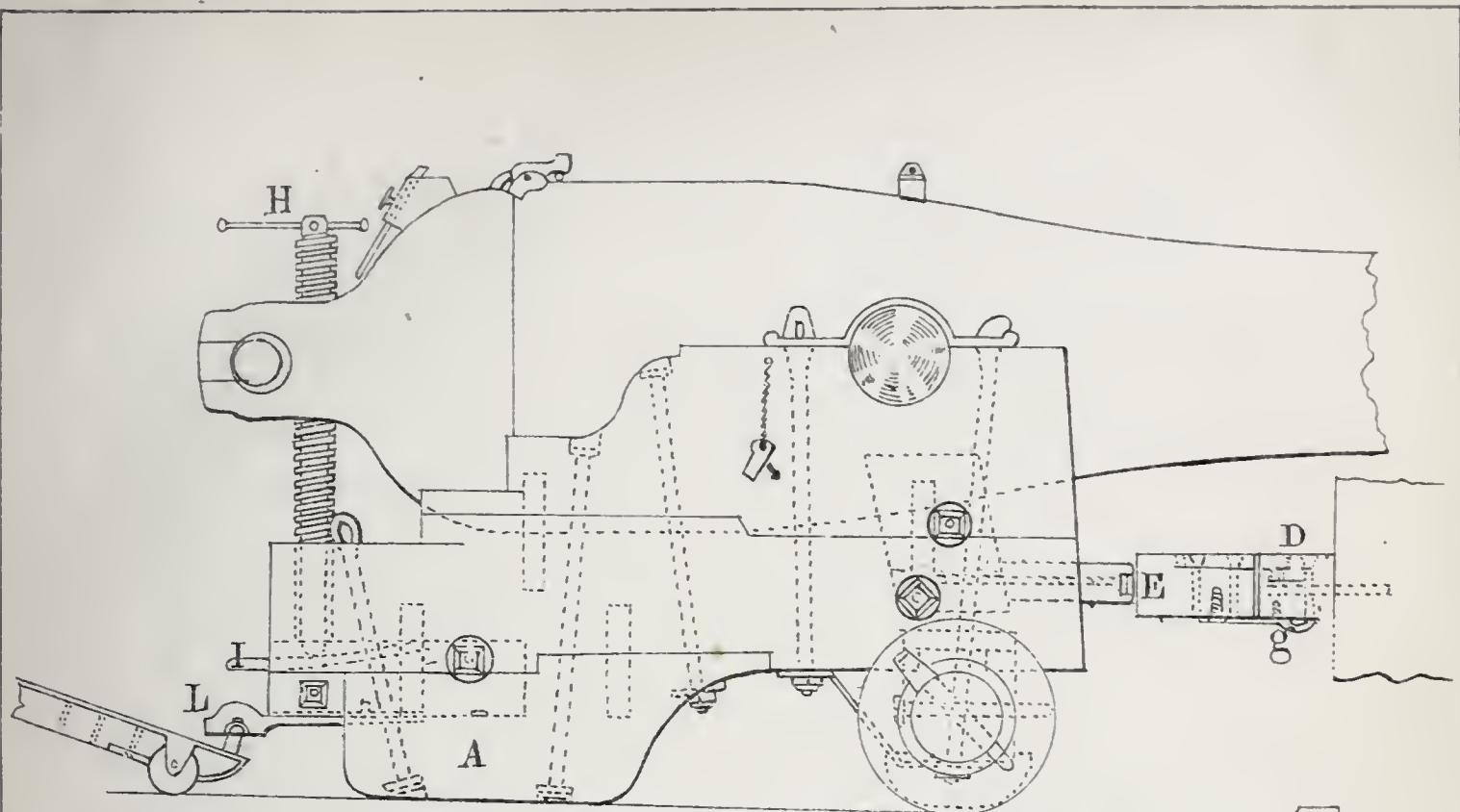
The 1st CAPTAIN directs the gun to be laid square in the middle of the port.

When the guns are to be secured without being housed the 1st Loader and 1st Sponger place the chocking-quoins square up against the rear part of the front trucks and put in the tompion. The Handspikemen free the quoin and lower the breech, the 2nd Captain handling the quoin. When the gun is fitted with an elevating screw this operation is performed by the 2nd Captain alone, who handles the screw.

The 1st Captain, assisted by the 2nd Captain, hauls the breeching through the jaws of the cascable to the port side of the gun, forming with the bight a turn over the breech and 1st reinforce, and securing the parts on each side with selvagees and heavers; or, if this should interfere with the breech-sight, by crossing the breeching at the side and securing it with selvagee straps and toggles.

The 1st Loader and 1st Sponger haul up and secure the lower half-ports. The 1st Captain puts in the vent plug, lays the hammer of the lock in its place, and the lock-string in a coil around it. The 2nd Captain takes the lock cover from the Train-tackleman and secures it over the lock, and in like manner covers the breech and reinforce sights; [and at Friction Carriages puts the housing-chock into the slot in the rear of the gun, and raises the training trucks clear of the deck, by means of a chock under the slide.]

MARSILLY CARRIAGE FOR IX IN SHELL GUN.



NOMENCLATURE  
OF PARTS PECULIAR TO

- |   |  |
|---|--|
| A. The lowest piece of the Bracket, in place of rear truck of ordinary Carriage | D. Fixed below the Port-sill   |
| B. Rear Transom in place of rear axle   | F. Movable, with brass catches (f.f.) and hooks and eyes (g-g)           |
| C. Breast-piece (fixed)   | H. Elevating screw and lever with saucer (I.) in place of bed and quoin. |
| D.E. Sweep-pieces   |  |
| K. Roller Handspike   |  |
| L. Loop for D.  |  |





The men at the side-tackles unhook the double blocks from the side training bolts and hand them to the 1st Loader and 1st Sponger, who hook them to the eye-bolts at the sides of the port. The men on both sides haul them taut and stop the parts of the tackles together, with knittles provided by the Quarter Gunner, and then expend the remainder of the falls by passing them round the breech of the gun, above the jaws of the cascable, and stopping the bights alternately to the eye-bolts\* on each side of the port until expended.

The Train-tacklemen hook the train-tackle to the side-tackle bolts on each side of the port, the double block on the port side, haul the tackle taut, expend the end round the breech, and stop the parts in with the side-tackles.

The 1st Captain then directs the Handspikemen, or if the screw is used, the 2nd Captain, to raise the breech so as to level the gun and bring all parts of the tackles and breeching taut.

The 1st Loader and 1st Sponger put in and secure the upper half-ports, if directed, and the 1st Loader swabs the deck to collect any loose powder which may have been scattered on it.

The several persons who provided the arms and implements used in the exercise, return them to their proper places, or to the persons appointed to take charge of them, care being taken that the small arms are unloaded before they are sent below, unless otherwise directed by the Captain.

#### HOUSING LOWER-DECK GUNS.

204. *If the lower-deck guns are to be housed*, the 1st Captain directs the gun to be laid square in the middle of the port and run it to a taut breeching, *and if loaded, the load to be drawn*. The 1st Loader and 1st Sponger place the housing-chocks before the front trucks.

The gun is then run close up against the housing-chocks, and the chocking-quoins are placed square up behind the rear trucks.

The Handspikemen raise the breech to free the quoin; the 2nd Captain withdraws it and the bed; the Handspikemen lower the breech upon the axletree, so that in case the gun should break adrift, the muzzle will take the upper port sill; and the Port-tacklemen lower the port-lid.

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\* Should hook-bolts be substituted for the eye-bolts now in use for the side-tackles, as vessels are built or repaired, the turns of the fall will be taken round the hooks in securing the gun.

The 2nd Loader and 1st Shotman bring the port bar to the 1st Loader and 1st Sponger, who put it in place across the port, hook the port-hooks in the ring-bolts in the port-lids, and drive in the keys until the port is perfectly closed.

The men on both sides shift the side-tackles from the training bolts to the side-tackle bolts, haul them taut and expend the ends between the blocks. The 1st Loader and 1st Sponger pass the frapping lashing round both parts of the breeching, in front of the brackets, and with the assistance of the men nearest them bowse it well taut; and secure the muzzle by placing the grommet over it and the housing hook-bolt, and by frapping the two parts together with the lashing. When the housing bolt is an eye-bolt, a toggle will be necessary to keep the grommet in its place.

In moderate weather the train-tackle is unhooked from the deck, and made up and stopped along the side-tackle, on the forward side of the gun. In bad weather it is kept hooked, bowsed taut, and the end expended through the ring bolt and round the arms of the rear axle.

The manner of housing guns, mounted on truck carriages, on other decks, in bad weather, does not vary materially from that just described, excepting that the upper half-ports and the *port bucklers* are put in and secured.

When there are no housing chocks the ordinary chocking-quoins may be used as such. It will be an additional security to take off the rear trucks, and to tighten the muzzle lashing by raising the breech.

In housing broadside guns mounted on *Friction Carriages*, the gun is first run in and the housing-chock dropped into the slot in front of the gun, which is then run out hard upon the chock and the compressor tightened. The gun and implements are secured as at other guns, the training trucks being raised clear of the deck by means of a chock under the slide.

#### GENERAL REMARKS.

205. When the individuals of the guns' crews have become well acquainted with, and expert in the performance of their several special duties, they are to be successively transferred, temporarily, to the performance of the duties of some other station, until each man shall have become acquainted with the special duties of every station at the gun.

In exercising each man of a gun's crew in the duties of all the other men of that crew besides his own, it is to be done thus:

The system supposes that, beginning with the 2nd Captain to take the place of the 1st Captain, the men are to be called to perform the duties of the

latter in a regular succession agreeably to the way they are placed at the gun ; *i.e.* after the 2nd Captain the 2nd Handspikeman is to do the duties of 1st Captain ; after the 2nd Handspikeman, the 2nd Train-tackleman, and so on all round the gun. Each man is to fleet his position one remove or place, in a direction 'with the sun,' so that instead of the interchange of duties being confined to two individuals only, it is to extend to the whole gun's crew. Thus, for instance, when the 2nd Captain is called upon to do the duties of 1st Captain, the latter, by moving one place 'with the sun,' becomes the 1st Handspikeman, the 1st Handspikeman becomes the 1st Train-tackleman, the 1st Train-tackleman the 1st Port-tackleman, and so on all around the gun throughout the whole crew, the person at the muzzle of the gun on its left side crossing over and taking the place of the one at the muzzle on the right side. Next in order, the 2nd Handspikeman is required to take the place of the 1st Captain, then the 2nd Captain becomes 1st Handspikeman, the 1st Captain the 1st Train-tackleman, the 2nd Train-tackleman the 2nd Captain, and so on throughout.

If it should be desired to take, at first, a man from the middle of the crew of the gun, or even still farther towards the muzzle, to do the duties of 1st Captain, then it must be done under the supposition that all the men preceding him in the order above mentioned have already been exercised in those duties, and the men are then to take their stands accordingly.

After the guns' crews have been well trained by giving the words of command, it will be expedient to exercise them without giving the several detailed commands, by directing them to 'load and fire!' At this command the different individuals should, each in proper order of time, silently perform his prescribed duties of sponging, loading, running out, training and pointing, the Captain of the gun regulating the elevation and depression, by raising or lowering his hand, and by holding it horizontally and steady when the gun is 'well;' and in pointing, by moving his hand to 'right' or 'left' as the gun requires to be trained, and by bringing it down to his side when it is 'well.' Before firing, he is to throw his hand well up as a signal for the men to 'drop tackles,' and is to give the word 'fire' when he pulls the lockstring.

206. Whenever the crew of a gun becomes so greatly reduced in action that men enough are not left to work the piece, it may be fired while partially run in. In such case, however, the breeching should be frapped forward of the carriage, or otherwise arranged so as to keep the muzzle outside of the port ; the side-tackles should be hauled well taut and secured ;

the chocking-quoins placed square up against the after part of the rear trucks; the train-tackle hauled taut and well secured, and wet swabs placed up against the forward part of the front trucks and sprinkled with sand or ashes. The greatest possible care should be taken to guard against accident from fire.

It must be apparent to every officer that both the rapidity and the accuracy of fire to be obtained from guns in vessels at sea, must depend, in a great degree, upon the care which may be taken to explain to the men the best mode of performing their respective parts of the exercise, and the particular object for which each part is intended, and especially on such frequency of exercise and target firing as will make the men perfectly familiar with their prescribed duties. The importance of this instruction, which may decide whether an action shall result in victory or defeat, will, it is hoped, insure due attention to it from all officers, and especially from the officers of divisions at quarters.

THE GUNS ON ONE SIDE BEING MANNED,

TO CHANGE SIDES,

ON BOTH SIDES BEING MANNED,

TO MAN ONE SIDE ONLY;

COMMAND.

‘ MAN THE STARBOARD (OR PORT) GUNS ! ’

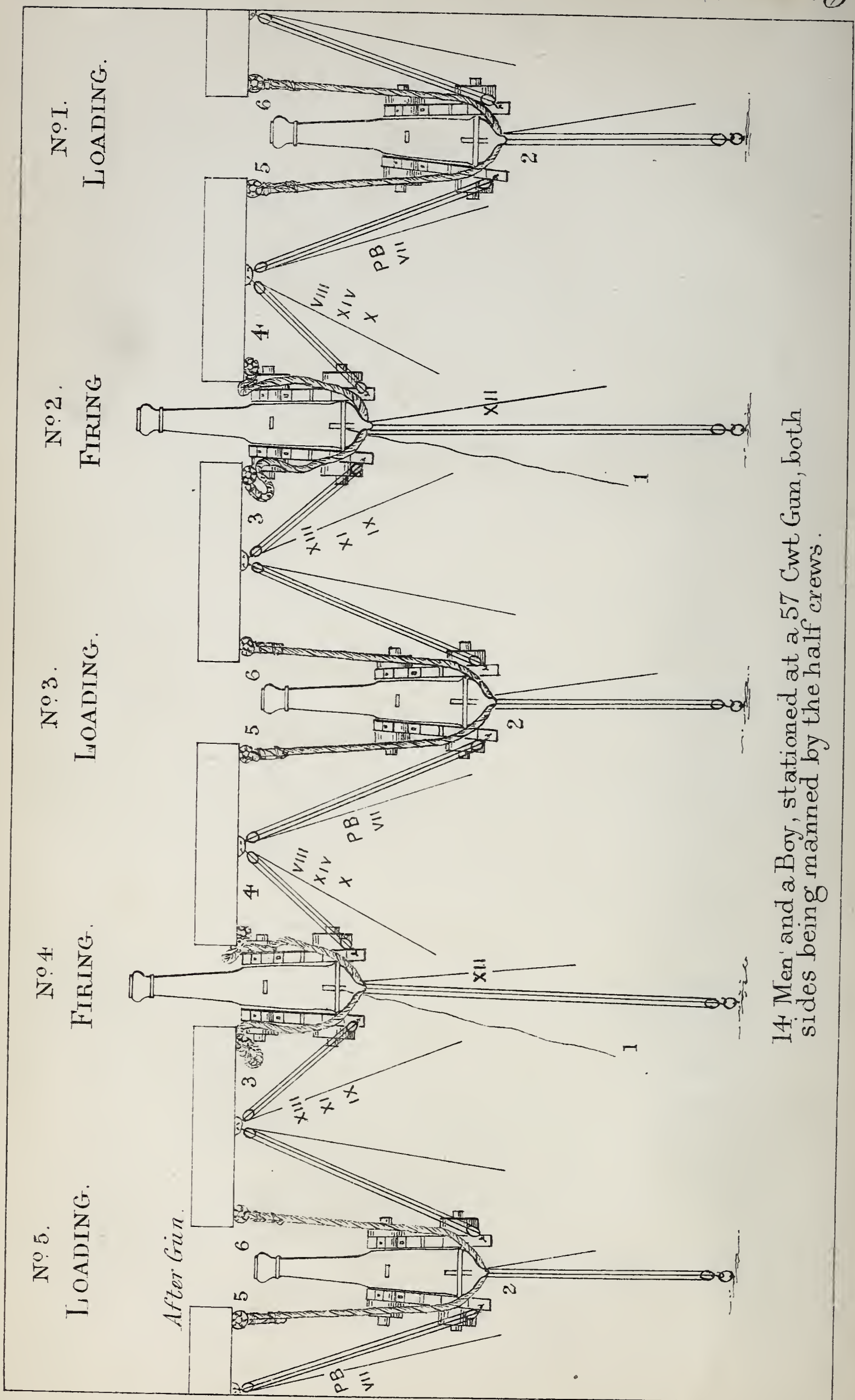
207. Whenever this or any other order is given which requires all the men suddenly to leave the gun which they are working, they are not to do so until it is properly loaded, and well secured by hauling taut the side and train-tackles, and hitching their falls around the straps of the single blocks; nor on lower decks of ships of the line till the ports are down and secured by their laniards. A strict compliance with this injunction is indispensable to guard against excessive or imperfect loading and other accidents.

When these precautions have been duly taken, the men will shift over in obedience to the command.



*Fighting both Sides.*  
PORT GUNS.

6



14 Men and a Boy, stationed at a 57 Cwt Gun, both sides being manned by the half crews.

# Diagram C.

## STARBOARD GUNS.

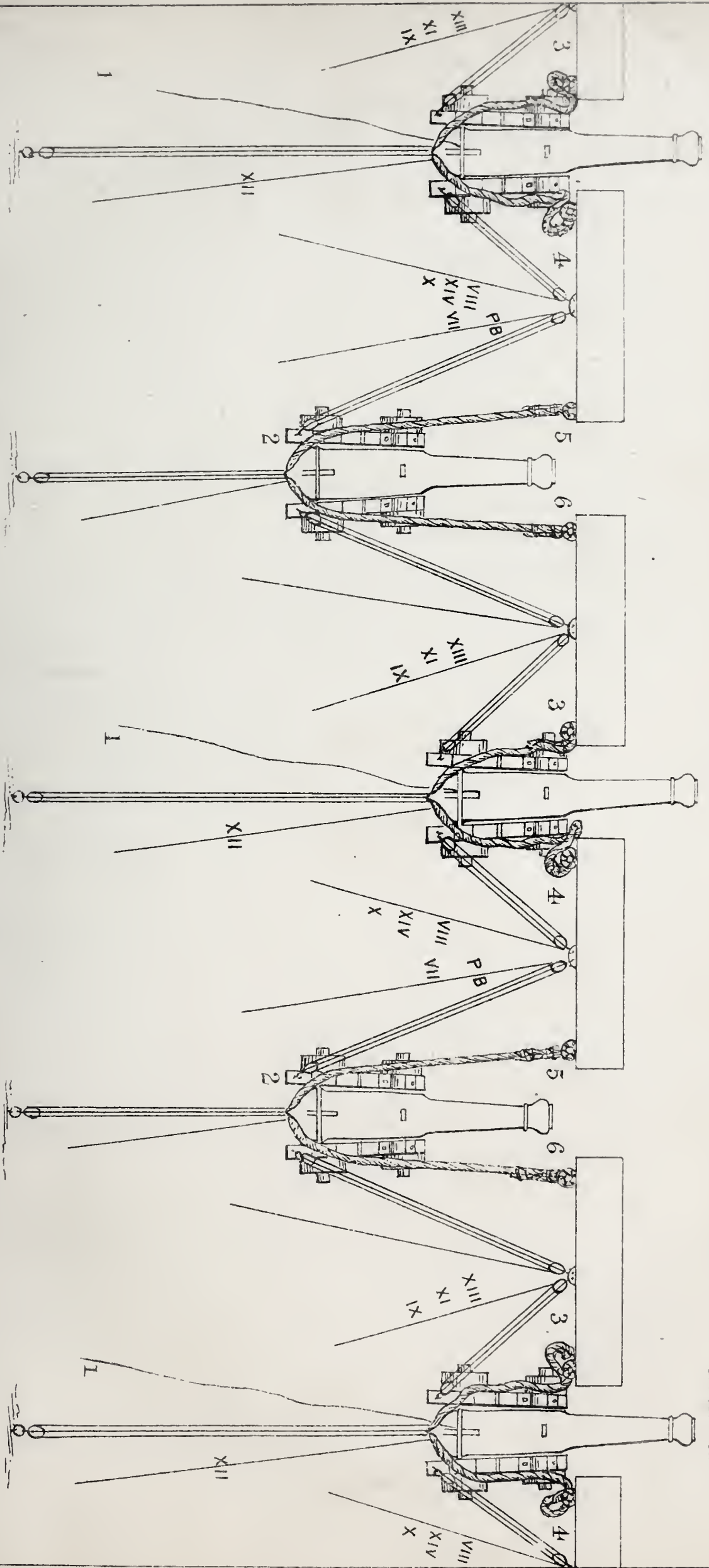
No 1.  
FIRING.

No 2  
LOADING

No 3.  
FIRING.

No 4.  
LOADING

No 5.  
FIRING  
*After Gun*



The Roman numerals indicate the Shifting men.





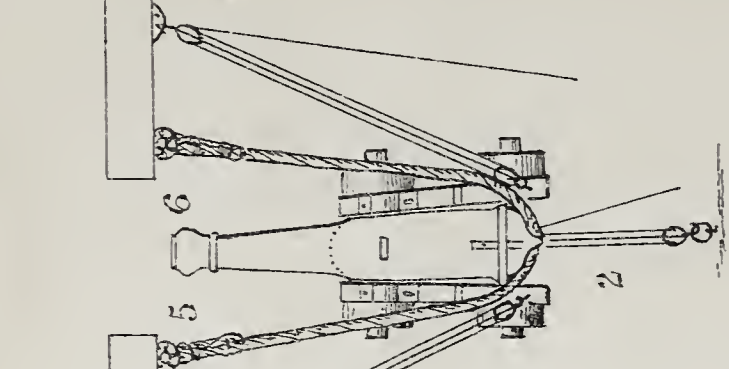


*Fighting both sides.*  
**PORT GUNS.**

D.

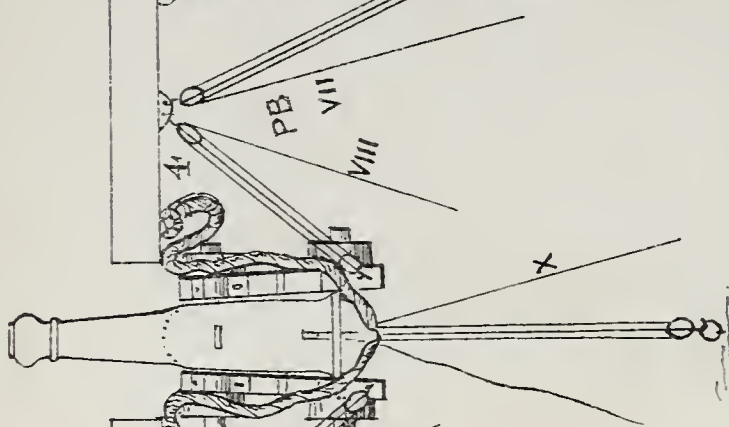
No 1.

LOADING.



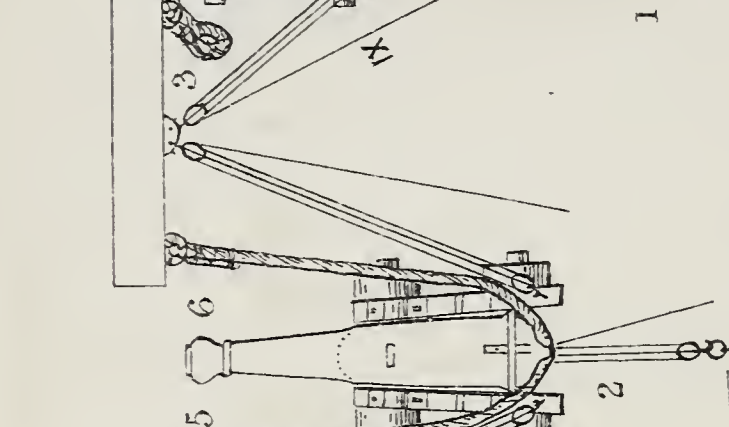
No 2.

FIRING.



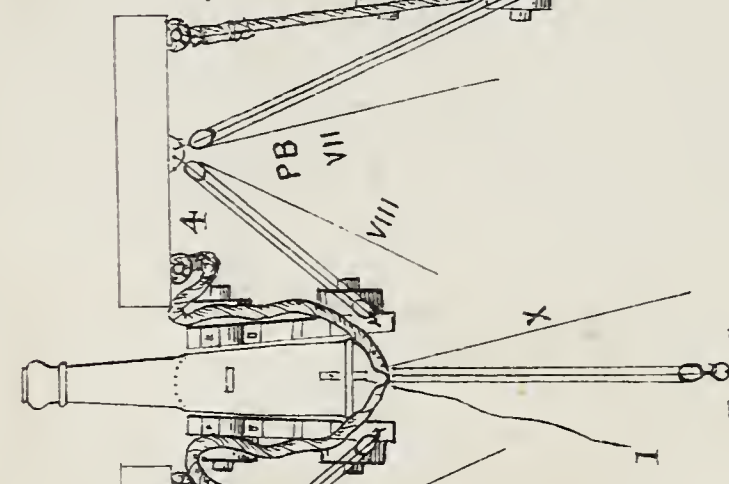
No 3.

LOADING.



No 4.

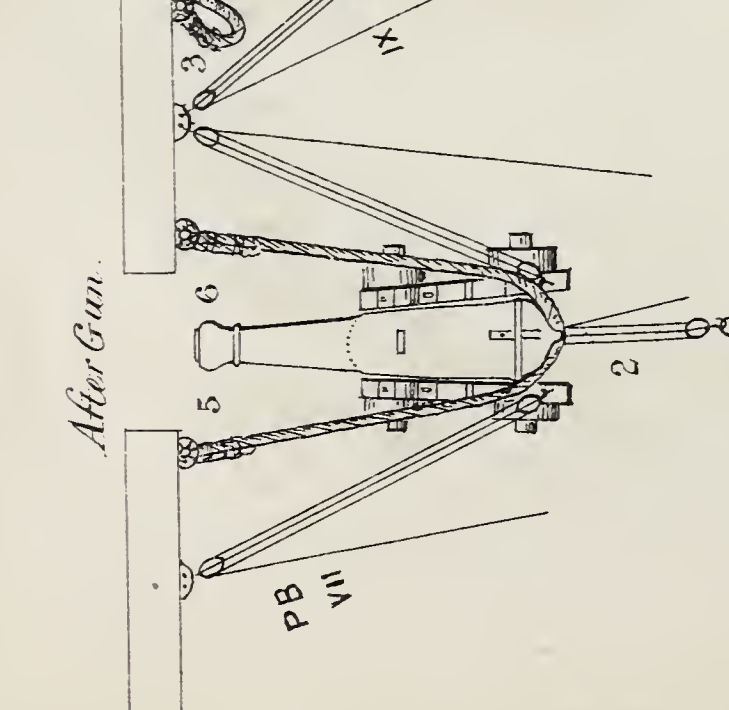
FIRING.



No 5.

LOADING.

*After Gun.*



10 Men and a Boy, stationed at a 42 Cwt. Gun  
 both sides being manned by the half crews.

Diagram D.  
STARBOARD GUNS.

N<sup>o</sup> 1.

FIRING.

N<sup>o</sup> 2.

LOADING.

N<sup>o</sup> 3.

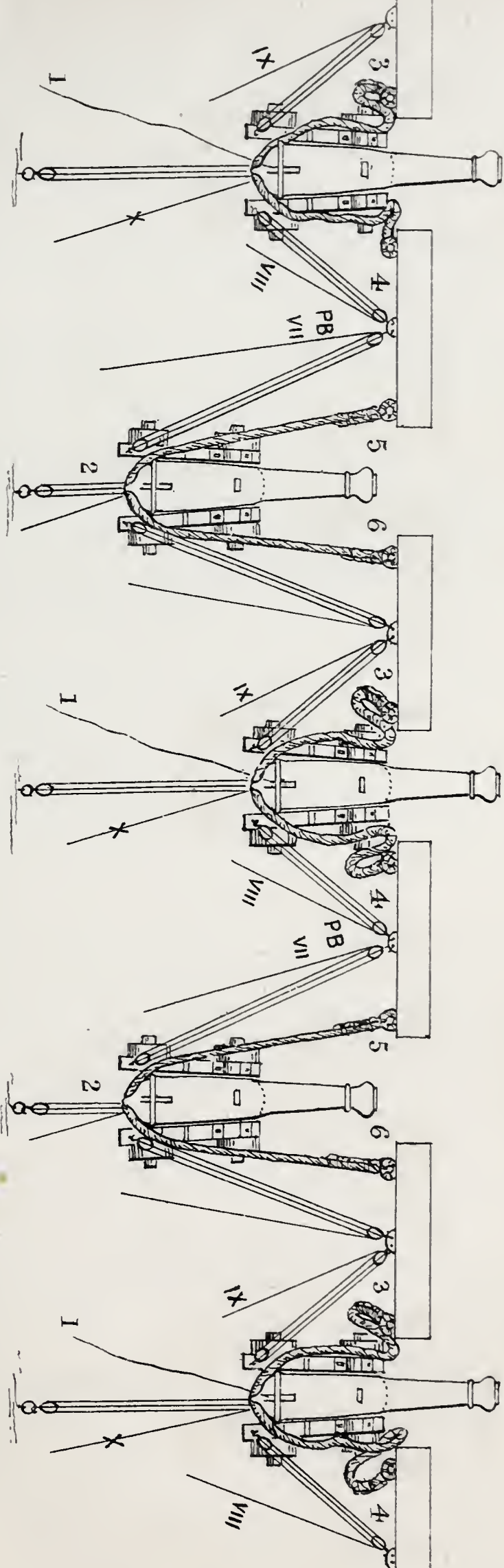
FIRING.

N<sup>o</sup> 4.

LOADING.

N<sup>o</sup> 5.

FIRING.



The Roman numerals indicate the Shifting men.



EXERCISE OF BROADSIDE GUNS ON BOTH SIDES  
AT ONCE.

## GENERAL REMARKS.

208. The object of the following arrangement is to enable each gun's crew to work together and fire alternately a pair of guns on the same side of the deck.

When the after gun on a deck has an odd number, that and its opposite are to constitute a pair, and the crew is to be distributed between them and work them accordingly. (*See diagrams C and D.*)

209. *When the command is given to man both sides*, the guns' crews of the *starboard* watch will man the *starboard* guns, with their first parts at the *odd*, and their second parts at the *even* numbered guns; and the guns' crews of the *port* watch, the *port* guns, with their first parts at the *even*, and their second parts at the *odd* numbered guns.

210. *When the guns are cast loose and provided*, 1st and 2nd Captains, Spongers, and Loaders are to remain at their respective guns, the 'Shifting men' changing, at the order to do so, from one gun to the other of the pair. Captains, Loaders, and Spongers are to endeavour to load their respective guns, ready for running out, while the 'Shifting men' are employed at the gun about to be fired. The same Powderboy is to supply both guns worked by the gun's crew to which he belongs.

211. Diagrams C and D exhibit the places of the men at the guns at the commencement of the exercise in working both sides at once.

The six permanent men of the gun's crew are distinguished by Arabic, and the 'Shifting men' by Roman numerals.

Nos. 3 and 5, 4 and 6, assist at the side-tackles of their respective guns, while at their several stations.

212. If the gun's crew consist of 14 men, (*see Diagram C,*) Nos. VIII, XIV, and X work the right, and XIII, XI, and IX the left-side tackles of their pair of guns.

No. 12 attends train-tackle in running out and in, and No. VII passes shot and shell for his pair of guns.

213. If there be 16 men at a gun, the arrangement will be the same, with the addition that No. XVI works at the right and XV at the left side-tackle.

214. With a gun's crew of 10 men, (*see diagram D,*) Nos. VIII and X work the right, and No. IX, assisted by Nos. 1 or 2, the left side-tackles of their pair of guns.

No. VII supplies shot or shell, and No. X also attends the train-tackle, in running out and in, of his pair of guns.

215. With a gun's crew of 8 men, No. VII supplies shot or shell, and works at the left side-tackles, and No. VIII attends the train-tackles and works at the right side-tackles of the guns of their pair.

When little or no training is required the side-tackles should be hooked at the sides of the ports.

216. If there be but 6 men at a gun there can be no 'Shifting men,' consequently, to man both sides, in this case, Marines or other available men must be taken to supply the deficiency.

217. At Friction Carriages the Loaders attend compressors. No. VIII attends the train-tackle of both guns of a pair.

218. Luffs of side and train-tackles of all guns run in, are to be choked or hitched round straps of single-blocks, and chocking-quoins used when necessary.

219. In case the guns' crews should be so reduced, from any cause, as to render it impracticable to fight all the guns alternately as just described, the remaining men must be concentrated so as to work *efficiently* as many guns as their numbers will permit.

220. The exercise begins under the supposition that the guns commanded by 1st Captains are loaded and run out, and those commanded by 2nd Captains are run in and loaded. The orders are first addressed to the 1st Captains, because the 'Shifting men' are supposed to be with them, ready to run out if required; the order of the commands, however, may be changed to suit any other state of the case.

## PREPARATORY COMMANDS AND DUTIES.

221. 1st. 'SILENCE! MAN BOTH SIDES!'

The guns' crews will man the guns as directed in article 209.

2nd. 'CAST LOOSE AND PROVIDE!'

222. The *Captain* at the gun, with the *Train-tackleman* to aid him in taking off the covers of the lock and sights, and placing them and the straps and toggles amidships, middling breeching and handling quoin, is to attend to the same duties as those prescribed for both 1st and 2nd *Captains* when providing and working the guns on one side only.

The *Sponger* and the *Loader*, aided respectively by the *Side-tackleman* and the *Handspikeman*, are to attend to the same preparatory duties as are prescribed for both *Loaders* and both *Spongers* when providing and working one side only, with the exception that the rammer and sponge are to be shifted to the left side of the gun.

The *Shotman*, in addition to his ordinary duties, handles the left handspike in freeing the quoin.

The *Side-tackleman* provides sand and water, sprinkles and sands the deck if directed, and assists the *Sponger*.

The *Train-tackleman* hooks train-tackle.

The *Fireman* provides fire-buckets and lanterns for both guns of the pair.

The *Handspikeman*, aided by the *Shotman*, does what is required of both *Handspikemen* when exercising one side only.

EXERCISE. (*See diagrams C and D.*)

223.

**WORDS OF COMMAND.**

1st CAPTAINS—‘PRIME!’

1st CAPTAINS—‘POINT!’

1st CAPTAINS—‘FIRE!’

‘SHIFTING MEN—CHANGE!’

1st CAPTAINS,  
‘SERVE VENT AND SPONGE!’2nd CAPTAINS,  
‘RUN OUT AND PRIME!’1st CAPTAINS,  
‘LOAD WITH CARTRIDGE!’2nd CAPTAINS,  
‘POINT!’1st CAPTAINS,  
‘LOAD WITH SHOT (OR SHELL)!’2nd CAPTAINS,  
‘FIRE!’

‘SHIFTING MEN—CHANGE!’

224. To continue the exercise the orders will be the same, applying to 1st Captains those which were given to 2nd Captains, and reciprocally.

225. After exercising the men sufficiently in the order of commands just described, it will be well, by way of transition, and before giving the order to Captains of guns to continue the exercise, to confine it for a while to *three* commands, as follows:

## FIRST.

1st CAPTAINS,  
‘SPONGE AND LOAD!’2nd CAPTAINS,  
‘POINT AND FIRE!’

## SECOND.

‘SHIFTING MEN—CHANGE!’

## THIRD.

1st CAPTAINS,  
‘POINT AND FIRE!’2nd CAPTAINS,  
‘SPONGE AND LOAD!’



## OBSERVATIONS ON THE EXECUTION OF THE COMMANDS.

226. The order '*Prime!*' is executed as in the exercise of guns on one side only.

227. The order '*Point!*' as in the exercise of one side, except attending the train-tackle, which is to be done by the 2nd Train-tacklemian when the gun's crew consists of more than 10 men, by the 2nd Handspikeman when the gun's crew consists of but 10 men, and by the 2nd Shotman when the gun's crew consists of less than 10 men, and excepting also that the Train-tacklemian is in all cases to attend the quoin, in place of the 2nd Captain.

228. The order '*Fire!*' the same as in fighting one side only.

229. At the order '*Shifting Men—Change!*' the shifting men go promptly from one gun of a pair to the other, and distribute themselves at the side and train-tackles, as shown by diagrams C and D, the left Handspikeman first shipping his handspike in the training loop, ready to give the gun the proper direction in running out.

230. '*Serve Vent and Sponge!*' as in exercising one side, except that the sponging and loading are to be done by the Sponger and Loader stationed at the gun, alone, and that the sponge and rammer being on the left side of the gun, the Loader is to pass them to the Sponger, and the Sponger is to return them to the Loader. The Handspikeman examines and clears the sponge-head and worm.

231. '*Run out and Prime!*' as in exercising one side, except that the *left handspike* alone is to be used by the Captain of the gun, and that the Sponger and Loader at the gun are to do the duties required of the 1st Sponger and 1st Loader in fighting one side.

232. '*Load with Cartridge!*' as in the exercise of one side, except for 1st Sponger and 1st Loader read Sponger and Loader.

233. '*Load with Shot!*' the same as in exercising one side, except that the Shotman passes shot and wad to the Loader (*see diagram*), and for 1st Sponger and 1st Loader read Sponger and Loader, and that the Sponger returns the rammer to the Loader instead of to the 2nd Sponger.

234. '*Load with Shell!*' for 2nd Loader read Shotman, for 1st Loader read Loader, and for 1st Sponger read Sponger.

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The Shotman covers the box again, goes for another shell, and sends the empty box below.

For 1st Sponger and 1st Loader read Sponger and Loader, and omit the paragraph relating to Handspikemen.

235. When the order to '*Secure!*' is given and the guns are run out, the *Shifting* men divide into 1st and 2nd parts and repair to the guns of their respective 1st and 2nd Captains. The order '*SECURE!*' is then to be executed as in the exercise of one side, except for 1st Sponger and 1st Loader, throughout, read Sponger and Loader; that the Handspikeman is to be aided by the Shotman in freeing the quoin and lowering the breech, and at the proper time in raising the breech and leveling the gun; that the Train-tackleman is to handle the quoin or screw; that the Captain in hauling the breeching through the jaws of the cascable, is to be assisted by the Train-tackleman, who is to put on the lock and sight covers (and in Friction carriages, the housing-chock in place), and hook train-tackle to side-tackle bolts; and that the Side-tackleman on the side of the Loader, and the Shotman on the side of the Sponger, are to unhook the double-blocks from the side-training bolts and hand them to the Sponger and Loader.

236. *If the lower-deck guns are to be housed*, it will be done as in the exercise of one side, except that for 1st Sponger and 1st Loader, throughout, read Sponger and Loader; and that in raising the breech to free the quoin, and in lowering the breech upon the axletree, the Handspikeman is to be aided by the Shotman, the Train-tackleman withdrawing the quoin and bed.

The Port-tackleman lowers the port-lid and brings the port-bar to the Sponger and Loader.

## QUICK FIRING.

237. The service of the guns consists, essentially, of two distinct parts, *pointing* and *loading*. The first of these, *pointing*, cannot be performed too carefully and methodically, and requires extreme coolness and attention on the part of the Captain of the gun; *loading*, on the contrary, cannot be executed with too much rapidity, provided neither the safety of the gun nor of its crew be compromised.

It is clear that if two hostile vessels meet equally matched in all the ordinary points of equipment and preparation, and manned by crews equally skilled in gunnery, the advantage will be in favour of the ship that loads quickest; and should it happen that nicety of aim becomes a matter of secondary importance, in consequence of the closeness of the action, then, evidently, rapidity of fire will determine the affair.

These considerations appear decisive, and every care should be taken, in the instruction of guns' crews, that pointing be executed with deliberation, care, and method, and loading with all possible despatch. In order, therefore, to insure the great advantage of rapid firing, officers are enjoined frequently to exercise the crews in setting the cartridge, shot and wad home together, in one motion, of such guns as may be loaded in this manner, without inconvenience. This is the case with all the guns chambered as well as unchambered, excepting the 8-inch shell-gun of 63 cwt. of patterns earlier than 1851; it is not recommended, however, to practise simultaneous loading with guns of higher calibre, such as IX-inch and upwards, as nothing will be gained by it in point of time.

To prevent the shot from rolling on the tie of the cartridge and jamming it, the end of the cartridge-bag, outside of the tie, should be shortened as much as security will permit, unless it has been specially prepared for this use as recommended in chapter VII.

With the view of affording the Loader a certain and independent means of knowing when the whole load is really home, the handle of the rammer should have a mark upon it, easily distinguishable either by day or night, and this should be suited to the 'ordinary firing' charge of powder, due allowance being made for the others.

A strip of raw hide, leather, or copper, properly secured, will answer the purpose.

## COMMAND.

‘LOAD IN ONE MOTION!’

238. The Loader receives the cartridge and puts it in the gun, as already described; he also receives the shot and wad and introduces them accordingly.

As soon as the *whole charge* has been introduced, the Sponger and Loader together thrust it down smartly with the rammer, as in ordinary loading. When *home*, the men run the gun out as quickly as possible; the Captain of the gun clears the vent, primes in running out, points and fires in the usual manner, but as rapidly as is consistent with a good aim, taking care that the muzzle is clear of the port sill, and on lower-decks that the port is triced up clear of the explosion.

## SHIFTING BREECHINGS IN ACTION.

## COMMAND.

‘SPONGE, LOAD, AND SHIFT BREECHING!’

239. Supposing the gun's crew to be reduced to six men and the Powder-boy, that being the least number required to perform the evolution, and the gun to be discharged and run in. The 1st Captain hauls taut the train-tackle and chokes the luff, and the 1st Loader and 1st Sponger place the chocking-quoins forward of the front trucks, and proceed to sponge and load the gun in the usual manner. The 2nd Sponger and 2nd Loader haul taut side-tackles and choke luffs, or if rolling deep, hitch the falls round the straps of the blocks, and then unshackle the old breeching and shackle the new, which is to be brought to the gun by the 2nd Captain.

The 1st Captain removes the old breeching from, and places and secures the bight of the new one in, the jaws of the cascable. The 2nd Captain passes the old breeching amidships, and the men resume their usual duties at the gun.

When there are more than six men at the gun, the 2nd Sponger and 2nd 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, but one of these will do all the duties just assigned to the 1st Captain, so as not to interfere with his ordinary duties in loading.

## SHIFTING TRUCKS.

240. *At the order to shift any one of the trucks that may be designated,* the 2nd Handspikeman lays his handspike on the deck for a fulcrum, he is also to take the truck off. The 1st Handspikeman applies his handspike under the dumb-truck to free the truck to be shifted.

In shifting a truck on the left side of the gun, the 2nd Loader is to put on the new truck, and in shifting one on the right side of the gun, the 2nd Sponger is to perform that service. To shift a *front truck*, the *rear truck* on the opposite side should be first taken off.

## PIVOT GUNS.

## XI-INCH SHELL GUN,

*(For example,)*

241. Arranged to traverse on circles fitted with *Bossed-Sockets* for pivoting, and with clevis bolts and sockets for housing.

## EQUIPMENTS AND IMPLEMENTS.

ARTICLES	WHERE THEY ARE TO BE PUT WHEN THE GUN IS SECURED
Carriage and slide complete, with elevating screw and pivot bolts.	} In place.
Two front roller levers. Two rear do. do. Two levers for training and shifting-trucks.	} Becketted to brackets.
Two in-tackles.	Hooked in place.
Two out-tackles.	Do. do.
Two shifting-tackles.	Made up on slide.
Two training-tackles.	Do. do.
Breeching.	In place.
Preventer.	Do.
Lashings for securing gun.	Do.
Tompion with wad and laniard.	Do.
Sponge and cap. Rammer.	} Becketted to beams between decks.
Lock, with string. Vent plug.	} In place.

ARTICLES	WHERE THEY ARE TO BE PUT WHEN THE GUN IS SECURED
Lock-cover and strap.	In place on gun.
Breech-sight and cover.	Do. do.
Reinforce-sight and cover.	Do. do.
Trunnion-sight.	In box between decks.
Priming-wires.	} Inside brackets.
Boring-bits.	
Water buckets.	Hold.
Hand-swabs.	Breast of carriage.
Selvagee-wads.	Do. do.
Battle-axes, as allowed, ( <i>art.</i> 101.)	On breast transom.
Two transporting axles and trucks.	In storeroom, at hand.
One shell in box.	On slide.
Shell bearer.	Do.
Rail chocks.	Under rails.

## STATIONS AND GUN NUMBERS.

242. The following are to be the gun numbers and stations for a gun's crew of twenty-five men, including the Powderman, the XI-inch shell gun being taken as an example.

LEFT SIDE	GUN Nos.		RIGHT SIDE
First Loader . . . . .	3	4	First Sponger.
Second Loader . . . . .	5	6	Second Sponger.
Front Leverman . . . . .	7	8	Front Leverman.
Compressorman . . . . .	13	14	Compressorman.
Shell (or shot) man . . . . .	15	16	Shell (or shot) man.
	19	18	
Tacklemen . . . . .	21	20	Tacklemen.
	23	22	
	25	24	
Rear Leverman . . . . .	9	10	Rear Leverman.
Train Leverman . . . . .	11	12	Train Leverman.
1st Captain . . . . .	1	2	2nd Captain.
Powderman . . . . .	17		

243. The several classes of pivot guns requiring different numbers of men, the permanent duties have been assigned to the first seventeen men, that being the least number required for a heavy gun.

The rest of the men are to be considered as auxiliaries, and are to work the tackles.

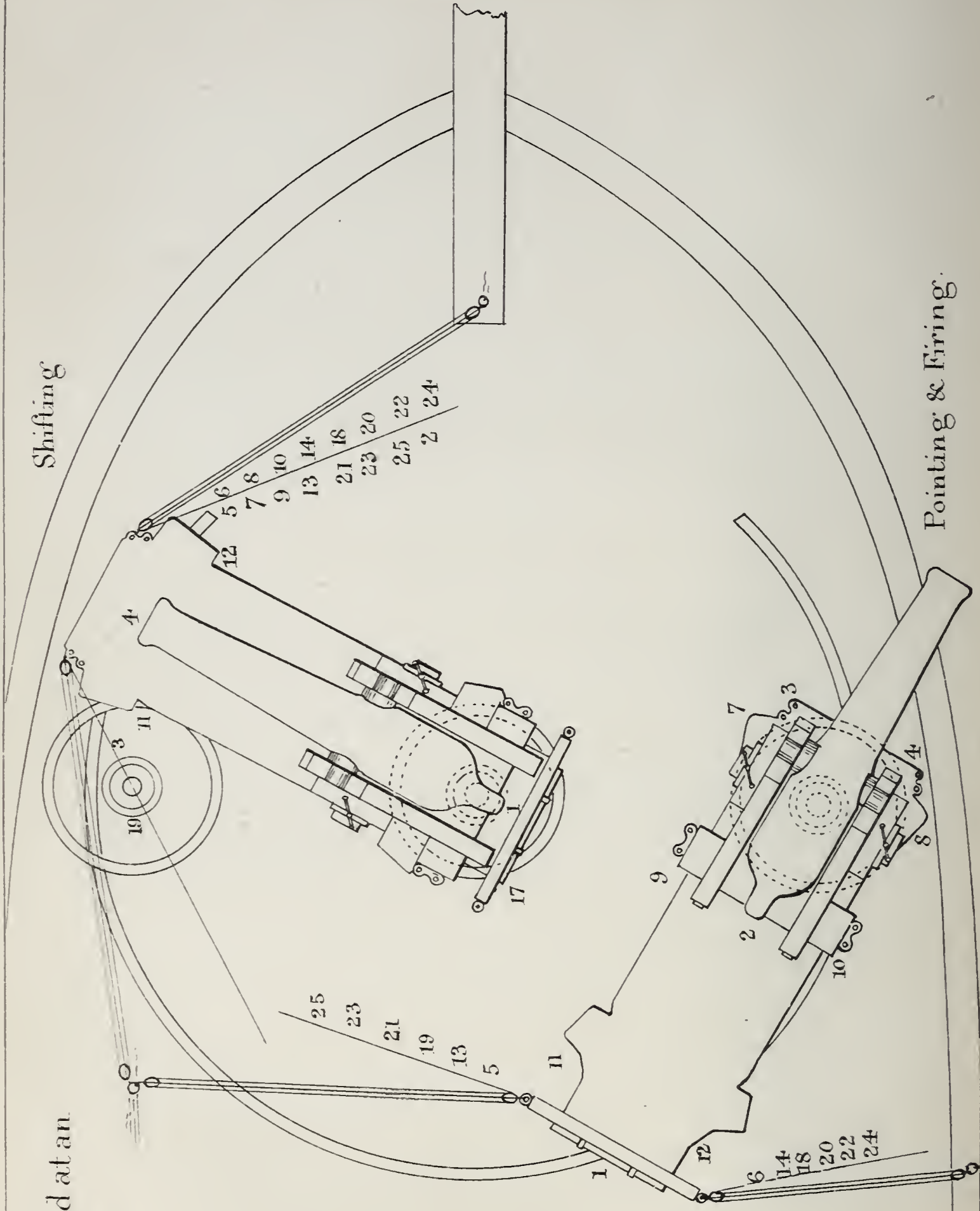
When the gun's crew consists of less than twenty-five men, some of the permanent men must be employed as Tacklemen.





25 Men stationed at an  
Xlin Pivot Gun.

(Diagram E.)



Shifting

Pointing & Firing.

## EXERCISE FOR HEAVY GUNS.

## MOUNTED ON PIVOT CARRIAGES.

XI-INCH SHELL GUN. (*As an example.*)\*

244. The gun is supposed to be secured amidships, fore and aft, over the housing pivot, and not loaded.

The exercise will proceed in conformity to the following words of command, viz. :

- I. 'SILENCE ! CAST LOOSE AND PROVIDE !'
- II. 'RUN IN !'
- III. 'SHIFT PIVOT !' To the *right* (*or left!*).
- IV. 'SERVE VENT AND SPONGE !'
- V. 'LOAD !'
- VI. 'RUN OUT !'
- VII. 'PRIME !'
- VIII. 'POINT !'
- IX. 'READY—FIRE !'
- X. 'SHIFT TO HOUSING PIVOT, AND SECURE !'

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\*The recent introduction into the service of the XI-inch Dahlgren shell gun has rendered it necessary to modify the Pivot exercise of 1852. These modifications are based mainly on the results obtained on board the U. S. Practice Ship, Plymouth, in 1857-'58, as submitted to the board to revise Ordnance Instructions, by Commander Dahlgren, May 17, 1859, in the form of an exercise, which has been conformed to the nomenclature and usages of the service.

Since 1852 there have been introduced into the pivot carriages and their implements several important improvements, for which the service is also indebted to Commander Dahlgren.

245. The details of the exercise, and the necessary precautions, common to both broadside and pivot guns, having been fully gone into in the former exercise and in the notes upon it, it is deemed unnecessary to repeat them all here, though reference is made to them under the appropriate heads.

*N.B. It is always to be understood that when any of their respective duties under one command are executed, the men will at once proceed to prepare for those which follow next in order. The exercise must be considered as a whole, though the details are necessarily divided under the several words of command.*

#### I. 'SILENCE! CAST LOOSE AND PROVIDE!'

246. No. 1, Commands; sees his gun cleared and cast loose; circles cleared and swept; tackles hooked; levers shipped; lock and sights in place; elevating apparatus, pivot-bolts, and compressors in working order; takes off lock cover and hands it to 23, who lays it clear of circle; provides himself with waist-belt and primers, priming-wire, boring-bit, and thumbstall; and sees that all the gear and implements are ready for use, and the men at their respective stations.

No. 2, Takes off sight covers and hands them to 22, who lays them clear of circle; removes rail chocks and assists in casting loose. He provides waist-belt and primers, and sees that the men on his side of the gun execute promptly their several duties.

Nos. 3, 4, Take off muzzle bag and out tompion; assist in casting loose lashings.

„ 5, Brings rammer; fills water-buckets.

„ 6, Brings sponge and removes cap; brings wet swabs.

„ 7, 8, Cast loose gun lashings; ship front roller levers.

„ 9, 10, Cast loose gun lashings; ship rear roller levers.

„ 11, 12, Cast loose in-tackles; ship shifting truck levers.

„ 13, 14, Cast loose out-tackles; sweep gun circle.

„ 15, 16, Assist Carpenters in removing bulwarks, and bring up shell in box.

- 
- No. 17, Provides shell-bearer ; brings powder in passing-box.  
 „ 18, 19, Cast loose and hook shifting-tackles to slide.  
 „ 20, 21. Cast loose and hook shifting-tackles to deck.  
 „ 22, 23, Cast loose and hook training-tackles to deck, ready to take  
     the place of shifting-tackles when ablock.  
 „ 24, 25, Assist in removing bulwarks.

## II. 'RUN IN!'

247. No. 1, Commands ; tends breeching.  
 „ 2, Tends breeching.  
 „ 13, 14, Ease compressors and tighten them when in.  
 „ 3, 7, 4, 8, Bring front rollers into action and release them  
     when in.  
 „ 9, 10, Bring rear rollers into action, and release them when  
     in.  
 „ 5, 6, Attend out-tackles and unhook from slide when in, to  
     leave room for hooking training-tackles in shift-  
     ing.  
 „ 9, 11, 13, 19, 21, 23, 25, } Man in-tackles and run the gun  
 „ 10, 12, 14, 18, 20, 22, 24, } in.

III. 'SHIFT PIVOT!' (*to right or left!*)

(See diagram.)

248. No. 3 or 4, Draws front pivot-bolt and replaces it when the gun  
     is shifted to new position.  
 „ 11, 12, Bring shifting trucks into action, release them when  
     pivoted, and shift levers to training-trucks.  
 „ 5, 7, 9, 13, 19 (or 18), 21, 23, }  
 „ 6, 8, 10, 14, 20, 22, 24 (or 25), } Haul on shifting-tackle.

Nos. 19, 3 or 18, 4, Ease opposite shifting tackle.

- „ 24, 25, Stand by to hook training-tackles to front of slide in order to fleet shifting-tackles; and shift to rear of slide when pivoted.
- „ 22, 23, Shift single blocks of training-tackles when in new position.

NOTE.—*In shifting from one to another fighting centre* the gun must first be run out, if not already in that position. The men then take the places shown in the diagram 'Pointing,' except 2, who attends rear pivot. The gun is then trained over the shifting centre, the rear pivot adjusted, and the training trucks thrown out of gear; then the gun is run in and the shifting proceeds as before.

#### IV. 'SPONGE !'

249. No. 4, Standing on the slide, receives the sponge from 6, sends it home and, assisted by 3, also standing on the slide, *presses it firmly* to the bottom of the bore, turns it round two or three times in the direction to give effect to the worm, and withdraws it. When out, 4 strikes the sponge staff, near the head, against the swell of the muzzle. Should any burning fragments be drawn out, 3 extinguishes them, and the sponging is repeated.\* Then 4 hands sponge to 6, who lays it out of the way.

No. 1, Stops vent *after* the sponge is home.

- „ 10, Examines and clears the sponge-head and worm, when returned to place.

#### V. 'LOAD !'

250. No. 20, Hands the rammer to 4, as soon as the sponge is taken by 6.

- „ 3, Takes the cartridge from 5, to whom it has been passed by 17, and places it in the muzzle, seam from the vent, small end inwards and tie outwards.

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\* See NOTE on the VI command of the 'MANUAL EXERCISE OF BROADSIDE GUNS,' (article 294,) relative to the *moist sponge*, the use of which obviates other precautions against fire in the bore. See note for other details, also.

No. 4, Enters the rammer and pushes the cartridge home steadily, until the mark on the handle shows it to be in place.

“ 3, Assists with one hand. *The charge is on no account to be struck with the rammer!*

“ 4, Withdraws the rammer and hands it to 6.

Meantime 15 or 16 and 5 open the shell box, disengage the shell and place it on the bearer, sabot inwards and fuze in the slot, and pass it to 3 and 4,\* who with the bearer enter it into the muzzle, sabot first and fuze outwards. The bearer is then returned to 15, and 4 steadies the shell, whilst 3 strips the patch from the fuze and passes it along to 1, and then pushes the shell well into the bore.

No. 4, Enters the rammer, and, assisted by 3, pushes the shell in until the mark on the handle shows it to be home.

*It is strictly forbidden to strike the shell with the rammer. (See Broad-side Exercise and notes.)*

No. 6, Takes the rammer from 4 and lays it out of the way.

#### VI. 'RUN OUT!'

251. The execution of this order is controlled by the gun's being to windward or to leeward, and by the nature of the rolling motion.

To *leeward, or with much motion*, the tendency is to go out violently!

Therefore, Nos. 5, 19, 21, 17, 15, 13—6, 20, 22, 18, 16, 14, haul handsomely on the out-tackles. The Quarter Gunner and No. 2, assisted by 11 and 12, hold well back on the in-tackles; 13 and 14 ease the compressors. Nos. 3, 7—4, 8 bring the front rollers into action.

Nos. 9 and 10 attend rear roller levers, to bring the rollers into action only when necessary. If not, assist 11 and 12 at in-tackles.

To *windward and with little motion*, the compressors are eased, the in-tackles slacked, the rollers brought into action, and the levers secured by the pins. The Compressor and Levermen, Nos. 3—4, 7—8, 9—10, 11—12, then assist at the out-tackles.

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\* For this a special drill is required! The 'bearer' is not necessary for lighter projectiles.

When the gun is out the rollers are released, the levers unshipped, and the compressors tightened !

N.B.—When this command is *first* executed after pivoting to the side, Nos. 3—4, 13—14 shackle the breeching to the ship's side, and No. 2 draws the rear pivot bolt !

#### VII. 'PRIME !'

252. No. 1 again makes sure that the vent is clear, and in so doing lets his priming-wire down quickly into the charge !

He inserts a primer and presses the wafer down flat upon the vent field.

#### VIII. 'POINT !' (*See Diagram.*)

253. No. 1 adjusts the sliding-bar of the breech-sight to the desired range,\* throws back the hammer, and, lock-string in hand, steps off the slide directly to the rear and directs the pointing, using the words 'elevate' or 'depress,' 'muzzle to right,' or 'muzzle to left,' as occasion may require.

No. 2, handles lever of the elevating screw. 11 and 12 ship the levers on training-trucks and bring them into action.

“ 5, 13, 19, 21, 23, 25, } Man and work training tackles on their  
 “ 6, 14, 18, 20, 22, 24, } respective sides.

#### IX. 'READY—FIRE !' (*See Diagram.*)

254. No. 1, with lock-string just taut, and eye ranging over the sights, awaits the coincidence with the object by the roll; laterally this coincidence must be maintained constantly by the training-tackles ! When sure of his aim, No. 1 draws the laniard firmly and steadily. 11 and 12 release the training-trucks the moment before firing.

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\* When the distance is so great that with the required elevation the line of sight is intercepted by the muzzle of the gun, aim may be taken by the trunnion sight. In this case the thumbscrew is loosened and the sight directed at the object, in which position it is held until the desired elevation above it is given to the gun, as indicated by the graduation of the face of the trunnion, when it is screwed fast again.



If the gun does not come in sufficiently, ship levers and bring the rollers into action. Run in to a taut breeching. Then release the rollers and set the compressors; and if it is intended to continue the exercise, resume it at the command 'Sponge.' If not—

X. 'SHIFT TO HOUSING-PIVOT, AND SECURE!'

255. The gun is brought into the housing position amidships and pivoted to the socket farthest from the extremity of the vessel, and run out.

- No. 1 puts in the vent-plug, wipes and lays the hammer in place and the lock-string around it, and puts on the lock-cover; sees his gun properly secured, and the implements and spare articles returned to their places.
- „ 2 levels the gun and wipes off and relackers rear pivot-bolt and elevating screw; puts on sight-aprons; puts in rail-chocks and assists in securing lashings and breeching.
- „ 3 and 4 put in the tompion and on muzzle-bag, and wipe off and re-lacker the front pivot-bolt.
- „ 5 and 6 return rammer and sponge to place, and assist in securing lashings and breeching.
- „ 7, 8, 9, 10, 11, 12 wipe off and relacker their respective levers and eccentrics, and secure levers in place and assist in securing the gun.
- „ 13 and 14 wipe off, relacker, and tighten the compressors, and assist Carpenter in replacing and securing bulwarks.
- „ 15 and 16 return shells, empty boxes, and shell bearer to their places, and assist in securing bulwarks.
- „ 17 returns spare powder and passing-box to the magazine.
- „ 18, 19, 20, 21, 22, 23, 24, 25 tighten and secure 'in' and 'out-tackles,' and make up and stow 'shifting' and 'training-tackles' on the slide; ship the clevis-bolts and pass and tighten the gun lashings; and, if required, assist in replacing bulwarks.

The several persons who provided implements and spare articles return them to their places.

## TRANSPORTING PIVOT GUNS FROM ONE END OF A VESSEL TO THE OTHER.

256. The gun is to be pivoted and trained so as to bring its muzzle towards the direction in which it is to be transported, the transporting trucks are to be shipped and secured to their axles, the chocking quoins placed, the training trucks thrown out of action, the compressors brought to bear to confine the gun near the middle of the slide, some of the tackles hooked for dragging, and others, with capstan bars, for guiding and steadying it. The pivot-bolts are to be removed, and the gun's crew, aided by others if required, are then to transport it to the desired position at the other end of the vessel. The slide is then brought over and pivoted upon a fighting or outer centre, the transporting trucks removed and the training trucks brought into action. The implements for working and loading the gun are to be brought to it, and it will then be ready for action.

When the forward and after slides are of different lengths, and the traversing circles of different diameters, the longest slides will be fitted with an additional rear pivot-hole and plate, to correspond with the smaller circle, that the gun may be worked from the midship pivot-bolt and shifted to the different fighting centres or pivot-bolts of the smaller circle.

Thus, when only one pivot gun is mounted forward and one aft, and when they can both be brought to bear from only one end of the vessel, the force may be doubled at that extremity, by pivoting one gun on each bow or quarter, as the case may be.

For heavy guns this is practicable in smooth water only!

Arrangements are made for shifting the broadside guns both to the bow and stern, in aid of the pivot guns, when the distance of the enemy is not too great. When the stern gun is pivoted over the rudder one of the broadside guns may be worked on each side of it, in firing right aft. Guns mounted on pivot carriages may be fought upon the rear pivot, on the common or shifting centre, and fired from any point of the traversing or shifting circle, if the elevation be such as will not endanger the decks. In this case the training must be done with the gun run in over the rear pivot, as after it is run out the training will be difficult, and the helm must be relied on to bring the gun on with the object.

## B O A R D E R S .

257. It is not supposed that any directions can be framed in such a way as entirely to provide for all the various circumstances which may require attention when about to board an enemy, or to repel a similar assault made by an enemy upon our vessels.

The following general suggestions are, however, presented for the consideration of Captains, in order that some degree of uniformity may be preserved when other more important considerations do not prevent it.

258. Upon the call for 'Boarders,' the divisions which may be called should form on the gangway of the side which is not engaged, properly armed, and remain there till ordered elsewhere.

'PREPARE TO BOARD!'

(FROM ANY SPECIFIED PART OF THE SHIP.)

259. The Boarders should repair to the place directed, taking care to keep themselves down so as not to be seen by the enemy, and form close to the bulwarks until the order is given to—

'BOARD THE ENEMY!'

260. The Boarders should then gain the enemy's deck as quickly as possible, keeping near enough to each other for mutual support, and to act in concert against the opposing force, using every possible exertion to clear the enemy's decks, by disabling or driving the men below.

In case the intention of boarding should be discovered by the enemy, and he should collect his men to repel the attack, the marines and small-arm men should take positions where they can best fire upon the men thus collected, and if possible the spar-deck guns loaded with grape, and howitzers loaded with canister, should be used for the same purpose, before the Boarders are ordered to make the attack.

So long as the contest is continued after boarding, the fire should be kept up against the enemy from all the guns excepting those of the spar-deck, with as much vigor as the number of men remaining at the guns will allow.

## NOTES UPON THE MANUAL EXERCISE.

## SECOND COMMAND.

## 'PRIME!'

266. It is essential that the head of the primer should be placed flat and close upon the lock-piece, in order that the hammer may strike it fairly.

The tubes of all the primers are carefully gauged before issuing them for service, but such as, from any cause, become so much enlarged as not to go easily into the vent, should be rejected without attempting to force them down.

It will occasionally happen, either from carelessness or inattention to the instructions given for the proper manner of pulling the lock-string, that the head of the primer will be crushed without exploding it. Frequently a second and stronger pull will have the desired effect, if the fulminate has not been dispersed; in case, however, this attempt should prove unsuccessful, the tube of the primer should be drawn out, if possible, before using the priming-wire to clear the vent.

267. In case either lock or primer should entirely fail, recourse will be had to the *friction-primers* or to the '*spur-tubes*.' In using the first, the Captain of the gun, after taking the primer from the box, will raise up the twisted wire loop until it is on a line with the spur; place the tube in the vent with the spur towards the muzzle of the gun, and so that this spur will rest on the lock-piece; then hook the laniard, fitted for the purpose, into the raised loop and pull it, when otherwise ready to fire the gun, as though it were a lock-string, using, however, a less degree of force. The laniard may be hooked to the loop before the tube is put into the vent. When the '*spur-tubes*' are used, the 1st Captain exposes the priming and the 2nd Captain uses the match.

268. The men should be practised at unloaded guns, in placing the primers, both percussion and friction, properly, and in pulling the lock-string so as to insure their explosion, until this very essential knowledge and skill have been perfectly attained.\*

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\* 'NOTE.—In 10,000 fires, when testing guns of different calibres, with the regulation locks, less than fifty primers failed from all causes.'

## THIRD COMMAND.

## ‘POINT TO THE OBJECT!’

269. To facilitate the operation of pointing guns according to the distance of the object aimed at, sights are prepared and fitted to each gun: as breast-sweeps should also be for all truck-carriages of heavy guns.

The ordinary sights which are now fitted, consist of two pieces of bronze gun metal, one of which, called the ‘reinforce sight,’ is a fixed *point*, firmly secured to the sight-mass, upon the upper surface of the gun, between the trunnions.

270. The other, or ‘*breech-sight*,’ is a square bar or stem, with a ‘head,’ in the top of which is a ‘sight-notch.’ This bar or stem is made to slide in a vertical plane, in the ‘*sight-box*’ fixed to the breech sight-mass, and is held at the various elevations for which it is graduated by means of a thumbscrew.

The bar or stem of the sight has lines across its faces denoting degrees of elevation, each of which is marked with the number of yards at which a shot or shell will strike the point aimed at, when that line is brought to a level with the top of the sight-box and the gun is loaded with a specified charge of powder.

The uppermost line on the stem marked ‘*level*’ is the zero of the other graduations, and when adjusted to the level of the top of the sight-box, the bottom of the notch in the head of the breech-sight and the apex of the reinforce sight show the ‘dispart’ of the gun. When the line of sight coincides with these points, it is parallel to the bore, and when continued to a distant horizon the gun is laid ‘*level*’ or horizontal.

Sights should invariably be made so that the ‘*level*’ line on the stem will correspond with the bottom of the head where it rests on the ‘*sight-box*,’ and thus secure a dispart sight in case of accident to the screw in the sight-box.

271. For shot-guns the ranges in yards for one shot with the ‘*distant firing*’ charge of powder should be marked for each degree of elevation on the *inboard* face of the sight-bar. Those for the ‘*ordinary firing*’ charge should be marked on the *right* face, and those for the ‘*near firing*’ charge on the *left* face of the sight-bar. For shot guns the ranges of a *shell* when fired with the ‘*near-firing*’ charge should be marked on the *outboard* face of the bar.

For shell guns the ranges are marked for shells on the sight-bars in the same manner as those for the shot of shot guns.

272. These sights being each adjusted to a particular gun, and marked with its class and number, do not, in strictness, admit of being transferred to other guns even of the same class.

273. When used, the stem of the breech sight must be raised or lowered to correspond with the ascertained or estimated distance, in yards, of the object aimed at, and firmly secured there by the thumbscrew. Then, if the ship be steady, elevate or depress the gun until the line of sight from the bottom of the notch of the breech sight, the top of the reinforce sight, and the point to be struck, will coincide; but, if the ship have a rolling motion, 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 favourable part of every roll which the ship makes.

274. The inclination of the line of metal to the axis of the bore varies in guns of the same class, as well as in those of different classes. Aiming, therefore, by the line of metal cannot be relied on for definite ranges; besides that, within those ranges, it is apt to mislead by giving too much elevation to the piece. Therefore, when the established sights are not furnished, or have become unserviceable, *wooden* dispart sights lashed on the reinforce should be immediately substituted. A narrow groove in the upper surface of the wooden sight, made to coincide with the plane of the line of sight marked on the gun, will assist the gun Captain in getting the true direction quickly.

Half the difference between the diameters of the gun at the base ring and swell of the muzzle, or at any intermediate point on the line of metal, will give the proper height of the dispart-sight at the point where the least diameter was taken, to which must be added the height of the lock-piece above the base ring, in order to get a line of sight, over it, parallel to the axis of the bore.

275. All the new guns are marked on the top of the lock-piece, or over the vent, the reinforce sight-mass, and the swell of the muzzle, by notches which indicate a vertical plane passing through the axis of the bore, at right angles to the axis of the trunnions.

276. Pivot guns will be supplied with trunnion sights, which are designed to be used *only* when the ordinary sights will not give the required elevation.

277. Various modes have been practised to ascertain the *distance* from the object aimed at, when at sea, by which to regulate the elevation of guns, but none can be depended upon for giving it with minute accuracy, and when obtained it is continually varying; therefore, when the projectile fired is seen to exceed or fall short of the object considerably, the sight-bar must be readjusted accordingly. It thus becomes, under ordinary circumstances, the best instrument for approximating distances. In correcting the elevation, however, the variation of range to the first graze, attributable to eccentricity, differences of windage, and other causes, must be taken into consideration, as, under the most favourable circumstances at the Experimental Battery, this variation is found to equal fifty yards, more or less.

278. In case the ordinary sights should be lost or rendered useless, *tangent firing* may be resorted to against ships, by pointing with the wooden dispart-sight at such part of the ship as the tables indicate for the distance, and according to the class of gun in use at the time.

A table of this kind is appended, which has been calculated for the 8-inch and some of the heavier of the 32-pounder guns, when loaded with single shot and distant-firing charges.

The different classes of sailing ships of war, whether of the same or of different nations, are not of the same length, nor are their masts of the same height from the deck, or from the water. They, however, correspond so nearly, for the same class of ships of the same nation, that calculations made from the angles subtended by the average height of their masts, will generally give their distance with sufficient accuracy for general firing.

Tables are inserted at the end of the book, in which the distances corresponding to different angles made by the masts of English and French ships of war are shown—from which the intermediate distances due to other angles may be estimated, and the sights regulated accordingly, if circumstances should render it desirable.

279. Officers of divisions and Captains of guns should be occasionally practised in measuring the distances of objects by the eye, at times when opportunities offer of verifying the accuracy of their estimate by comparing it with the distance obtained by the foregoing methods, or any other which will afford the best means of comparison.

280. Within point blank range, with the breech sight at zero, or, if needs be, with the wooden dispart-sight, the gun should be pointed directly at the point which it is desired to hit. If from any cause the *hull* of an

enemy's vessel at such times cannot be seen, but only its *direction* be known, advantage may be taken of the flashes of the enemy's guns to determine, approximately, when the guns are level, in case the ship has a heel or a rolling motion.

281. The ordinary beds and quoins are arranged to allow the extreme elevation and depression of the guns which the usual arrangements will admit with safety. When the inner or thick end of the quoin is fair with the end of the bed in place, the gun is level in the carriage; or horizontal, when the ship is upright. The degrees of elevation above this level which may be given to the gun by drawing out the quoin when laid on its base, are marked on the side or edge, and those of depression on the flat part of the quoin, so that when the quoin is turned on its side for depressing, the marks may be seen. The P. B. mark on the quoin is to correspond with the end of the bed. When the quoin is entirely removed and the breech of the gun rests on the bed, the gun has its greatest safe elevation, and when the quoin is pushed home on its side, the gun has the greatest safe depression, that the port will admit.

Care must be taken that the stop on the quoin is always properly lodged, to prevent the quoin from flying out or changing its position, and that the bed is secured to the bed bolt.

When the *elevating screw* is used, a quoin should be at hand to place under the breech of the gun, when properly elevated, to relieve the screw from the shock of the discharge, and prevent a change of the elevation, as well as to take the place of the screw, if it should be disabled.

282. If a greater elevation for broadside guns should be desired for any special purpose, it may be obtained by placing inclined planes behind the rear trucks for them to recoil over, and produce a corresponding depression of the muzzle of the gun as it comes within the port.

Additional depression may also be obtained by placing inclined planes for the front trucks to recoil upon, or by raising the breech by means of a wooden toggle placed vertically under it. One end of a tripping line is fastened to the middle of the toggle, and the other to the breeching bolt in the side of the ship; by this arrangement the toggle is tripped from its place at the commencement of the recoil, and the muzzle is raised so as to clear the port sill by the preponderance of the breech.

283. '*Brings his eye in range,*' &c.—Officers of divisions, while instructing the men in aiming, should be particular in impressing upon their minds the necessity of bringing the eye to an exact level with the *bottom* of the sight-notch, as otherwise they will fire too high.



284. ‘*To train the gun until the sights are in a line,*’ &c.—In lateral training, when the direction of the gun is frequently changing by the coming up or falling off of the ship; or when the position of the object to be fired at is rapidly changing by passing in opposite directions, or from other causes, it may be better to train nearly to the direction, so that the causes which are in operation will soon bring the object in line, and then watch the proper moment for firing, instead of endeavouring to train at once directly upon the object.

It should be borne in mind that the lateral training, when considerable, should always precede the elevation.

## FIFTH COMMAND.

## ‘FIRE!’

285. The exact moment for firing, at sea, necessarily varies with circumstances; but when these are favorable, the following general principles should govern:—

286. When the ship is steady, the gun should be fired when the line of sight is brought upon the object; but when the ship has much rolling motion, the moment for firing should be chosen a little before, so that the shot will probably leave the gun when the roll brings the line of sight upon the object aimed at.

When practicable, and too much time will not be lost, it will be best to fire when the vessel is on the top of a wave and just begins to roll towards the object. If the loss of time should be found objectionable, the gun may be fired at any other instant, when properly pointed, giving a preference, however, to the moment when rolling *towards*, rather than when rolling *from* the object, and making due allowance for the probable change of elevation by the roll of the ship, before the shot leaves the gun.

287. If, from *any cause*, the firing should be delayed after the gun has been pointed, it should be carefully pointed again before the order to fire is given.

288. The great object is to fire *low enough* to strike the hull, if the shot preserve the *intended* direction, and as a general rule to strike it near the *water-line*.

289. To avoid loss of shot from lateral deviations, it is recommended to direct all the guns to be pointed to strike somewhere between the fore

and mizzen masts of on enemy ; when quite near, the guns of the forward divisions should be pointed in preference to that part of the hull about the foremast, and one or two of the after guns at the rudder, if it should be fairly exposed.

290. When the guns are laid for the projectile to strike the object aimed at without grazing between the gun and the object, the firing is said to be *direct*. This mode of firing is to be preferred when the object fired at is so near that the chances of hitting it are very great, and also when the intervening surface between the gun and object is so rough or irregular that the projectile striking it would have its velocity much diminished or destroyed, and its direction injuriously affected.

*Direct firing* requires a good knowledge of distance, and precision, both of elevation and lateral direction, in order to strike an object which is comparatively a point.

291. When the guns are so laid that the projectile makes one or more grazes between the gun and the object, and continues its flight, the firing is denominated *ricochet*.

*Ricochet firing*, upon a smooth surface within certain distances, has some important advantages over direct firing. When the guns have very little or no elevation, and are near the water, as they are in a ship's battery, the projectile strikes the water at a very small angle, its flight is very little retarded by the graze, and it rises but little above the surface in its course.

*Ricochet firing* at low elevations requires only correct lateral direction, since the projectile would rarely pass *over* and would probably strike a vessel if within its effective range, whether the actual distance had been correctly ascertained or not.

The deviation of projectiles is, however, generally increased by ricochet, and in proportion to the roughness of the surface of the water. Even a slight ripple will make a perceptible difference not only in direction, but in range and penetration, and the height to which the projectile will rise in its bounds.

Although these facts demand attention, yet when the estimated distance does not require an elevation of more than three degrees, projectiles from guns pointed rather too low for direct firing will probably ricochet and strike the object with effect, even when the water is considerably rough.

When the water is not smooth the most favourable circumstances for ricochet firing are when the flight of the shot is with the roll of the sea, and the sea is long and regular.

Upon *smooth* water, a shot fired horizontally from the 32-pdr. of 33 cwt. with  $4\frac{1}{2}$  lbs. powder ricocheted and rolled about 3,000 yards; the greatest range obtained from an elevation of  $5^\circ$ , with the same gun and charge, was less than 1,800 yards. (*See Dahlgren's report on 32-pdr. of 32 cwt., p. 90.*)

Shot rarely ricochet at all with elevations above  $5^\circ$ , and the bounds are always higher, with equal charges from the same gun, as the elevation of the gun is increased.

292. *Concentration of fire* may be desirable under certain circumstances; and arrangements have been sometimes made to secure it by the simultaneous discharge of a number of guns upon some part of an object whose distance is known.

The advantages of these arrangements are not very obvious, excepting in cases where the position of the enemy may be visible from one part of a ship and not from all the guns in the batteries. Even in these cases, however, it requires that all the guns which are to fire in this manner should be regulated by one gun, and all be fired at the same time, which it would be difficult to accomplish; and if successful, the simultaneous discharge from many heavy guns may be considered objectionable.

Concentration of fire upon a particular part of an enemy's vessel may be obtained by a general order for the guns to be aimed to strike that part, leaving the Captains of guns to determine the proper time for firing, according to circumstances at the moment. This obviates the objections due to simultaneous firing and would generally be equally effective. In this, as in all other cases at sea, success would depend mainly upon the skill, judgment, and coolness of the Captains of the guns.

#### SIXTH COMMAND.

'SERVE VENT AND SPONGE!'

'*The Captain of the Gun then stops the Vent!*' &c.

293. A difference of opinion being entertained among artillerists with regard to the utility of stopping the vent, the continuance of the practice, as directed in the text, is recommended.

294. It has been the uniform practice at the Experimental Battery at the Navy Yard, Washington, and also on board the Gunnery Ship Plymouth, in 1857-58, to use a *moist* sponge, and as no accident from

premature explosion has taken place in either case, the inference is that the method is a safe one and might obviate other precautions, especially where *reloading* is necessary in firing salutes, and there being no shot over the cartridge it is imperfectly consumed.

## SEVENTH COMMAND.

## ‘LOAD WITH SHOT (OR SHELL)!’

295. No gun is to be loaded with more than a single shot at once, without the express sanction of the Captain, and *never* with more than a single shell! As a general rule, solid shot or grape are not to be fired from shell guns. Neither is ever to be fired from those guns without a direct order from the Captain.

Although double shotting may be attended with advantages when 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.

Experiments have shown that two solid shot, when fired from 32-pdr. shot guns of 46 cwt. and upwards, will generally range sufficiently near together, and have sufficient penetrating power to produce destructive effect upon the broadside of a ship when not more than 300 yards distant. Beyond that distance, the divergence of shot is so great that, even when they retain sufficient penetrating power, their use becomes improper. From 32-pdr. guns of less than 46 cwt. the use of two shot against ships should be limited to a distance not exceeding 200 yards.

Whenever the firing is oblique to the surface of the object, double shotting should not be used beyond half these distances.\*

296. Experiments show that firing two *loaded* shells together should never be practised. With quite reduced charges [of from  $\frac{1}{8}$ th to  $\frac{1}{12}$ th the weight of the *single shell*], of 88 loaded shells thus fired 25 were broken and 43 did not explode, and some of the remainder were exploded too soon by the shock of discharge. Of 50 *unloaded* 8-inch shells, fired two at the same time, with 6 lbs. of powder, only one was broken by the shock of the discharge. This difference between loaded and empty shells

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\* In the action between the Chesapeake and Shannon, at not over 200 yards' distance, the gun-deck batteries of both vessels were double shotted, and not one half the shot which hit went through the sides of either of the opponent's ships.

is accounted for by the fact that a small hole is generally broken into the outer shell, through which its charge is ignited. (*See p. 13, Report of Capt. Farragut, dated August 31, 1853, on Experiments made at Old Point Comfort.*)

297. In loading with a shell the most exact attention is required to all the precautions relating to the position of the fuze and the mode of setting home the shell. The Loader is to be specially instructed that, unless the leaden patch is stripped off to expose the priming, the fuze will not ignite, and, consequently, the shell cannot explode.

298. *Grape shot* have not sufficient penetration to be used with effect, generally, against ships of war beyond 150 yards. When the men on the spar decks of the enemy are exposed by the heeling of the ship, grape may be used against them at distances varying from 200 to 300 yards. Against light vessels, boats, or masses of men, a single stand of grape may be used at about 400, and a double stand at about 300 yards. The dispersion of the balls at these distances is about 30 yards.

299. The use of a solid shot and a stand of grape together, is not to be encouraged.

The elevation of the gun necessary to render one effective makes the other comparatively useless. And, for the same reason, grape and canister cannot be fired together with any certainty of effect.

300. *Canister or case shot*, prepared for immediate use, are supplied for the boat and field howitzers, and are effective, at short distances, against boats or exposed bodies of men; they may be used also, under favourable circumstances, against the tops of an enemy.

A further allowance will be given, in bulk, for great guns, which can be put in canvas bags of suitable dimensions for a charge and so used at the option of the Captain.

#### THE USE OF FUZES.

301. In practising with shells, as a general approximate rule, the 5" fuze should not be used, with ordinary charges, at a distance exceeding  $\frac{3}{4}$  of a mile, or 1,320 yards; nor should the 10" fuze be used at a less distance than this, nor at a greater than 2,300 or 2,400 yards for the 8-inch and 32-pdr., or 2,000 for the 12-inch guns, with distant firing charges. The flight of the 15" fuze, with distant firing charges, from the 32-pdr. and 8-inch guns, is  $1\frac{3}{4}$  miles, or 3,080 yards. If, therefore, the shell sinks short of these distances its explosion may not be seen, or it may not explode at all.

## DIRECTIONS IN CASE OF FIRE.

302. In the following directions no other object is proposed than to notice some of the more prominent and common preparations which may be generally made, and the means to be adopted in vessels, on the alarm of fire; but without expecting to meet all the varieties which that danger may present, and which can only be successfully met by properly stationed, well trained, and well disciplined men, judiciously directed by the Captain and superintended by officers whose coolness and presence of mind are proof against every form and degree of danger, and such as will enable them to adopt and preserve the best measures which the emergency may require.

To this end the Captain will, as soon as the crew is organised, cause a FIRE BILL to be prepared, adapted to the particular circumstances and arrangements of his ship, and in accordance with these directions, by which the crew is to be drilled once a week till expert, and after that occasionally.

303. Should the alarm of fire be given when the men are not at quarters, that alarm of itself is to be considered as a call to quarters, and the men are to repair to their stations at once; but the ordinary call as for inspection is to be given as soon as practicable, by way of enforcing the order.

The alarm will be given by the sentinel near the bell, by ringing quickly and loudly successive peals of ten or fifteen seconds, with short intervals between.

The bell is to cease, however, as soon as the drum begins to sound the call to quarters.

Should it be deemed necessary to water and provision the boats, preparatory to lowering them, the drum will beat the usual call for provisions, when the men stationed for these purposes will promptly proceed with their duties. In this case the shot will be drawn or discharged from the guns, to guard against accidents in leaving the ship, should it be impossible to save her.

304. The Captain will direct the Executive Officer, and such others as he may deem proper, to visit the seat of the fire, and to transmit reports

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to him, by officers, of its character and extent, and to suggest the measures which will most speedily and certainly subdue it, or prevent its extension to more dangerous parts of the ship.

305. He will, if at sea, cause the ship to be hove-to, or steered in such direction as will be least likely to increase the activity of the fire, or will best enable the men to use the means in their power for controlling and extinguishing it.

306. If fire should take place in a ship at anchor in a port or harbour, his attention must be given to prevent the communication of the fire to other vessels or combustible objects, and to have the cables ready for slipping, and boats ready, and, if advisable, springs prepared, to change the position of the ship, either to prevent danger to other vessels, or better to apply the force for suppressing the fire.

307. He will decide whether and when the magazines and shell-rooms shall be flooded, and give orders accordingly; whether hammocks should be brought up and stowed; when and where sentinels should be placed, and what disposition shall be made of the sick and of the prisoners.

If the hammocks are to be brought up, each man not a Fireman, Pumpman, Hoseman, Axeman, or Smotherer, or belonging to the Carpenter's gang, or detailed as a Sentinel over boats' falls or spirit room, will lash and carry up *two* hammocks and stow them in the nettings, on his way to quarters. Blankets, or other woollen materials, when wet, afford an excellent means of smothering fire, and should be left out by the party lashing up the hammocks and collected by the Smothering party, in charge of an officer, whose duty it will be to see them properly disposed of.

308. The Officers of the respective divisions will enforce the strictest observance of orders from those under their command, and allow no one to leave his station, unless by express orders or permission. At the same time they will direct the most trustworthy of their men to perform any particular duty within their divisions which may tend to check the spreading of the fire, or furnish the means of extinguishing it.

309. Officers of gun-deck divisions will be prompt to detach, under proper officers, the men who may be directed for any particular service, or who may be called from the guns by the calls for Firemen, Sailtrimmers, or Boarders. Should the call for Boarders be made in case of fire, the men will answer the call without any other arms than their swords or

battle-axes. Divisional Officers near the main or other pumps, will cause the men of their divisions to aid in rigging and working them. The ship's buckets are to be passed up to the pumps, as soon as possible, by the persons who may be stationed near them, and these and the fire buckets and division tubs filled. The swabs are also to be got up and thoroughly wetted.

Division boxes, and all powder or explosive materials not in the magazines, are to be taken in charge by the Quarter Gunners and placed in the safest positions, and ready to be thrown overboard, if ordered.

310. The Officer commanding the Powder division will himself deliver the keys of the magazines, shell-rooms, and water-cocks to the Gunner and his Mate, and the men stationed at the water-cocks and see that they are prepared to flood the magazines, if orders should be given to that effect; but must take especial care that the magazines, passages, and shell-rooms are kept closed until orders to open them are received from the Captain.

311. He will also take care that the air ports are immediately closed, and all other means adopted for diminishing currents or supplies of air, and especially if there should be a hope of confining the fire to the lower parts of the vessel.

He will at once have the hose led from the bilge cock, the cock turned, and, if the forcing pump or engine is worked below the gun deck, will see it manned and worked by some of the men of his division.

312. The Master will cause windsails to be taken down; and, if set, courses, spanker, and all lower sails hauled close up; head, channel, and all other pumps which work on upper deck, and fire engine, if on deck, to be rigged and worked by the men of his division stationed nearest to each of them. If practicable, sails, rigging, boats, spars, and sides of ship to be kept wet, and every exertion made to furnish a full supply of water for extinguishing the fire. Rigging-axes and battle-axes to be ready for use in case they should be wanted for any purpose.

313. The CHIEF ENGINEER will detail such Assistant Engineers and men as may be needed to take charge of steam pumps, to lead out hose, and to use such other means of extinguishing the fire as may be ordered or deemed advisable. If under steam, the main engine will be stopped on the first alarm of fire, unless otherwise expressly ordered, and the steam pumps started.



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314. The Surgeon and his assistants will be in readiness to destroy, if required, all inflammable fluids, or other medical stores, which would increase the fire; and to superintend the removal, if necessary, of patients who may be lame or confined to hammocks.

315. Exercises, by order of the Captain, following *false alarms* of fire, known only to him and the Executive Officer to be false, at the time of giving the alarm, may, it is believed, be resorted to with advantage, especially at night.

Such alarms furnish the best means of ascertaining practically whether the necessary preparations for extinguishing fire have been duly attended to, and what degree of silence, calmness, and promptitude may be expected from officers and men in repairing to their stations, as well as in the performance of their duties in a real case of fire.

False alarms, frequently repeated, may, perhaps, lead some of the men to move slowly, under the impression that every alarm given is false and merely intended for exercise, and this impression may be entertained even when a fire has actually taken place. This evil would, however, be comparatively small, since it will be readily admitted by any one who has witnessed the effect of a fire upon a crew at sea, that the great difficulty in such cases is to obtain the necessary quiet and orderly attendance at quarters, which is essential to the success of all subsequent measures.

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## CHAPTER IV.

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### EQUIPMENT OF BOATS

#### WHEN DIRECTED TO BE MANNED AND ARMED FOR SERVICE.

316. Boats are to be provided according to the time they are to be absent and the nature of the service they are to perform, keeping in view the details prescribed in table, *article 333*.

Boat Howitzers are to be distributed as follows :

317. *In Ships-of-the-line and 1st class Propeller Frigates*, each of their two Launches is to have a 24-pdr. of 1,300 pds. weight, with a boat carriage; and both the 1st and 2nd Cutters are to have a 12-pdr. of 750 pds. weight, with a boat and also a field carriage.

318. *In all other Frigates*, each of the two Launches is to have a 12-pdr. of 750 lbs., with a boat and also a field carriage; and the 1st Cutter is to have a 12-pdr. of 430 lbs., with a boat carriage.

319. *In Razee Sloops, [Frigates cut down,] and 1st class Propeller Sloops*, the Launch is to have a 12-pdr. of 750 lbs., with a boat and a field carriage; and the 1st Cutter a 12-pdr. of 430 lbs., with a boat carriage. *In 1st and 2nd class Sailing Sloops*, the Launch is to have a 12-pdr. of 750 lbs., with boat and field carriages.

320. *In all other Sloops and Brigs*, the Launch is to have a 12-pdr. of 430 lbs., with a boat and a field carriage. Whenever the Howitzers are to be used in boats they are to be fitted for the purpose as directed in pages 4, 5, and 6 of 'Exercise and Manœuvre of Boat Howitzers.' (*See Appendix D.*) Their crews are to be armed with swords and revolvers.

321. For boarding parties, swords and revolvers, and rifles loading at the breech, with filled cartridge boxes, are to be supplied.

322. When boats 'manned and armed' are ordered, the Officers assigned to the command of the boats will see that they are thus furnished, or otherwise, as may be specially directed, and report when the boats are ready. They will also see that all articles are safely returned, or duly accounted for, when the boats return to the vessel.

If the boats are directed to assemble alongside of any particular vessel the officers are to report as they arrive there. If signalled alongside of the ship of the Commander of the Squadron for *exercise* or for *inspection*, they are to be inspected, if he shall so direct, by an Officer appointed by him, whose duty it shall be to report those which may be particularly well prepared, and those which he may find deficient in equipment or arrangement, specifying particulars.

#### MANŒUVRES OF BOATS ARMED FOR SERVICE.

323. The boats of a vessel being completely armed and equipped, as directed, they are to hoist their colors, shove off, and fall in as follows :

No. 1. First Launch.

No. 2. Second „

No. 3. First Cutter.

No. 4. Second „

No. 5. Third „

No. 6. Fourth „

Or, if they be less than six in number, they are to fall in agreeably to the order of their size and designation, with the Senior Officer always in the leading boat.

The boats of each ship are to constitute a subdivision.

324. When the Officer designated to command all the boats of a squadron has had them assembled, they are to form, in the above order, into as many columns as there are vessels to which the boats belong.

## ORDER OF COLUMNS.

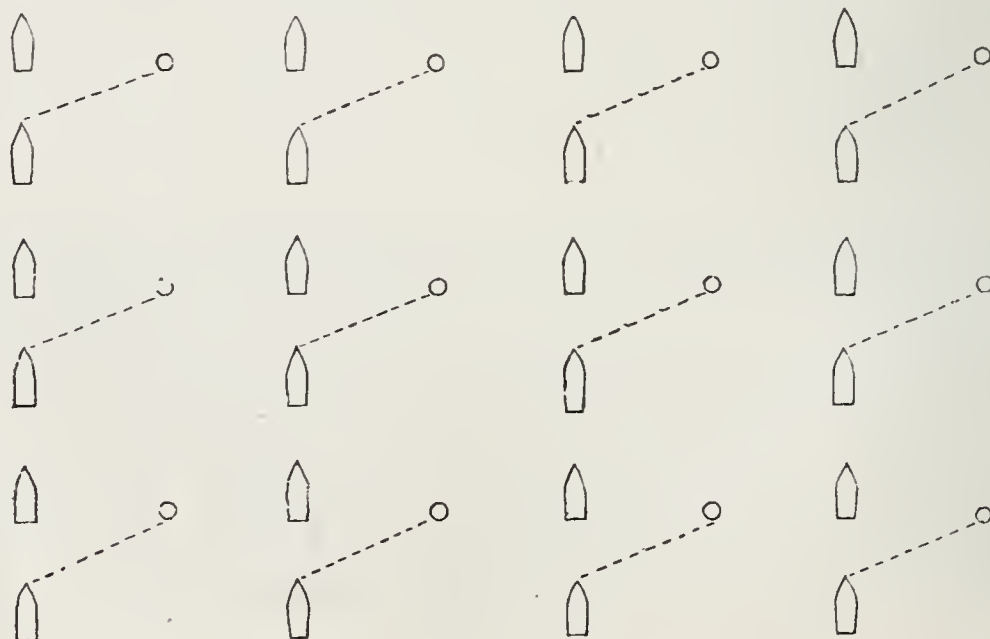
325. The order of seniority of the Commanding Officers of subdivisions of boats is to regulate the relative position of the columns; and, supposing that the natural series of the alphabet represents this order of seniority, the columns will be as follows :

D	B	H	F	A	G	I	C	E
2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6

This arrangement of boats is to be called the first order, and it is to serve as a basis for all other manœuvring.

## TO FORM IN THE ORDER OF ATTACK THREE DEEP.

326. Each even numbered boat of a column is to be placed to the right of the next ahead of it.

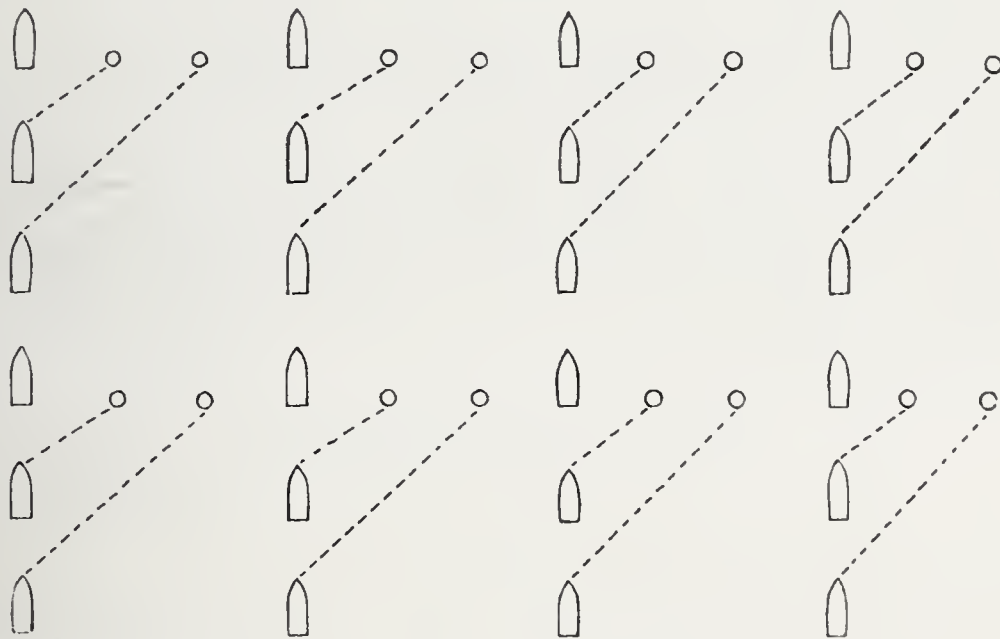


Thus, in the order of attack, three deep, the boats will be arranged as follows :

D	2	B	2	H	2	F	2	A	2	G	2	I	2	C	2	E	2
3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4
5	6	5	6	5	6	5	6	5	6	5	6	5	6	5	6	5	6

TO FORM IN THE ORDER OF ATTACK TWO DEEP.

327. In each column, boats Nos. 2 and 3 are to be placed to the right of No. 1, and boats Nos. 5 and 6 to the right of No. 4.



Thus, in the order of attack, two deep, the boats will be arranged as follows :

D	2	3	B	2	3	H	2	3	F	2	3	A	2	3	G	2	3	I	2	3	C	2	3	E	2	3
4	5	6	4	5	6	4	5	6	4	5	6	4	5	6	4	5	6	4	5	6	4	5	6	4	5	6

TO FORM IN THE FIRST ORDER.

328. To pass from either order of attack, just mentioned, to the First Order, the manœuvring is to be the inverse of that by which the order of attack is formed.

## TO FORM LINE AHEAD.

329. The orders of attack being formed as designated, it is sufficient for all the boats together to alter the course eight points, one way or the other, to become arranged in a line ahead, in two or three columns.

Being thus arranged in a line ahead, by returning back eight points the boats will be again arranged in an order of attack, two or three deep.

## TO CHANGE THE DIRECTION OF THE FRONT.

330. The evolution of changing the direction of the front of the orders of attack is effected by a general movement at the time the course, which the leaders of columns are to steer, is shown by signal.

## TO FORM THE ORDER OF RETREAT.

331. This order is the reverse of the first order.

To pass from the first order to the order of retreat all the boats turn together 16 points in the same way, and thus retire protected by the guns of the launches.

## FORMATION OF DIVISIONS.

332. Two or three divisions of attack may be formed to operate upon two or three points at the same time.

In the first case, the boats on the right, including those of the Commanding Officer, constitute the 1st division, and those on the left the 2nd.

In the second case, the third of the boats on the left constitute the 2nd division; the third on the right the 3rd division; and the third at the centre the 1st division.

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NOTE.— The manœuvres of boats armed for service, from articles 323 to 332 inclusive, are derived from the 'Règlement sur le service Intérieur à bord des batiments de la flotte,' published by authority of the French government in 1852.

333. TABLE OF BOAT EQUIPMENTS, ARMS, AND STORES FOR EXPEDITIONS.

Departments	Line Ships and 1st class Screw Frigates			All other Frigates			Razee'd Frigates and 1st class Screw Sloops			All other Sloops and Brigs		
	LAUNCHES	1st and 2d CUTTERS	3d and 4th CUTTERS	LAUNCHES	1st and 2d CUTTERS	3d and 4th CUTTERS	LAUNCH	1st CUTTER	2d and 3rd CUTTERS	LAUNCH	1st and 2d CUTTERS	3d CUTTERS
Boat carriage, complete.....	1 ea.	1 ea.	...	1 ea.	1 to 1st	...	1	1	...	1		
Field carriage, complete.....	...	1 ea.	...	1 ea.	...	...	1	...	...	1		
Ammunition chests (various in size and contents)..	Either one or all, as the nature of the service may require.											
Ammunition pouches.....	One for each man of the field howitzer's crew, except Nos. 1 & 2.											
Match rope.....(lengths)	1 ea.	1 ea.	1 ea.	1 ea.	1 ea.	1 ea.	1	1	1 ea.	1	1 ea.	1
Primers.....(tin boxes)	1 ea.	1 ea.	...	1 ea.	1 to 1st	...	1	1	...	1		
Cartridges for bursting-charges.....	One for each shell or shrapnel fitted with ordinary fuze.											
Fuzes, spare, assorted as to time.....	In proportion to ammunition taken in each boat.											
Spare lock, complete.....	1 ea.	1 ea.	...	1 ea.	1 ea.	...	1	1	...	1		
Havresack for Captain of howitzer.....	One for each field gun.											
Swords.....	One for each man in the boat.											
Breech-loading guns.....	One for each man of the boat's crew.											
Minié rifles.....	When extra men in the boat, one for each.											
Revolvers.....	One for each man of the boat's crew.											
Cartridge-boxes, filled.....	One for each rifle, breech-loading gun and revolver.											
Empty powder tank, as a magazine.....	1 ea.	1 ea.	1 ea.	1 ea.	1 ea.	1 ea.	1	1	1 ea.	1	1 ea.	1
Boat arm-chest.....	1	1	1	1	1	1	1	1	1	1	1	1

2 H

GUNNERS

TABLE OF BOAT EQUIPMENTS, ARMS, AND STORES FOR EXPEDITIONS—Continued.

Departments	NAMES OF ARTICLES	Line Ships and 1st class Screw Frigates			All other Frigates			Razeeed Frigates and 1st class Screw Sloops			All other Sloops and Brigs		
		LAUNCHES	1st and 2d CUTTERS	3d and 4th CUTTERS	LAUNCHES	1st and 2d CUTTERS	3d and 4th CUTTERS	LAUNCH	1st CUTTER	2d and 3d CUTTERS	LAUNCH	1st and 2d CUTTERS	3d CUTTER
CARPENTER'S	Masts and spars.....(set)	1 ea.	1 ea.	1 ea.	1 ea.	1 ea.	1 ea.	1	1	1 ea.	1	1 ea.	1
	Set of oars.....	1 "	1 "	1 "	1 "	1 "	1 "	1	1	1 "	1	1 "	1
	Spare oars for one thwart.....(set)	1 "	1 "	1 "	1 "	1 "	1 "	1	1	1 "	1	1 "	1
	Boat hooks.....	3 "	3 "	3 "	3 "	3 "	3 "	3	3	3 "	3	3 "	3
	Box of sand for fireplace.....	1 "	1 "	1 "	1 "	1 "	1 "	1	1	1 "	1	1 "	1
	Tools and articles for repairing damages (set fixed)	1 "	1 "	1 "	1 "	1 "	1 "	1	1	1 "	1	1 "	1
	Bucket.....	1 "	1 "	1 "	1 "	1 "	1 "	1	1	1 "	1	1 "	1
	Tarpaulin.....	1 "	1 "	1 "	1 "	1 "	1 "	1	1	1 "	1	1 "	1
	Sails.....(set)	1 "	1 "	1 "	1 "	1 "	1 "	1	1	1 "	1	1 "	1
	Awning.....	1 "	1 "	1 "	1 "	1 "	1 "	1	1	1 "	1	1 "	1
SAIL-MAKER'S	Tent awning (see drawing).....	1 "	1 "	1 "	1 "	1 "	1 "	1	1	1 "	1	1 "	1
	Thrum mats for muffling oars.....(sets)	1 "	1 "	1 "	1 "	1 "	1 "	1	1	1 "	1	1 "	1
	Hand grapnels.....	2 "	2 "	2 "	2 "	2 "	2 "	2	2	2 "	2	2 "	2
	Anchors.....	1 "	1 "	1 "	1 "	1 "	1 "	1	1	1 "	1	1 "	1
	Chain or rope for anchor.....(15fms. long)	1 "	1 "	1 "	1 "	1 "	1 "	1	1	1 "	1	1 "	1
	Marlinspike.....	1 "	1 "	1 "	1 "	1 "	1 "	1	1	1 "	1	1 "	1
	Spun yarn.....(balls of)	1 "	1 "	1 "	1 "	1 "	1 "	1	1	1 "	1	1 "	1
	Grease.....(pounds)	1 "	1 "	1 "	1 "	1 "	1 "	1	1	1 "	1	1 "	1
	Fishing lines and hooks.....	1 "	1 "	1 "	1 "	1 "	1 "	1	1	1 "	1	1 "	1

Three lines for the larger boats and two for the smaller, with 1 dozen assorted hooks per boat





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 DETAILS OF THE FOREGOING TABLE.

334. BOAT CARRIAGE COMPLETE, consists of—

Bed.

Slide.

Compressor plates.

„ screw-bolts.

„ handles.

Lugs for loop.

335. FIELD CARRIAGE COMPLETE, consists of—

Axle.

Trail.

Braces.

Lugs for loop.

Train wheel, or runner.

Bolt for „

Socket for handspike.

Elevator.

Disc of elevator.

Box for elevator.

## FIXTURES IN BOATS FOR BOAT GUNS.

336. Two eye-bolts on each bow, to receive the hooks of the skid; two cross pieces, of yellow pine, to bear the carriage, so as to carry the muzzle of the howitzer just above and clear of the gunwale and stem.

One piece of yellow pine scantling, placed lengthways and amidship morticed into the rear cross piece, to sustain the carriage in sweeping.

MOVABLE PIECES.

337. Six pivot plates and bolts—one at the stem, one at the stern, one at each bow, and one on each quarter; two light wooden tracks to lay along the thwarts for the wheels of field carriage and the slide of boat carriage; one midship wheel track for the trail of field carriage; two stout skids, each fitted at one end with two hooks, and connected at the shore end by an iron brace.

The chocks with rollers at the stem and stern posts of launches, are arranged to be removed when the gun is to be used.

338. *Implements for shifting the Howitzer from boat to field carriage.*

One muzzle block.

One selvagee strap.

One shifting spar.

One short iron or wooden bolt, which will enter the breeching hole, to keep the piece on the right slue.

339. *Implements, complete, for serving and working the Howitzer.*

Breeching for boat gun (if deemed necessary).

Lock with lock-string.

Elevating screw.

Sight.

Priming-wire.

Boring-bit.

Vent-cloth.

Sponge and rammer.

„ „ spare.

Spring spike.

Rat-tail file.

Havresack, with strap, for Captain of howitzer, to contain a supply of primers, spare fuzes, spare lock, vent-bit, vent-cloth, and implements for spiking; leather ammunition pouches for each of the men of the field gun, except Nos. 1 and 2, to be supplied by the Quarter Gunner, with one round of ammunition each, a set of common fuzes, and two primers, when the order to land is given.

Drag rope, fitted with hooks and handles.

Trail handspike.

A rope, or chain, to lock the wheels in descending slopes.

340.

#### AMMUNITION.

A chest containing shrapnel.

„ „ shell.

„ „ canister.

These chests are of two sizes; the single, holding nine, and double, eighteen rounds.

A key is becketed to each box for unscrewing the lid.

Cutting tool for *opening* the Bormann fuze.

#### FOR SMALL ARMS.

341. Cartridge boxes and belts, furnished with cartridges and percussion caps, screw-driver, cone-key, and wiper.

An empty powder tank for magazine, to contain filled cartridge boxes and spare cartridges.

#### SMALL ARMS.

342. Breech-loading guns, in loops or brackets under the gunwale of the boat, protected by a water-proof canvas covering, running round the rising of the boat.

Rifles.

Revolvers.

Swords.

Boat-arm chest.

A good tarpaulin to cover ammunition, &c.

343. PROVISION.

Pork. (To be cooked if there be time.)

Bread, in water-proof bag.

Cheese.

Whisky, in breaker.

Fresh water, in kegs; always to be used for ballast when ballast is required.

Fuel and kindling.

344. UTENSILS AND ARRANGEMENTS FOR COOKING.

A box of sand, to make a fire-place in the boat.

A proper vessel for cooking.

A small frying-pan.

Mess kettle.

Tin pots and spoons.

Grog measure.

Funnel.

Bucket.

345. TOOLS AND ARTICLES FOR REPAIRING DAMAGES.

Axe, 1 for each boat.

Hatchet, „ „

Hammer, „ „

Hand-saw, „ „

Nails, 2 pds. for each launch;  $1\frac{1}{2}$  pds. for each large cutter; and 1 pd. for each of the rest.

Sheet lead, 3 square feet for each launch; and 2 square feet for each cutter.

Tacks (number), 100 for each launch; 75 for each large cutter; and 50 for each of the rest.

Marlinspike.

Spun-yarn.

Grease.

346.

MISCELLANEOUS ARTICLES.

Boat ensign.

Set of signals for boat of Senior Officer.

Boat compass.

Spy-glass.

Lead and line.

Lantern.

Candles.

Tinder-box, with flint and steel.

Fishing-lines and hooks.

347.

FOR TREATMENT OF SICK AND WOUNDED.

Tourniquets.

Bandages.

Lint.

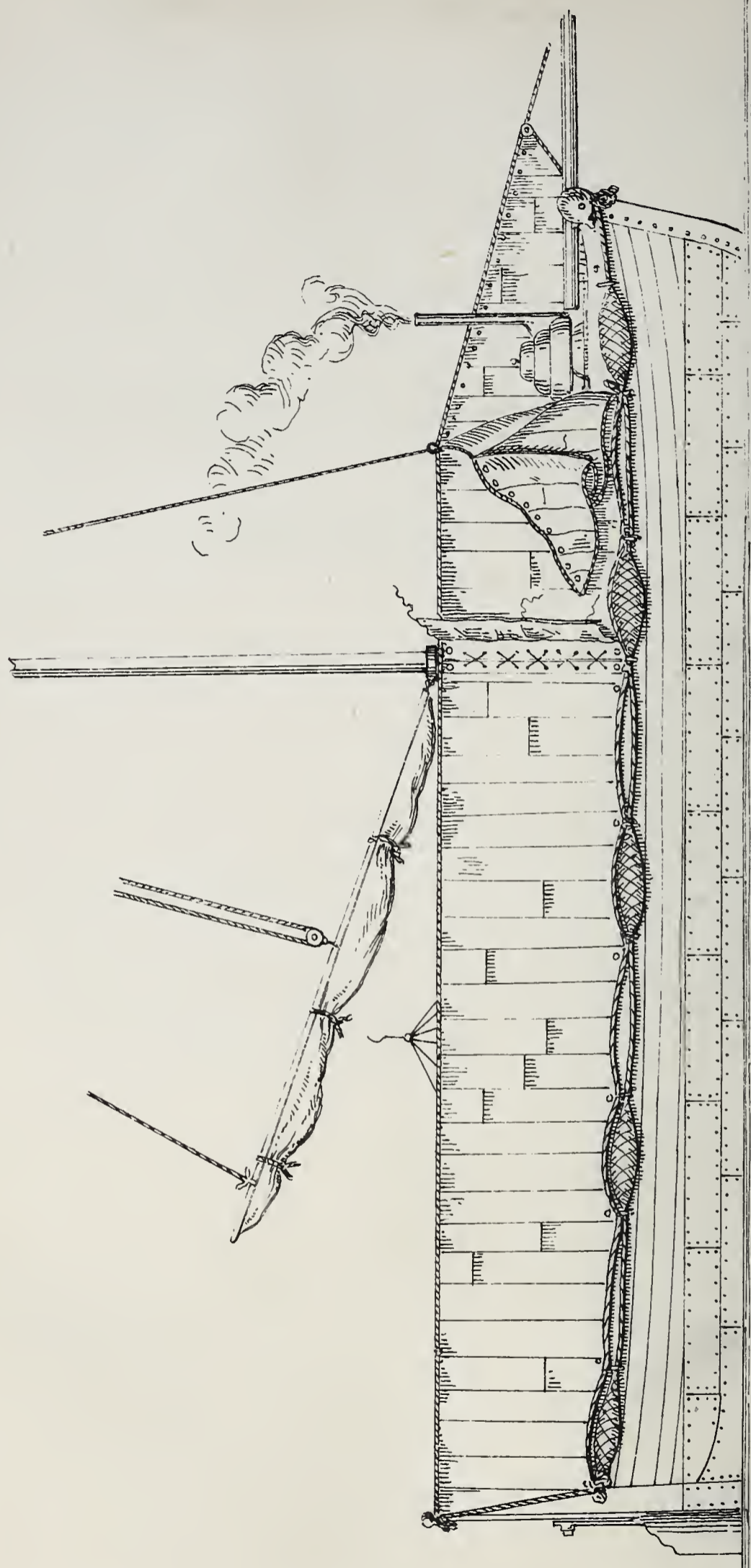
Medicines.

Surgical instruments.



(Diagram F.)  
TENT AWNING FOR LAUNCH.

BY LT. VANZANDT.





348.

## BOAT GEER.

Masts.

Spars.

Rigging.

A set of oars, fitted with trailing-lines long enough to allow them to trail alongside in the water.

Three boat-hooks.

Spare oars, with trailing-lines, for one thwart.

Small thrum mats for muffling oars when required.

Anchor.

Chain, or rope.

Hand grapnels, fitted with a fathom of light chain, and five fathoms of line.

Sails.

Awning and stauncheons.

Tent awning. (*See Drawing.*)

N.B.—In order to avoid delay and confusion when boats are called away for service, it is recommended that the articles required by the foregoing lists should be kept separately in the store rooms, in convenient packages for stowage in the boats and protection against weather. The contents of each package should be marked on it, together with the name of the boat for which it is intended. Particular attention should be paid by the Executive Officer of the vessel to the best and most compact stowage of all articles required for boat expeditions, which will, necessarily, vary according to the size of the boat and the nature of the service she is to perform.

## NOTES ON THE USE OF BOAT HOWITZERS,

*Derived from the 'Boat Armament of the United States Navy,' 1856 :  
originally reported to the Chief of the Bureau of Ordnance  
and Hydrography by Commander Dahlgren, 1852.*

349. N.B.—Before equipping boats with the howitzers, notice attentively the 'hints for general service,' commencing at page 146, and 'suggestions for landing,' page 127, of that system, which relate more especially to the condition and management of boat guns.

350. 'Too much care cannot be taken to be fully provided, and to have each detail in good condition ; for, after the boat has left the ship, it may be impossible to compensate for failure in some seemingly trivial article.'

351. 'The chief purposes of naval light artillery are :

1. To attack small vessels that are lightly armed and furnish but slight protection to the crews.
2. To contend with other armed boats.
3. To cover the landing of regular troops.'

352. The landing of seamen is rather a remote contingency in the naval service, and should never be resorted to when opposed by good infantry, or when the object to be attained would take the seamen too far from their boats, which should be the base of operations.

353. *Boat Guns.*—*No tackles* are required to run out 12-pdrs. ; 24-pdrs. may possibly require them.

354. The hole in the cascable for reeving a breeching has been purposely omitted in howitzers recently cast, as hitherto the use of a breeching has not been found necessary. Should one be required, a thimble may be fitted to the neck of the knob to serve in place of this hole.

With a breeching the piece may be fired as if on an ordinary carriage.

355. The recoil is controlled by compressing the slide between the bed and the lower plate. It is necessary, however, that the surfaces of the carriage to be in contact should be plane. If they are not so, dismount the gun and examine them, and where the wood is worn smooth remove

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it in the slightest manner and correct the surfaces generally, which will be found to reduce the recoil. In making the surface plane it is by no means necessary that it should be rendered smooth. It ought to be as little so as possible for the present purpose.

356. *Field Carriage*.—In order to moderate the recoil on smooth ground, take out the axle or pin of the trail wheel and turn the wheel up on the trail.

In using the howitzer on shore one or two double boxes of ammunition may be lashed under the axle of the field carriage. When more than a single piece is landed it may be found convenient to secure the trail of one field carriage to the axle of another, and then, by means of pieces of stuff, or boat's spars, secured from axle to axle, to place the ammunition boxes, provisions, pouches, &c., upon them.

357. *Shrapnel* may be effectively used where the dispersion of common canister becomes too great and its effects feeble. It takes the place of common shell, to a great extent, when uncovered masses of men are in view, and is designed to burst in front of troops, and at just such a distance and height as to disperse the balls among them.

358. Similar terms are used in marking the sight and the fuze. Thus, if the fuze be adjusted to 2'', and the piece elevated by the sight raised to the line on it marked 2'', then the shrapnel will burst about 500 yards from the piece, and spread its balls from that point to a considerable distance farther—effectively at least 150 yards.

The adjustment of the fuze to the distance and the altitude of explosion are regulated to the elevation; and therefore, the three conditions to good effect may be said to depend mainly on a correct knowledge of distance.

359. The 12-pdr. shrapnel contains 80 musket balls, and if its explosion occur at one hundred or one hundred and twenty yards in front of the object, one-seventh of the number of balls may be relied on to take effect on an object 20 by 10 feet square.

360. The shell may be advantageously substituted for shrapnel when the hostile force is sheltered, especially by such quarters as small craft or merchantmen afford, or when material of any kind is the object of the fire.

361. At a couple of hundred yards, canister only is required.

## FUZES.

362. When provided with the Bormann fuze the shrapnel, or shell, as issued, is complete. The upper surface of this fuze is graduated into seconds and fourths of seconds; and it is only necessary to lay bare the composition contained in the fuze by the cutting tool, to prepare the projectile for instant use. In this respect the Bormann fuze has an advantage over the ordinary fuze.

363. The ordinary fuze consists of a wooden tube driven into the shrapnel after the balls are put in, which is to receive a paper case containing the composition. Five of these fuzes are allowed to each shrapnel, their times of burning being, respectively, 1", 2", 3", 4", and 5". They are packed in a paper case, and before the shrapnel is placed in the howitzer a fuze of the time supposed to correspond to the distance is selected and inserted in the wooden tube.

The shells for howitzers are fitted in the same manner.

364. Both shrapnel and shells fuzed in this way must be charged with powder while preparations are in progress for clearing and getting ready the boats. These charges are —

		Shrapnel	Shell
		<i>oz.</i>	<i>lb.</i>
For the 12-pdr.	. . . . .	4½	0·5
For the 24-pdr.	. . . . .	6	1·0

The charges are adapted to these quantities. After the shell has been charged the orifice of the plug should be closed with a tow stopper.

365. Fixed ammunition is preferable on the score of greater convenience and of avoiding difficulties.

366. Moistening the sponge is recommended. Brightening howitzers is not approved.

## CHAPTER V.

## MISCELLANEOUS OPERATIONS.

## GETTING IN GUNS ON COVERED DECKS.

367. After bracing the yard over the port through which it is intended to take the guns, secure the lizard round the yard, five or six feet outside of the ship, and hook the top burtons just outside of the lizard.

Haul taut and bring an equal strain on the burtons and lifts. Hook a rolling tackle on the opposite side of the yard, bowse it well taut, and the trusses also, if they be of rope. Pass the end of the pendant of the gun-purchase through the thimble of the lizard; take the end up and make it fast round the top-mast, just above the lower cap. Have the port lined with pine boards to keep it from being chafed.

Bore a hole in the deck or decks through which it is intended to pass the gurnet, as nearly as possible over the rear end of the gun carriage, and as near in a line with the centre of the port into which the guns are to come as the beams will allow. Pass the upper end of the gurnet through the hole, and turn in the thimble, to which hook the pendant tackle. Place a tackle across the deck ready for bowsing the gun into its carriage through the port.

Bring the gun under the yard and sling it as follows: place one bight of the slings under the neck of the cascable, and pass the lashing which is attached to the slings round the chase, at such a distance from the trunnions as will allow them to go into the trunnion holes without bringing too great a pressure of the slings against the upper port sill. Then toggle or hook the gun-purchase to the outer bight of the slings and sway away. When the breech of the gun is above the port sill, hook the gurnet and the thwart-ship tackle to the cascable, and bowse on both. When the slings bear hard on the upper port sill, lower the gun-purchase, and bowse on the gurnet until the breech is high enough for the trunnions to clear the cap-square bolts in the carriage; then bowse on the thwart-ship tackle

until the trunnions are over the trunnion holes, lowering the purchase as required to bring the gun into its place.

As each gun is mounted unhook the purchase and gurnet, take off the slings, run the carriage to its proper port, and place another for the next gun.

#### TAKING IN GUNS OVER ALL.

368. Sling the gun slightly breech-heavy, to render it more manageable. If it is to be mounted on the spar-deck place the carriage in the gangway; if on the main-deck, close to the main hatchway on that deck. In place of the gurnet, hook the stay-purchase for lowering the gun into its carriage.

#### GETTING OUT GUNS THROUGH PORTS.

369. Secure the yard as in getting in guns, and sling the gun in the same manner. Hook the gurnet and haul it taut, so as to raise the breech of the gun as much as the port sill will permit; hook or toggle the gun-purchase and sway away. As soon as the trunnions are clear of the carriage haul it from under the gun, ease away the gurnet, and let the gun go out the port. As soon as the gun is perpendicular to the purchase unhook the gurnet and lower the gun into the lighter, or on the wharf, as the case may be.

If the gun is to be taken out *over all*, the stay tackle is to be substituted for the gurnet, only it is to be hooked to the same end of the slings as the gun-purchase, and the lashing on the slings is to be passed around the chase of the gun, as near the trunnions as possible without being in the way of the brackets.

#### MANNER OF USING THE GRIOLET PURCHASE FOR DISMOUNTING OR MOUNTING GUNS ON COVERED DECKS.

370. The gun is to be run in, in the direction required to bring the muzzle under the housing bolt, and the breech under the hole bored in the deck to receive the screw bolt of the upper block of the breech purchase. This hole should be bored through the plank in the deck, as nearly abreast the middle of the port as the beams will allow, giving the block room to play clear of the beams and carlings.

With a gun's crew of twelve men the operation may be performed as follows :

*At the word 'Stand by to dismount !'* the Quarter Gunner of the division on the deck above that in which the gun is to be dismounted, removes the screw tap, and stands ready to place the washer, key and unkey the bolt of the breech-purchase block.

All the numbers, except 1, 3, 4, and 8, man the train-tackle.

No. 1 gives the word '*Run in !*'

*While the gun is coming in*, Nos. 1 and 2 remove breeching from jaws of cascable, and 7 and 8 remove it from side shackle. Nos. 1 and 2 throw its bight over the reinforce. No. 1 removes *sight-bar* and screws up the *thumb-screw* firmly.

*When the gun is in position*—Nos. 1 and 2 adjust upper and lower block of breech-purchase and secure the latter with the cascable pin. Nos. 3 and 4 chock fore trucks, provide muzzle-purchase, and, assisted, if necessary, by 5 and 6, adjust its upper block. Nos. 5 and 6 unshackle breeching from ship's side, and shove toggle block of muzzle-purchase into the bore and back it to the breech purchase.

Nos. 7 and 8 unkey and throw back cap squares and choke luffs of side-tackles, or, if rolling deeply, hitch them round the straps of the blocks.

Nos. 9 and 10 provide breech-purchase and assist 1 and 2 in adjusting it.

No. 11 chokes luff of train-tackle or hitches it, if required ; provides and hooks tackle of muzzle-purchase ; belays and lowers.

No. 12 provides and hooks tackle of breech-purchase ; belays and lowers.

These preparations made, all the numbers man the breech-tackle fall, or divide themselves to bowse upon both falls together, as the position of the gun in the battery may render either mode most convenient.

*At the word 'Dismount !'* the gun is swayed out of the carriage.

Nos. 3 and 5 attend chocking quoins, and 11 attends train-tackle, if required.

All the numbers, excepting 11 and 12, who attend purchase falls, move up to their ordinary stations for serving the gun, unhook side-tackles and remove the old carriage, under the direction of No. 1 ; and—

*At the word 'Mount!'* the same men bring the new carriage into position for mounting.

*At the word 'Lower!'* Nos. 11 and 12 lower the gun into its place; all the numbers then proceed, respectively, to reverse what they had done in dismounting.

Guns on covered decks may, also, be dismounted by means of a muzzle lashing, a runner, and the train tackles, assisted by the handspikes.

The gun is run in and laid square under the housing bolt, the bed and quoin removed, the muzzle elevated and secured as in the housing position; then, after unkeying and throwing back the cap squares, the breech is bowsed up clear of the carriage by means of the train-tackle, hooked in the eye of a runner, the block of which hooks in an eye-bolt in the beam over the gun. If preferred, this mode of dismounting may be adopted by substituting the muzzle lashing for the toggle block of the griolet, and toggling the runner block in the hole made in the deck for the breech-purchase of the griolet.

#### THROWING GUNS OVERBOARD.

371. The gun's crew being assembled at quarters, remove the pin and chock from the cascable, into the jaws of which place a selvagee strap; hook the double block of the train-tackle into the housing bolt over the port, and its single block into the selvagee strap; remove the cap squares and place a round block of wood on the sill of the port high enough to let the chase bear on it when slightly depressed; raise the breech as much as possible without lifting the gun out of the carriage. When all is ready man the train-tackle well; have the Handspikemen also 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. When all is ready give the order: 'All together—launch!' In a gale of wind advantage should be taken of a favourable roll to give the word, that the action of the sea and of the men at the guns may 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 is to be taken that each buoy-rope is of proper length and strong enough to weigh the gun. The best mode of securing the buoy-rope to the gun is to form a clinch or



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splice an eye in the end which goes over the cascable, and take a half-hitch with the bight around the chase of the gun and stop it with spun yarn.

The buoy must be sufficient to float the rope when saturated; or, in deep water, a smaller line may be used for the buoy, and attached to the rope intended for weighing the gun that it may be hauled up when wanted.

## CHAPTER VI.

MAGAZINES AND SHELL ROOMS.

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## CONSTRUCTION, LIGHTING, STOWING, AND FLOODING.

372. No details of internal arrangement are to be more carefully considered and executed than those relating to the stowage and delivery of powder, since a defect in these particulars, apparently insignificant, may lead to the instantaneous destruction of the ship; or, with the incendiary and explosive projectiles now used, to her becoming, comparatively, an easy prey to an antagonist. Every possible precaution, therefore, is to be taken to accommodate the full allowance of powder completely; to guard it to the utmost against injury and accidental explosion; and to deliver it at the magazine as required, with facility and certainty. To these ends, and in view of the fact that all the powder for great guns is now put up in cubical copper tanks, made water tight, THE FORM OF MAGAZINES should be as nearly rectangular as the shape of the vessel will admit, and they should be built strong enough to resist sufficiently the effect of her working in heavy weather, and also the pressure of water they will have to sustain in case of being flooded.

373. All magazines should have a light-box for each alley at one end and a passage to deliver powder at the other; and the magazine and its passage, considered as one, should be made perfectly water tight by caulking the bottom and sides, and then lining them internally, first with white pine boards, tongued and grooved, and again with sheets of lead of extra thickness, soldered together, over these boards. Both these linings are to extend entirely over the bottom or floor, and all the way up to the crown on all the sides.

374. When the magazine reaches the ceiling of the ship it should be battened off two inches; the lining of the floor should be battened up one, and also the magazine deck, so that water leaking through the sides of the vessel may run by and under and not into the magazine.

An external lining of sheet iron should also be resorted to, to protect against fire, and to prevent the intrusion of rats.

375. A magazine aft in a ship is to have its passage for delivering powder adjoining its forward part, and one forward in a ship is to have this passage adjoining its after part.

376. As many doors are to be cut in the bulkhead separating this passage from the magazine room as there are alleys to be left in the latter, between the racks or shelves on which the tanks are stowed, and these doors are to correspond with those alleys. They are not only to afford a means of entrance to the magazine, but also for passing the tanks in and out. Through the upper part of each door a small scuttle is to be cut (two, if necessary) for the purpose of passing the cartridges out of the magazine room with the door itself closed; and it is to have a lid so arranged as to open outwards only, and to close of itself when the scuttle is not actually in use.

377. Sailing ships-of-the-line and frigates should have two alleys for each magazine. Propellers of large class, where the shaft will interfere with this arrangement, two alleys for the forward magazine. In smaller vessels one alley will suffice. In all cases the alley is to be *not less* than two feet and ten inches in breadth, and it ought to be more, if practicable, to prevent confusion and delay. Each alley is to be illuminated by a separate light.

If there be room in the magazine there should be space left, at the end nearest the light, for a man to pass from one alley to the other without going into the passage.

378. Ships with two magazines—one forward and the other aft—are to have them as nearly equal, in point of capacity, as the shape of the vessel and other circumstances will admit.

Magazines should be kept as low down as possible. Their floors may rest on the keelson, but should not come below it. Their height should be equal, only, to an exact number of times the height of a powder tank when lying on its side, in addition to the thickness of the shelving. An additional half inch for each shelf should be allowed for play or spring. The whole height in the clear should be limited by the condition that a man standing on the floor may reach the upper tier of tanks with ease. Four tiers of 200 lb. tanks, three of them resting on shelves two inches thick, and the other on inch battens on the magazine floor, will, with an allowance of one and a half-inch for play and spring, require a height, in the clear, of six feet two inches. This, both safety and convenience would suggest, should be the maximum limit in height, even for the

largest magazine. Three tiers of these tanks will require a height, in the clear, of four feet seven inches.

If, however, in ships of great draft of water, it should be found practicable to extend the height of a magazine so as to accommodate five tiers of tanks, then the lower or ground tier may be laid so as to occupy the whole of the magazine floor, and on the top of this tier, in the alley-way, a light false bottom is to be placed for the men to stand upon to enable them to reach the upper tier, which is the one that should first be exhausted. This false bottom should be made of gratings and in sections convenient for speedy removal.

379. When the state of things is such as to render it impossible to avoid extending the sides of the magazine so far out towards the skin of the ship as to leave only an air passage on either side, the crown should be *at least* six feet below the deep-load line.

In all cases where this crown is less than six feet below that line the sides should be made susceptible of protection by allowing a space to interpose materials, such as sand, coal, or water in tanks, between them and the inner planking of the ship.

An average space of six feet on both sides will probably be sufficient; still if a greater space can be given it ought to be. Under no circumstances, however well the sides be guarded, should the crown of the magazine, if it can be avoided, be less than four feet below the deep-load line.

380. It is proper to add, in connexion with this most important subject, that, in order to increase security against the effects of lightning, a magazine should be placed, if practicable, so as not to include a part of a mast.

381. All the metallic *fixtures* about a magazine, delivering passages, and light rooms, are to be of copper.

382. Each delivering passage is to have, for the distribution of powder, at least as many passing scuttles communicating with the orlop or berth deck as there are chains of scuttles above.

#### MAGAZINE COCKS.

383. Each magazine, as a whole—that is, including the delivering passage—being made, as stated above, water tight, is to be provided with an independent cock for filling it rapidly with water; a waste pipe leading

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from above the upper tier of tanks to lead off the superfluous water ; and a cock just at the floor for letting the water off when the magazine is to be emptied after having been flooded. Both the cocks are to be turned from the deck above, each having a lever to its spindle for the purpose, distinctly marked, with engraved letters, what it is and how it is to be used, and kept secured by a proper lock, the key of which is to be kept among those of the magazines. A short pipe to lead the water down into the hold is to be attached to the emptying cock, and with this the waste pipe is to connect. All are to be well boxed over for protection against injury. A perforated disk, or strainer, is to be secured inside of the hole, at the upper part of the magazine, for the waste pipe.

## LIGHTING THE MAGAZINE.

384. The magazine is to be lighted by means of one regulation lamp, to correspond with each alley of the magazine room, placed in a box arranged for the purpose. This box, of which a portion of the magazine bulkhead forms a part, is to be lined, internally, with soldered sheets of copper, and is to have a few inches of water in it whenever the lamp is lighted. The entrance to it is to be at the top, through a scuttle in the deck large enough to admit the lamp. In the portion of the magazine bulkhead just alluded to, and so as to throw as much light as possible into the magazine room, an opening with great bevelling is to be cut, which is to be covered by two plane glasses of suitable thickness, somewhat separated from each other, one of which, that next to the lamp, must be permanently fixed ; and the other, or that next to the magazine, is to be let into a wooden frame so that it may be easily removed, and thus both glasses cleaned at any time with convenience and safety. The glasses are to be held in place by brass screws, after being closely fitted and having their edges made perfectly tight. A small dome or reversed funnel, of copper, is to be placed above the lamp and fitted with a pipe of the same metal to convey the smoke off. This pipe is to pass up through the covering of the light-box (which is to have a plug-hole, lined with brass, for the purpose) and then led farther, if necessary, taking care, however, to consult perfect safety throughout.

The admission of air to the light-box will be from the division of the hold in which it is placed, by small holes, near its top, through its side or back, protected with copper-wire gauze, inside and outside of the box.

## STOWING THE MAGAZINES.

385. In the stowage of magazines reference must be had to the Gunner's duties (*articles 36, etc.*), and to 'Arrangements for delivering and distributing powder' (*articles 389, etc.*) A bar of wood, to ship and unship with facility, will be provided for each tier of tanks, on each side of the alleys, to secure them from getting out of place when the ship rolls.

## SHELL ROOMS. \*

386. Rooms for the stowage of loaded shells require the same care in construction and protection against an enemy's shot, and in provision for lighting and flooding, as magazines. Therefore, they should always be built with reference to these objects, as well as to affording room enough to accommodate, conveniently, the number of loaded shells allowed, in their boxes, stowed in bulk. Each should have one light, arranged like those for magazines.

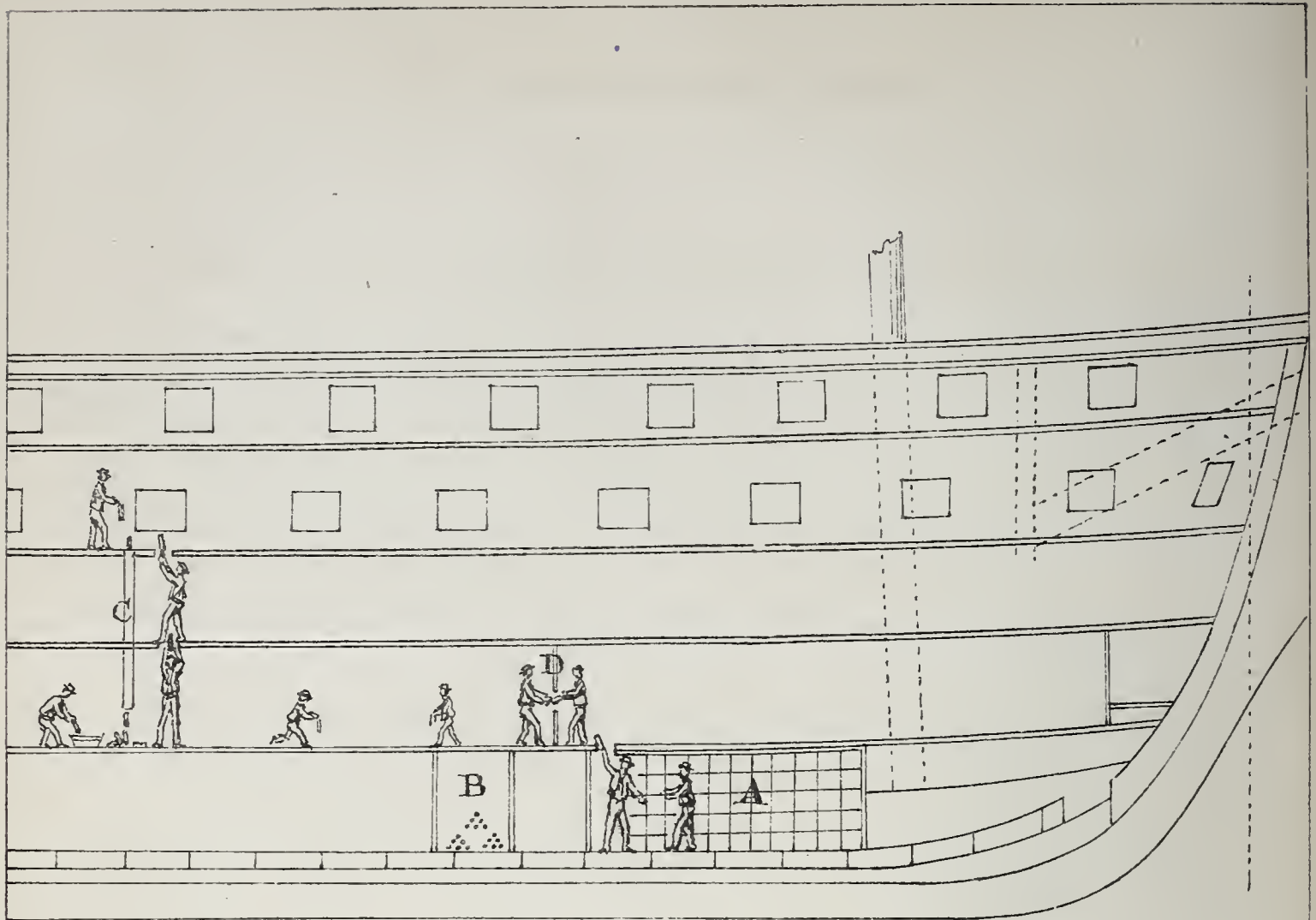
387. In vessels partially armed with shell guns the best place, perhaps, for these rooms is immediately forward of the spirit room, but not communicating with it; and in those armed entirely with such guns the additional shell rooms necessary may be, perhaps, more conveniently placed abaft and adjoining the delivering passage of the forward magazine than elsewhere.

## DAMPNESS OF MAGAZINES AND SHELL ROOMS.

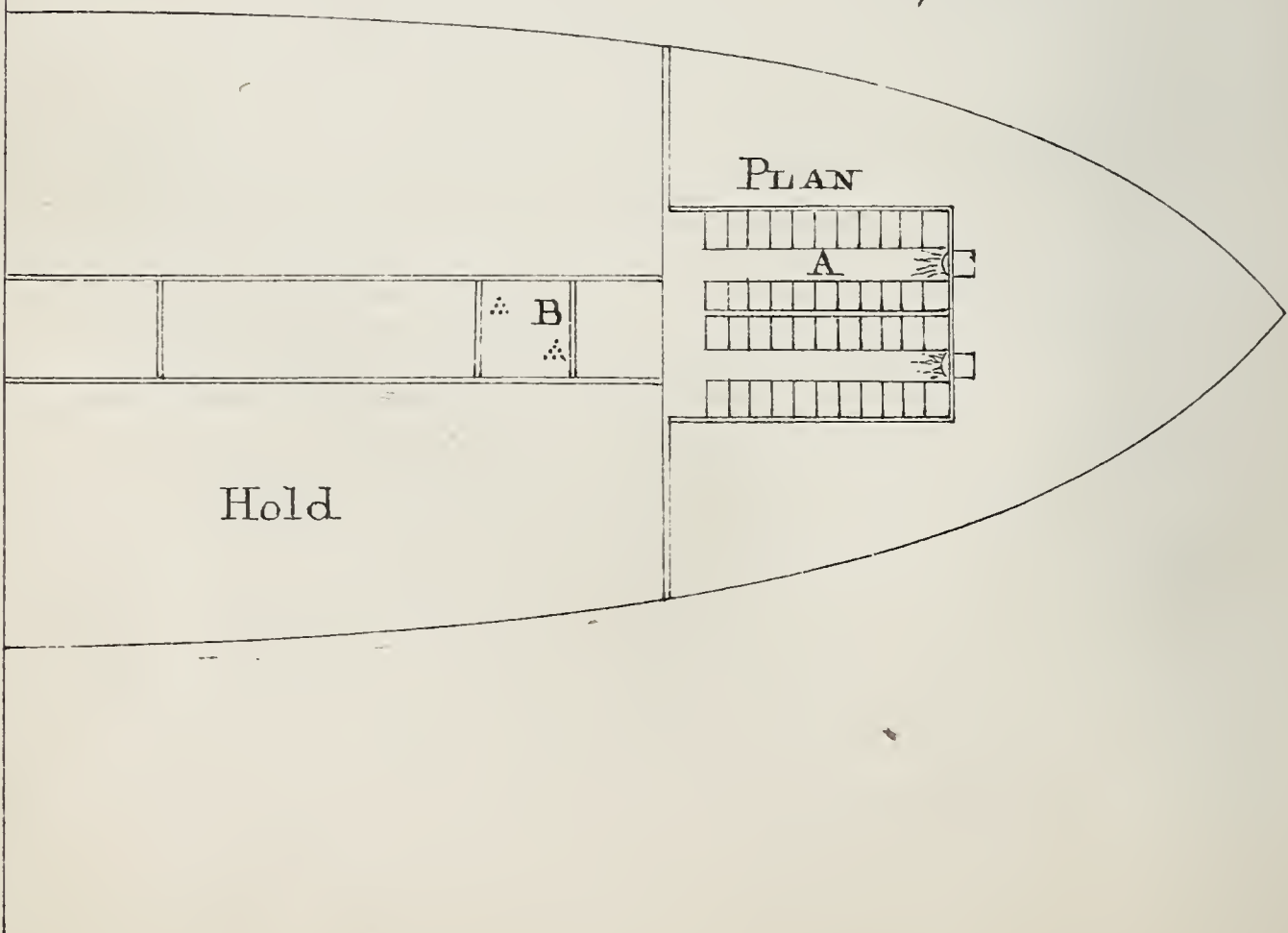
388. Sponge dipped in a solution of salt in water, and dried and weighed, is a means of ascertaining if dampness exists in these places. If it become heavier the room is damp.



(Diagram O.)  
 PASSING POWDER.



- A Magazine
- B. Shot Locker -
- C. Carvass Shoot through which to pass down empty boxes
- D. Screen with hole in it, through which the Cartridge is passed.





## ARRANGEMENTS FOR DELIVERING AND DISTRIBUTING POWDER.

389. In making arrangements to deliver and distribute powder from the magazines, for action, the following general considerations and rules should govern.

390. Cartridges, as experience proves, can be passed up each independent chain of scuttles leading from the magazine to the point at which the Powderboys are to receive the full boxes, at the rate of one every six or seven seconds.

391. Experience also proves that, under the most favourable circumstances, the broadside guns of a man-of-war cannot be advantageously fired oftener than once every seventy-five seconds.

Hence it may be received as a rule that a single chain of passing-scuttles is abundantly sufficient to supply powder for a division of guns as large even as eight of a side; and that it is also sufficient when both sides of such a division are to be used at once, for then the firing of each piece is unavoidably retarded by the division of the guns' crews.

392. No one chain of scuttles ought to be required to supply cartridges for more than a single description of guns,\* unless their cartridges be the same in diameter, weight, and form, and their passing-boxes alike, as in the case of the 8-inch shell gun of 63 cwt. and the 32-pdr. of 57 cwt. If, therefore, there be on a deck of guns but one differing from the rest in calibre, class, or assimilation of cartridges, that one should have a separate chain of scuttles for its supply, in order to guard effectually against confusion, or, at least, delay. In a word, each additional calibre or class of guns, unless the cartridges be assimilated and the passing-boxes alike, involves an additional chain of passing-scuttles for its supply; and it should be borne in mind that errors with respect to cartridges of guns of the same calibre, but differing in class, are more to be apprehended than with guns differing only in calibre.

393. If the guns on a deck be all of the same calibre and class, or of like cartridges and passing-boxes, then one chain of scuttles to supply the forward half of those guns, and another to supply the after half, will be all sufficient.

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\* See Table of Charges for Great Guns. (*Article 489, Chapter VII.*)

394. For each chain of passing-scuttles there will probably have to be :

One man in the magazine to deliver charges from the tanks ;

One man in the passage to receive and pass those charges through the scuttle in the orlop or berth deck ;

One man at the passage scuttle on the orlop or berth deck, to receive the charges 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 empty passing-boxes ;

One, two, or three Runnerboys (according to the distance) to run, on the orlop or berth deck, with full passing-boxes, from the screen to the scuttles through the deck, 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 passing-boxes, strike them, in an inverted position, over the fire-tub, and inspect them carefully before allowing them to be taken away to be replenished ;

One man, on the orlop or berth deck, at the passing-scuttle through the deck above, to pass up full boxes ;

One man, at the passing-scuttle on the next deck above the orlop or berth deck, to receive and pass up full boxes, or, in the case of a single-deck vessel, or of distribution on the main deck of a frigate, or on the lower deck of a ship-of-the-line, to receive and deliver them to Powderboys ;

One man, at the passing-scuttle on the second deck above the orlop or berth deck, to receive and pass up full boxes ; or, in the case of a frigate, or distribution on the main deck of a ship-of-the-line of two decks, to receive and deliver them to Powderboys ;

And one man at the passing-scuttle on the third deck above the orlop to receive and deliver full boxes to Powderboys on the spar deck of a ship-of-the-line of two decks.

Thus each chain of scuttles will require—

Seven men to supply its guns on the first deck above ; as, for example, the lower deck of a ship-of-the-line, the main deck of a frigate, or the spar deck of a sloop-of-war, or other single-deck vessel ;

Eight men for the spar deck of a frigate, for the main deck of a ship-of-the-line of two decks, or for the middle gun deck of a ship-of-the-line of three decks;

Nine men for the spar deck of a ship-of-the-line of two decks, or for the main deck of a ship-of-the-line of three decks;

And ten men for the spar deck of a ship-of-the-line of three decks.

Besides, each of these numbers—7, 8, 9, and 10—is to be increased by two or three Runnerboys, for the purposes above described.

395. In vessels of and above the class of frigates, or having two magazines—one forward and the other aft—the forward half of the guns on each deck is to be supplied from the forward magazine, and the after half from the after magazine. Thus, for each deck of guns, one scuttle at each of the two magazines, together with its corresponding chain of scuttles, will be sufficient, *if all the guns be of the same calibre and class* or have like charges. But the introduction on board of any vessel of guns differing in either of these respects, will involve the necessity above stated of a separate scuttle of delivery at the magazine, and also of a distinct chain of scuttles connected with it for the exclusive supply of each variety of charges that may be introduced.

In this case, the exceptional guns should be supplied, whenever practicable, from the larger magazine when there are two differing in size.

396. In single-deck vessels carrying more than sixteen guns, all of the same calibre and class, and having but one magazine, two scuttles at that magazine will be sufficient—one to supply the forward half of guns, and the other the after half.

397. In single-deck vessels carrying only sixteen guns, or less, all of the same calibre and class, or having like charges, one scuttle at the magazine will suffice.

398. Should any single-deck vessel be of such great length, or so remarkable in her armament of guns, although all of the same calibre and class, as to render additional scuttles advisable, they are to be cut.

#### PASSING-SCUTTLES.

399. All the powder is to be passed up from the orlop or berth deck through circular scuttles cut in the deck or decks at places, as nearly as

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circumstances will permit, immediately abreast of the middle of the particular set of guns to the supply of which each chain of scuttles is specially appropriated. Besides these scuttles for passing the powder up, there are to be corresponding ones for each set, provided with a canvas shoot for returning the empty boxes below. The drawing shows the manner of supplying an upper deck and returning the empty boxes from it. Each deck is to be supplied in like manner by a distinct and separate arrangement through as many independent sets of scuttles as may be required by the preceding 'Arrangements for delivering and distributing powder.'

400. Each scuttle is to have a tompion or other means of closing it, so as to be water-tight when not in use, and to be so regulated in height as not to interfere with the transportation of guns.

401. Should any serious difficulty arise in finding places for cutting any of the different sets of scuttles through the decks, or in the cases of small or very wet vessels, recourse may be had to the gratings of the hatchways. Still, they are always to be cut through the decks whenever it can be done with propriety.

402. For each scuttle at the magazine for the delivery of powder there must be a corresponding flap-hole in the magazine screen, and this is to be regarded as a part of the chain of supply equally with the scuttle itself.

403. When on board ship there are any guns of the same calibre and class, or of assimilated charges, carried on two consecutive decks, all of them may be supplied by the same chain of scuttles, provided the whole number of guns, thus made to depend upon this chain, does not exceed eight of a side. For instance, under the circumstances stated, the chase, or a few shell or other guns on a spar deck, may be supplied by a chain of scuttles intended principally for the main deck guns; or, the shell guns on a main deck being few, may be supplied by a chain intended principally for the deck below.

404. In delivering cartridges from the magazines, for serving guns, they are to be passed up from the magazine to the orlop or 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, to be allowed to go into it again, *or even inside of the screen*, during the whole time of such action or exercise. They are to be replenished at the screen, but outside of it.

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405. For *gun-decks*, passing-boxes, whether for shot or shell guns, having the same charges, are to be painted *black*. Passing-boxes of guns requiring lighter charges than the rest, *red* and *white*.

406. For *spar-decks*, passing-boxes for shot guns requiring lighter charges than those upon the gun-decks, and also passing-boxes for steamers having no gun-deck, and for sloops-of-war, are to be painted *black* and *white*; for shell guns, *red*. For chase guns the passing-boxes are to be similar to those of like charges on other decks.

407. *Empty passing-boxes returned by the shoots* are always to be landed upon wet swabs, and then to be turned upside down and so struck over a fire-tub, as before directed, to free them from any loose fire.

408. One fire-tub nearly filled with water is to be placed on the deck, alongside the bottom of each shoot for returning empty boxes. The top of this tub is to be provided with a stout hoop to ship and unship, with a grating of stout copper wire, the meshes of which are to be made small enough to prevent the passing-box from falling into the water, in case of slipping from the man's hand while being struck over the tub.

#### SHOT AND SHELL.

409. Shot and shell are to be passed up by hand, or whipped up, by the most convenient hatchways. The hands stationed below at the lockers are to work the whips, each of which being fitted with a toggle, will indicate when the projectiles are hoisted high enough. In case a shot-locker should be somewhat removed from the hatchway, up which the shot are to be passed or whipped, the shot may be speedily conveyed over the distance by means of a wooden trough fitted for the purpose.

#### HATCHWAY FOR THE WOUNDED.

410. One hatchway, or portion of a hatchway, and that as nearly amidships as possible, is to be reserved for lowering the wounded below, and to be properly provided with a cot or cots, having a whip to each.

CHAPTER VII.

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## ORDNANCE AND ORDNANCE STORES.

411. All articles of Ordnance and Ordnance Stores, or for Hydrographical purposes, when duly delivered at any navy yard, are to be borne on the books of the Assistant Inspector of Ordnance, if there be one thereat, otherwise on those of the Navy Storekeeper, and duly accounted for, according to such regulations as may from time to time be established by proper authority.

412. Whenever Assistant Inspectors of Ordnance shall be ordered for duty at any navy yard, the *immediate* custody and charge of all articles appertaining to Ordnance and Hydrography is to be transferred to the Senior Assistant, and they shall be kept in suitable places, separate from other articles in the yard.

413. For all articles so placed in charge of the Assistant Inspector of Ordnance the Navy Storekeeper is to take the necessary receipts.

414. Whenever any of these articles shall be furnished to vessels, or for any other purpose, by the Ordnance Officer, he is to take proper receipts for them from the Officer to whom they are delivered.

These receipts are to be regarded by the Navy Storekeeper as vouchers for expending the articles on his books.

415. If any articles for which the Assistant Inspector of Ordnance has receipted to the Storekeeper should be returned to the Storekeeper's immediate charge again, they are to be accompanied by a list stating that they have been so returned, which list, if found to be accurate, is to be certified to be 'correct,' and dated and signed by the Storekeeper, and returned to the Ordnance Officer.

416. Assistant Inspectors of Ordnance having charge of the articles above mentioned are, under the direction of the Commandant of the yard, to be responsible for their being carefully attended to, and, as far as possible, preserved from injury.

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417. When any of them shall require repairs the Assistant Inspector will apply to the Commandant of the yard, or to the Bureau through him, for the necessary means to keep all articles in his charge in order and ready for service.

418. Officers upon Ordnance duty at navy yards may correspond with the Bureau on subjects connected with Ordnance and Hydrographical duties, forwarding their communications, in all cases, open, to the Commandant of the yard for transmission.

419. The Commandants will, in forwarding such communications, accompany them with the remarks or recommendations which they may deem proper, and at any other time make such suggestions as they may consider will promote the public interests.

420. The allowances which are prescribed for the different classes of vessels in the Table of Allowances are not to be exceeded except by the express sanction of the Chief of the Bureau of Ordnance or of the Secretary of the Navy.

421. It shall be the duty of the Assistant Inspector of Ordnance, or of the Officers who inspect a ship on her return from a cruise, to report to the Bureau the condition in which the articles under the charge of the Gunner may be transferred, that his care and attention may be properly known and appreciated.

#### PRESERVATION OF GUNS.

422. Guns received at navy yards are to be carefully placed on the ranges of masonry, capped with iron skids or bars. It is intended that these shall be so high that the guns may be rolled upon them without their trunnions touching the ground, and that the earth will not be beaten up against their muzzles by heavy rains.

423. The surface over which guns are to be stowed should be kept firm and clear of all vegetation; and for this purpose should be covered with cinders from the smiths' forges, or other substance unfavourable to, or destructive of, plants and grasses.

424. In stowing the guns they should be made to rest on one of the skids or bars, a little forward of the base-ring, the muzzle depressed, but

not so much as to prevent the use of the sponge to clean out the gun; the axis of the trunnion of each to be inclined the same way, and just enough not to touch the adjoining gun; the vents to be upwards.

425. Before the stowage is finally made they should be carefully and thoroughly cleaned from rust and all improper coatings, and be lackered internally and externally with such composition as may be directed by the Bureau. This should be applied when practicable when the guns are well warmed by the rays of the sun. The vents and all screw holes are to be stopped with plugs made of soft wood or oakum dipped in tallow, after they have been protected by an application of beeswax dissolved in spirits of turpentine or other composition that may be directed by the Bureau.

426. No tompions are to be put into the guns when they are stowed, unless expressly directed by the Bureau; if so ordered, a score must be cut out from them on the lower side, half an inch wide and equally deep.

427. In lackering guns care is to be taken to leave the distinguishing marks and numbers distinctly visible.

428. Guns of the same calibre and class, when it can be conveniently done, are to be stowed in the same tier or range, and those of each class belonging to or selected for any particular vessel, kept together. Each tier or range of guns of a particular calibre or class is to be marked accordingly with paint on a sign-board, and the first gun of each class belonging to a vessel is to be marked with the name of the vessel.

429. The Officer on Ordnance duty will examine all the guns in the yard and on board vessels in ordinary at least once in every two weeks, and take care that they are kept protected from rust or any other injury; and will report to the Bureau whenever any additional precautions or arrangements are required for their proper preservation, and which may not be furnished by the order of the Commandant of the yard.

430. No cutting, boring, or chiseling of guns is to be done at any time without the express authority of the Bureau.

431. No condemnation of guns or small arms belonging to the Navy is to be made, except upon surveys specially ordered and confirmed by the Chief of the Bureau; nor of other articles which have been furnished under his authority or by his direction, unless by surveys ordered or sanctioned by him.



432. When guns and their equipments are to be put on board vessels for their armament, the guns are to be carefully and thoroughly cleaned and examined to see that they are in all respects in proper servicable condition.

The vents should be examined with the vent-gauges and searchers, to see that they are clear from any substance which may obstruct the use of priming-wires and primers.

433. The carriages are also to be carefully examined, the trunnion-holes and arms of the axletrees cleaned and saturated with boiled linseed oil, the cracks filled with putty and rubbed smooth, and the trunnion-holes black leaded. The iron work should be freed from rust, all screws be made to work easily, and be well cleaned and coated with proper composition.

434. The Ordnance Officers will see that the sights are properly fitted and marked for their proper guns, and that the beds and quoins are fitted and adjusted, and the quoins graduated to degrees or distances to correspond with those marked on the sight-bars.

435. New guns are to have locks fitted to them before being put on board ship. Those having two lugs will have the one on the right fitted; the other is to be left solid.

436. When guns are to be shipped for *transportation* merely, the same precautions are to be taken to guard them from injury as on shore, with the addition of a wad dipped into the composition which covers the bore, thrust into the muzzle and connected with the tompion by a laniard.

437. At the termination of a cruise, the guns composing the battery of every vessel of war of the Confederate States shall be carefully examined by the Ordnance Officer of the Yard and such others as may be directed, with the view to discover and report any injuries which they may have sustained in service, or any defects which may not have been developed in the original proof. In this examination the attention of the Inspecting Officers is to be directed to the following points, viz. :

*Indentations* or hollows produced by the shot *balloting* against the surface of the bore, or by the action of the gases.

*Cuts* or *scratches* in the bore, produced by fragments of broken or the roughness of imperfect shot.

*Roughness* or *corrosion* of the metal on the exterior, produced by neglect or exposure.

Similar injuries in the bore, or any enlargement of the bore, which is to be ascertained by the star-gauge, and the results recorded in the usual form, that they may be compared with those noted at the original inspection.

Care is to be taken that the distinguishing marks and numbers are always accurately noted, that the correct history of each gun may be preserved.

As the best indication of the amount of firing to which any gun has been exposed, when it is not otherwise known, is given by the enlargement of the vent, particular attention will be paid, in the reinspection of guns, to this point. The standard gauge will be used to ascertain the general enlargement, and the searcher to detect defects which may have been developed in firing. Impressions are to be taken of the lower orifice of the vent with softened wax, and if they show that the vent is corroded in furrows, and enlarged considerably in diameter at its junction with the bore, a permanent impression is to be taken in lead to show the conical enlargement. The following manner, practised at the Experimental Battery at Washington, is recommended :

#### IMPLEMENTS REQUIRED.

1. *A soft wire*, about 0.07 in. diameter, and 3 or 4 faths. long.
2. *A lever* about twice the length of the bore, and about 3 inches in diameter, and shod to suit the curve of the bore, nearly.
3. *A small button of lead*, judged to be of sufficient size to fill the vent at least one inch from the bore. This is to be pierced lengthwise to receive the wire.

#### TO TAKE THE IMPRESSION.

‘Shove the wire through the vent, let it pass along the bore and out at the muzzle; put it through the leaden button and tie a knot at the end. Draw the wire back through the vent until the leaden button is introduced firmly into the inner orifice.

‘Apply the lever, making its shoe bear on the button, and force it well in by repeated blows, the muzzle being the fulcrum. This done, disengage the button by pushing in the priming wire.’

## PRESERVATION OF SHOT AND EMPTY SHELL.

438. All round shot and shell are to be cleaned from rust, and covered with a thin lacker of such composition as may be directed by the Bureau, when they are first received and when they are re-stowed.

439. Empty shell are to have the fuze bouching coated with such composition as may be directed, and, unless otherwise ordered, be stopped by a plug of *very soft* wood, well coated with a mixture of oil and tallow, *screwed* into them. The ends of the plugs should not be sawed off even with the shell, but project sufficiently to allow them to be unscrewed by means of a wrench.

They are to be piled with the fuze-holes down, and free from contact; under cover when practicable, but with free ventilation.

440. Platforms of masonry, or of condemned shot, are to be prepared to pile shot and shell upon, and are not to be wider, if space can be found, than to stow fourteen 32 pdr. shot; or not exceeding eight feet in width. Square piles are to be preferred where there is room, but where this may be deficient the piles may be extended in length.

441. Shot and shell, after having been piled, are to be so far examined in the first week of June, in each year, as to ascertain if they require to be cleaned, relackered, and repiled to secure their proper preservation; and their condition reported to the Bureau, that if any work upon them is necessary it may be finished during the warm months of the year, when the lacker can be best applied.

442. Whenever shot or shell are to receive lacker care must be taken that the quantity applied does not increase the diameter more than is indispensably necessary, and in no case above the established high gauge. Old lacker and rust should be removed by scraping, as far as can be conveniently done, before a new coating is applied. Neither hammering nor heating is to be used for this purpose.

## SHOT AND SHELL GAUGES, ETC.

443.

SHOT.

DIMENSIONS, WEIGHT, ETC.	XI INCH	X INCH	IX INCH	VIII INCH	32 PDR.
Diameter of large gauge for foundries	10.87	9.87	8.87	7.87	6.27
Diameter of small...do.....do.....	10.83	9.83	8.83	7.83	6.23
Mean of.....do.....do.....	10.85	9.85	8.85	7.85	6.25
Mean weight required of.....do...lbs.	...	...	...	65.	32.5
Least weight allowed.....do...lbs.	...	...	...	64.5	32.
Diameter of small { 1st class.....in.	...	...	...	7.82	6.22
gauges for service. { 2d class.....in.	...	...	...	7.80	6.20

444.

SHELL.

DIMENSIONS, WEIGHT, ETC.	XI INCH	X INCH	IX INCH	VIII INCH	32 PDR.	
Diameter of large gauge for foundries	10.87	9.87	8.87	7.87	6.27	
Diameter of small...do.....do.....	10.83	9.83	8.83	7.83	6.23	
Mean of.....do.....do.....	10.85	9.85	8.85	7.85	6.25	
Thickness.. . {	Proper .....	2.00	1.8	1.60	1.5	1.25
	Greatest .....	2.05	1.85	1.65	1.55	1.30
	Least .....	1.95	1.75	1.55	1.45	1.20
	Through reinforce.....	3.17	2.78	2.40	2.41	1.83
Diameter of { fuze-hole.	Proper and least.....	0.60	0.60	0.60	0.60	0.60
	Greatest.....	0.62	0.62	0.62	0.62	0.62
Diam. large gauge for strapped.....in.	10.90	9.90	8.90	7.90	6.30	
Diam. small gauge for service .....	10.82	9.82	8.82	7.82	6.22	
Mean weight required of foundries..lbs.	130.	97.	69.75	51.	25.5	
Least weight allowed...do...for any one	129.	96.	68.75	50.	25.0	
Weight of, filled and sabotted.....	138.5	103.	74.	53.75	27.	

For gauges of boat gun fixed ammunition, see Boat Armament of U. S. N., by Commander Dahlgren, 2nd edition, 1856.

445. Shot of the *first* class, or which do not exceed 0.18 of an inch windage, are to be entirely black, and those of the *second* class, having from 0.18 to 0.20 of an inch windage, to be marked partly white. Each class is to be piled and kept separate from every other. Both classes are to be considered and supplied as 'serviceable shot;' but are to be stowed separately on board ship, and the returns to the Bureau are to show the number of each respectively. The number of those having more than 0.20 of an inch windage are to be reported and retained until special orders may be given for their disposition. In case any should be taken as the foundation for piling serviceable shot, they are to be painted entirely white and their number returned *as unserviceable*.

## PILING OF BALLS.

446. *To find the number of balls in a pile.*—Multiply the sum of the three parallel edges by one-third of the number of balls in a *triangular face*.

In a *square pile* one of the parallel edges contains but one ball; in a *triangular pile* two of the edges have but one ball in each. The number of balls in a triangular face is  $\frac{n(n+1)}{2}$ ;  $n$  being the number in the bottom row. The sum of the three parallel edges in a triangular pile is  $n + 2$ ; in a square pile,  $2n + 1$ ; in an oblong pile,  $3N + 2n - 2$ ;  $N$  being the length of the top row, and  $n$  the width of the bottom tier; or  $3m - n + 1$ ;  $m$  being the length,  $n$  the width of the bottom tier.

If a pile consists of two piles joined at a right angle, calculate the contents of one as a common oblong pile, and of the other as a pile of which the three parallel edges are equal.

447. When the length of the bottom tier does not exceed 21, the number of balls in any pile may be found by the following table, in which the second line shows the number of balls in a triangular pile, the base of which is the number in the same column in the top line. The other numbers show the contents of square and oblong piles, the bases of which are in the top line and the left-hand column, respectively.

448. Table of the Number of Balls in any Pile, the base of which does not exceed Twenty-one Balls.

	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
Tri.	4	10	20	35	56	84	120	165	220	286	364	455	560	680	816	969	1140	1330	1540	1771	
2	5																				
3	8	14																			
4	11	20	30																		
5	14	26	40	55																	
6	17	32	50	70	91																
7	20	38	60	85	112	140															
8	23	44	70	100	133	168	204														
9	26	50	80	115	154	196	240	285													
10	29	56	90	130	175	224	276	330	385												
11	32	62	100	145	196	252	312	375	440	506											
12	35	68	110	160	217	280	348	420	495	572	650										
13	38	74	120	175	238	308	384	465	550	638	728	819									
14	41	80	130	190	259	336	420	510	605	704	806	910	1015								
15	44	86	140	205	280	364	456	555	660	770	884	1001	1120	1240							
16	47	92	150	220	301	392	492	600	715	836	962	1092	1225	1360	1496						
17	50	98	160	235	322	420	528	645	770	902	1040	1183	1330	1480	1632	1785					
18	53	104	170	250	343	448	564	690	825	968	1118	1274	1435	1600	1768	1938	2109				
19	56	110	180	265	364	476	600	735	880	1034	1196	1365	1540	1720	1904	2091	2280	2470			
20	59	116	190	280	385	504	636	780	935	1100	1274	1456	1645	1840	2040	2244	2451	2660	2870		
21	62	122	200	295	406	532	672	825	990	1166	1352	1547	1750	1960	2176	2397	2622	2850	3080	3311	

## SHELL.

449. The fuzes for shell will be prepared at the laboratory, and distributed as they may be required.

450. The charges of powder for *shell* are to be as follows:—

	32 PDR.	XI INCH	X INCH	IX INCH	VIII INCH	BOAT AND FIELD HOWITZER	
						24-PDR.	12-PDR.
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Bursting or service charge.	0.90	6.00	4.00	3.00	1.85	1.0	0.5
Blowing charge .....	0.25	0.25	0.25	0.25	0.25		

451. The number of shell to be kept fitted at the navy yards will be determined by special directions from the Bureau.

452. The date when shell are fitted for receiving the bouching, or are bouched, fuzed, or filled, as well as that on which any of these arrangements are changed, or the shell are examined before issue to vessels, together with the initials of the Officer superintending these operations, should be legibly written and pasted on the shell.

453. The Ordnance Officer, or the Gunner of the Yard, is to see the shell supplied to all vessels properly conveyed on board and stowed, and to furnish the Commanding Officer with a statement showing the number of each description of shell.

454. The condition of the shell, and especially of their fuzes, is to be frequently and carefully examined into, taking out a fuze occasionally so as to detect any injury which may arise from moisture, and to have such as may be found damaged replaced by the spare fuzes.

Boat shell and their spare fuzes are also to undergo a similar examination.

Shell have been sometimes returned with their fuzes entirely destroyed by moisture!

455. Whenever it is expedient or necessary to examine the fuzes and loading of shell which have been already prepared, great care must be observed in removing the fuze.

456. The fuze stock may generally be safely unscrewed with the fuze wrench, taking care, in the first place, to strike the sides of the shell gently, to detach the powder from the fuze, to work very slowly, and not to endeavour to overcome any unusual resistance.

457. 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 shell being strapped 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 lacker 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 lacker should be of the consistency of cream, and when, from evaporation, it becomes too stiff, should be thinned by adding more spirits of turpentine.

458. In emptying shell they are to be handled carefully and placed on a bench with a hole in it 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.

459. Loaded shell are to be marked with red, and placed in boxes painted red, which boxes are to have the lengths of fuze painted on them in black. They are to be stowed in shell houses prepared for that purpose. Loaded shell, whether in or out of their boxes, must be handled carefully.

460. Shell houses, and the general condition of the shell they contain, are to be examined as often as once a fortnight by the Ordnance Officer, and every precaution taken to keep them as dry as possible.

461. The *shell* for boat guns are to be stowed in 'the shell houses' on shore, and 'shell rooms' on board vessels, in their proper boxes.



462. Half of the whole number of fuzes allowed for the great guns is to be for 5 seconds of time ; one fourth for 10 seconds ; and one fourth for 15 seconds.

463. *All the shell*, however, put on board ship, and fitted for *immediate* use, are to be provided with none other than the 5 second fuze.

464. At ranges exceeding 1,400 yards the 10 or 15 second fuzes, according to such excess, are to be substituted for the 5 second fuze, by removing one and putting in the other ; or, if preferred, those fuzes may be applied to shell which are not already fitted. The 5 second fuze is to be regarded as the general working fuze, and hence the reason the shell are to be fitted with it, as mentioned above.

465. EXTERIOR DIMENSIONS, IN INCHES, FOR SHELL BOXES.

For XI-inch shell, 12.75 × 12.75 by 14.5 high.

„ X „ „ 11.65 × 11.65 by 13.9 „  
 „ IX „ „ 10.63 × 10.63 by 12.9 „  
 „ 8 „ „ 10.20 × 10.10 by 12.2 „  
 „ 32-pdr. „ 8.60 × 8.50 by 10.2 „

466. AREAS OCCUPIED BY ONE TIER OF SHELL BOXES.

XI-INCH		X-INCH		IX-INCH		VIII-INCH		32-PDR.	
No.	Ft. In.	No.	Ft. In.	No.	Ft. In.	No.	Ft. In.	No.	Ft. In.
72	15.5½ × 5.8½	75	15.2 × 5.3½	102	15.8¼ × 5.9¼	108	16 × 6	176	16 × 6
52	14.4 × 4.6½	56	14.2 × 4.1½	80	14.9¼ × 4.9½	85	15 × 5	140	15 × 5

## GUNPOWDER.

## STOWAGE, PRESERVATION, HANDLING, CHARGES, ETC.

467. The powder houses or magazines on shore are to be inspected by the Ordnance Officers at least once in every two weeks, and every precaution taken to guard them against danger of explosion, and to preserve the powder dry and in good condition.

468. The powder barrels in the magazine, when there are no racks, should be placed on their sides, with their marked ends towards the alleys, three tiers high, or four tiers, if necessary, with small skids on the floor, and between the several tiers of barrels, using chocks at intervals, on the lower skids, to prevent the barrels from rolling. If it can be avoided, fixed ammunition should not be put in the same magazine with powder in barrels.

469. Should it be necessary to pile the barrels more than four tiers high, the upper tiers should be supported by a frame resting on the floor; or the barrels may be placed on their heads, with boards between the tiers.

470. There should be an unincumbered space of 6 or 8 feet at the door or doors of the magazine.

471. Whenever practicable, the barrels should be arranged in double rows, and there should be a passage-way between the rows, so that the marks on each barrel may be seen at a glance, and any barrel easily reached.

472. Besides being recorded in the magazine book, each lot of powder should be inscribed on a ticket attached to the lot, showing the entries and the issues.

473. The magazine should be opened and aired in clear dry weather; the ventilators kept free; and no shrubbery or trees allowed to grow so near as to protect the building from the sun.

474. The moisture of a magazine may be absorbed by chloride of lime or charcoal, suspended in an open box under the arch, and renewed from time to time. The use of quick lime is dangerous.

475. When powder is handled in powder houses on shore, either for the purpose of inspection or preparation for delivery to ships, the baize-cloth is to be spread, and the people, before entering the magazine, are to divest themselves of every metal implement, and empty their pockets, that nothing likely to produce fire may escape detection, and to put on the magazine dresses and slippers. The barrels must be opened only on the floor cloth, and no metallic setter must be used in connexion with either copper or wooden hoops.

476. The powder in barrels should be turned from time to time—at least as often as every three months; and, being arranged as mentioned above, the oldest powder will be at all times accessible for first delivery without disturbing that of more recent manufacture.

477. When powder is sent on board any vessel at the yard, an Ordnance Officer, or the Gunner, is to see it properly stowed, and the Ordnance Officer, or, in his absence, the Officer in charge of Ordnance duty, is to hand to the Commanding Officer of the Yard, for the use of the Captain of the vessel, a statement showing the quantity, together with all the information respecting it, directed by the three articles immediately following, with such remarks as he may deem proper to secure better precaution or more convenient arrangement, together with a request that the memorandum, or a copy of it, may be delivered to the Ordnance Officer at the yard where the vessel may be laid up at the end of the cruise.

478. When cartridges are filled for issue to any vessel, the powder should be selected, as far as practicable, from deliveries made by the same person, and at the same time or date; and the tanks in which they are stowed are to be marked with white paint on their upper sides, with the same marks as the barrels from which the powder was taken, giving the date of manufacture and the maker's name.

479. Whenever powder shall be returned into the powder houses from vessels, and the powder is emptied from the cartridges, care must be taken to have the barrels or other vessels in which the powder may be placed marked in the same manner, so that the maker's name and date of manufacture of all powder may be correctly known.

480. The names of vessels from which powder is received—the length of time which the powder has been on board, and the station on which the vessel has been employed, should also be noted and reported by the

Ordnance Officer, that reference may be had to the notes in case it should be desired in subsequent examinations of the powder.

481. The Ordnance Officers, when they supply vessels with powder, or remove any from them, are to report to the Bureau, by the earliest opportunity, all the information which is required to be noted by articles 478, 479, 480, immediately preceding; and when powder is received from vessels returning from cruises, or after it has been long embarked, they are to forward to the Bureau a sample of two pounds and one fourth, properly labelled, for every five hundred pounds landed, to be selected so as to show fair average samples of the whole, that its strength may be ascertained by the pendulum.

482. Powder for *saluting* may be purchased abroad to preserve a supply of our own proof powder for action.

483. When a vessel is about to leave a foreign station to return directly to the Confederate States, and other vessels belonging to the Navy, to be left on the station, are without a full supply of powder, the vessel which is about to leave may be directed to transfer to those remaining on the station any excess of powder that may be on board beyond fifty rounds.

484. Should it become necessary to use powder for service charges which has not been regularly inspected and proved in the manner required by regulations, such tests of it must be made as circumstances will admit.

The ranges given by it may be compared with those of service powder of known good quality, under the same circumstances. If deficient in strength, the quantity of the charges should be increased until the ranges are equalized, in order that the sight-bars may still indicate the proper elevations for each charge and distance.

485. When receiving or landing powder, the red flag is to be always hoisted at the fore, and all proper precautions taken to guard against accidents from fires and lights. The tanks should be passed through the ports most convenient to the magazines, and landed on mats to prevent injury.

486. When avoidable, gunpowder is not to be sent from vessels to powder houses, nor from powder houses to vessels, in wet weather, nor when there is a probability of wetting the barrels or cases; and the packages should be conveyed in covered boats or wagons showing a red flag.

487. The wharf or landing place should be spread with old canvas, so that the barrels or cases may not come in contact with and convey sand or gravel to the powder house.

488. The red flag is always to be hoisted at the powder houses when they are opened.

489. *The service charges* for the different calibres and classes of guns which are now used in the navy are to be as follows, and the cartridges are to be filled accordingly, viz.:—

## SERVICE CHARGES FOR NAVAL GUNS.

ORDNANCE		CHARGES OF POWDER			DIAMETERS OF CARTRIDGE GAUGES	SALUTING CHARGES
Calibre	Weight	For distant firing	For ordinary firing	For near firing or two projectiles		
64-pdr.	106 cwt.	16 lbs.	12 lbs.	8 lbs.	Cylindrical. 7.00 inches.	6 lbs.
32 "	61 "	10 "	8 "	6 "	5.50 "	4 "
32 "	57 "	9 "	8 "	6 "	5.50 "	4 "
32 "	51 "	8 "	7 "	5 "	5.50 "	4 "
32 "	46 "	7 "	7 "	5 "	5.50 "	4 "
*32 "	42 "	6 "	6 "	4 "	5.50 "	4 "
*32 "	33 "	4½ "	4½ "	4 "	5.50 "	4 "
*32 "	27 "	4 "	4 "	3 "	5.50 "	3 "
Shell Guns.				For near firing	Conical.	
XI-inch.	15,700 lbs.	15 "	15 "	15 lbs.	11 × 5.5 × 11	7 "
X "	12,000 "	12½ "	12½ "	12½ "	10 × 5.0 × 10	6 "
IX "	9,000 "	10 "	10 "	10 "	9 × 4.5 × 9	5 "
Cylindrical.						
8 "	63 cwt.	9 "	8 "	6 "	5.50	4 "
8 "	55 "	7 "	7 "	6 "	5.50	4 "

NOTE.—All the charges for a gun, saluting as well as the rest, shall be of the *same length*, however much this may cause them to differ in diameter.

\* Two projectiles are not to be fired from these guns at the same time, except at objects within 200 yards' distance, and only when the advantages at the moment may be deemed by the Captain sufficient to justify the risk of injuring the guns and their equipments by the extra strain to which they may be exposed.

490. Of the service charges one-tenth shall be for distant firing, six-tenths for ordinary firing, three-tenths for near firing, or for two projectiles. Saluting charges to be of under-proof powder.

That the kind of charges in each powder tank may be known by its exterior, the lid end is to be painted, wholly or in part, the colour of the cartridge bags the tank contains—that is, ‘white’ for *distant firing* charges; ‘blue’ for *ordinary* charges; and ‘red’ for *near firing* charges and for saluting. The *calibre* and *class* of gun for which the cartridges are intended are to be distinctly marked near the top of the lid end of the tanks.

491.

## POWDER TANKS.

CAPACITY OF TANK FOR POWDER IN GRAIN	EXTERIOR DIMENSIONS		WEIGHT WHEN EMPTY	APPROXIMATE WEIGHT WHEN FILLED WITH CYLIN- DERS
	Height in Inches, including lid and handle	Sides, in Inches		
200 pounds.	$22\frac{1}{4}$	$16\frac{1}{2} \times 16\frac{1}{2}$	$67\frac{1}{2}$ pounds.	218 pounds.
150 „	$22\frac{1}{8}$	15 × 15	$59\frac{1}{2}$ „	170 to 180 lbs.
100 „	$20\frac{1}{2}$	13 × 13		
50 „	$16\frac{3}{4}$	$10\frac{1}{4} \times 10\frac{1}{4}$		

492. ACCOMMODATION AFFORDED BY POWDER TANKS OF DIFFERENT SIZES FOR CARTRIDGES OF VARIOUS KINDS WHEN CLOSELY PACKED.

CAPACITY OF TANK FOR POWDER IN GRAIN.	WILL ACCOMMODATE OF CARTRIDGES FOR A—															
	XI-in., each weighing 15 pds.	X-inch, each weighing 12½ pds.	XI-in., each weighing 10 pds.	64-pdr. of 106 cwt., weighing respectively			32-Pounders, or 8-inch Shell Guns, weighing respectively									
				16 pds.	12 pds.	8 pds.	9 pds.	8 pds.	7 pds.	6 pds.	5½ pds.	5 pds.	4½ pds.	4 pds.	3½ pds.	3 pds.
Denomination	15 pds.	12½ pds.	10 pds.	16 pds.	12 pds.	8 pds.	9 pds.	8 pds.	7 pds.	6 pds.	5½ pds.	5 pds.	4½ pds.	4 pds.	3½ pds.	3 pds.
200 pounds	10	13	15	10	13	18	18	18	18	27	27	36	36	36	...	...
150 "	8	10	10	7	10	15	11	13	14	19	21	21	25	30	34	40
100 "	5	6	8	4	6	10	8	9	10	13	13	15	15	19	20	27
50 "	2	2	3	1	2	3	3	4	5	6	7	7	8	10	11	13

## FIXED AMMUNITION FOR BOAT GUNS

## AND SMALL ARMS.

493. The charges for 'Boat and Field Howitzers' are—

	<i>lbs.</i>
For the 24-pdr. of 1,310 lbs. . . . .	2.00
„ medium 12-pdr. of 760 lbs. . . . .	1.00
„ light 12-pdr. of 430 lbs. . . . .	0.625.

494. DIMENSIONS OF BOXES FOR BOAT AMMUNITION.

PROJECTILES WITH CHARGE OF POWDER FOR HOWITZER ATTACHED.

CALIBRE OF BOAT HOWITZER.	KIND OF PROJECTILES	NUMBER OF PROJECTILES BOX CON- TAINS	DIMENSIONS OF BOXES, IN INCHES	WEIGHT IN POUNDS	
				Empty	Filled
24 pdr. . . . .	Shrapnel	18	} Double boxes.		
24 „ . . . . .	Canister	18			
12 „ . . . . .	Shrapnel	18			
12 „ . . . . .	Canister	18			
24 „ . . . . .	Shrapnel	9	22 × 20.75 by 13.75 high.	35½	270½
24 „ . . . . .	Canister	9	22 × 20.75 by 15.50 „	36½	217⅝
12 „ heavy	Shrapnel	9	18.75 × 17.75 by 11.13 „	22⅞	140½
12 „ . . . . .	Canister	9	18.75 × 17.75 by 12.25 „	25½	114¾

495. The cartridges for small arms are to contain the following quantities of powder :—

For muskets . . . . .	70 grains, Troy.
„ pistols . . . . .	30 „ „
„ revolvers . . . . .	18 „ „

496. The ball cartridges for rifles and rifled muskets are to be made with a single Minie ball.



497. EXTERIOR DIMENSIONS AND CONTENTS OF BOXES

FOR SMALL-ARM AMMUNITION AND FIRE-WORKS.

ARTICLES	EXTERIOR DIMENSIONS			EACH BOX CONTAINS	REMARKS
	Length	Width	Depth		
	Inches.	Inches.	Inches.		
Musket-ball cartridges.....	12½	8¼	8¼	500	
Do. blank do. ....	9½	7¾	8½	500	
Carbine rifle-ball do. ....	14½	8¼	7¾	1,000	
Pistol-ball do. ....	13¾	6¾	7¼	1,000	
Blue lights.....	20½	13	6¾	30	
False fires .....	20½	13	6¾	30	
Port fires .....	19¾	10¼	10¼	100	First size.
Do. ....	19¾	10¼	6¼	50	Second size.
Signal rockets .....	15¼	9½	8¼	30	
Percussion caps.....	11¾	9¼	7¾	6,300	

N.B.—There is a variation in the dimensions of the above boxes, as made, of ⅛ of an inch, on an average, in their exteriors.

498. Percussion caps and bullets for small arms will be supplied.

499. The boxes in which cartridges for small arms are packed for distribution to vessels are to be marked with the number they contain, and the kind of arm for which they are intended, and at the expiration of the cruise are to be carefully returned into store.

500. *Standard powder measures* for filling cartridges for great guns will be made and distributed as they may be required for the use of vessels and shore magazines. As the gravimetric density of powder varies, the weight of the contents of measures should be ascertained for each lot, and allowance made accordingly before filling the cartridges.

## CANNON PRIMERS.

501. These are of two kinds, *percussion* and *friction* primers. Each percussion primer is composed of a quill tube capped by an explosive wafer. The quills used for this purpose are first inspected by passing them through a gauge rather smaller than the vent.

The *tube* is filled with fine-grained powder.

The wafer is composed of a cap of cartridge paper, enclosing a layer of fulminate of mercury combined with a small quantity of mealed powder. When pressed and perfectly dry the wafer is coated with uncoloured shellac to preserve it from dampness.

502. Primers are to be kept in *tin boxes* containing fifty each, the lids of which are luted with shellac to exclude moisture until wanted for immediate use. These boxes are intended to fit in and form a lining to the *primer-box*, fitted to slip on the *waist belts* worn by Captains of guns. For purposes of exercise no more of these boxes should be opened than are required; but for action a full box should be delivered to each Captain and 2nd Captain of a gun.

503. A *Friction primer* consists of a tube charged with gunpowder, to the top of which is fastened a spur containing friction powder, which is exploded by means of a slider pulled out by a laniard. It is intended for use in case the lock should be out of order, or the other primers fail from any unforeseen cause. Friction primers are packed in tin boxes in the same manner as percussion primers.

504. Filled boxes of primers are kept in close laboratory cases, for which stowage must be provided in the general storeroom of the ship, or other safe place. They are '*on no account to be placed in the magazine,*' and the boxes are to be so labelled before being put on board ship.

505. When *primers* have been returned from cruising ships, or have remained in store for one or more years, they are to be reported, and are not to be issued again without special orders.

506. PERCUSSION CAPS for muskets, carbines, and pistols are made in the laboratory at Richmond. They are put up in small packages of water-proof paper, labelled with the number contained in the package and the date of the fabrication, and stowed in tin cases containing 350 caps each.

*Laboratory boxes*, in which these are packed, are of the following dimensions:  $11\frac{3}{4} \times 9\frac{1}{4} \times 7\frac{3}{8}$  inches, and will contain 6,300 percussion caps, each. These boxes are to be labelled '*on no account to be put in the magazine.*' Stowage is provided for them in the general storeroom.

#### CARTRIDGE BAGS.

507. The material of which cartridge bags are made is woven expressly for the purpose, and furnished by the Bureau of Ordnance as required. When procured of necessity elsewhere the stuff should be chosen of wool, entirely free from any mixture of thread or cotton, and of sufficiently close texture to prevent the finer particles of powder from sifting through. Wildbore, merino, and bombazette are named as proper materials for cartridge bags; of these the thinnest stuff, not twilled, but having the requisite strength and closeness of texture, is the best.

508. *Making cartridge bags.*—Cartridge bags for *cylindrical* chambers are to be made of a rectangle to form the cylinder, and a circular piece to form the bottom. The flat patterns by which the cartridge bags for the 8-inch and 32-pounder guns are cut, are, consequently, to be made rectangular for the cylindrical part of the bag and circular for the bottom. The *length* of the rectangle is equal to the development of the cylinder, together with the allowance for seam; and its *width*, to the whole length of the bag, before sewing, including the allowance for seam and tie.

Special patterns are furnished for those of XI, X, and IX-inch shell guns.

509. DIMENSIONS OF FLAT PATTERNS FOR CUTTING OUT  
CARTRIDGE BAGS.\*

TO BE MADE OF PINE FOR THE 8-INCH AND 32-PDR. GUNS, AND OF METAL  
PLATES FOR THE 'GOMER' CHAMBERS OF OTHER GUNS.\*

Dimensions	10-inch Shell gun of 89 cwt.			64-pdr. Gun of 106 cwt.			32-pounder Gun and 8-inch Shell guns, having chambers of 32-pdr. calibre								
	10	9	8	16	12	8	10	9	8	7	6	5	4½	4	3
Charges ... .. lbs.															
Width of rectangle, (length of bag cut), including tie and four-tenths of an inch for seam.	15.8	14.3	13.3	18.7	15.7	12.7	16.6	14.6	13.6	12.6	11.6	10.6	10.1	9.6	8.6
	inches.			inches.			inches.								
Length of rectangle, (cylinder developed), including eight-tenths of an inch for seam.	19.65			22.8			18.1								
Radius of circular pat- tern of bottom, includ- ing four-tenths of an inch for seam.	3.40			3.60			2.95								
Diameters of cylindri- cal formers for inspec- tion of cartridge bags.	6.00			7.00			5.50								

510. In cutting, the length of the rectangle should be taken in the direction of the length of the stuff, as it does not stretch in that direction, and the material should be chosen, as nearly as possible, of the width required for the length of the bags, to save waste in cutting.

The bags are to be sewed with worsted yarn, with not less than eight stitches to an inch; they are to be stitched within four-tenths of an inch

\* The dimensions of those for the IX, X, and XI-inch guns, which have 'gomer' chambers, and cannot be conveniently tabulated, will be furnished to all vessels mounting such guns. The 'formers' for inspection of bags will have the forms and dimensions of the 'gomer' chambers less 0.87 inch for the IX-inch, 1.0 inch for the X-inch, and 1.15 inch for the XI-inch guns, for windage—in accordance with the flat patterns furnished for cutting.

of each edge, and the two edges of the seam *felled down* upon the same side, to prevent the powder from sifting through. The edges of the bottom are felled down upon the sides.

The bags, when filled, are to be tied with woolen thrums.

511. *Cartridge bags for saluting charges.*—Old cartridge bags which have been condemned for service charges are to be repaired and used for saluting charges, and whenever it is necessary to make bags expressly for the purpose, or for immediate use, they may be formed by sewing together two rectangular pieces with semi-circular ends.

512. *Inspection.*—The material especially procured for cartridge bags is to be carefully inspected to detect any mixture of cotton with the wool, by burning a few bits taken at hazard from each piece. The texture of the stuff is also to be examined and its strength tried, such standard for the latter being established as may be found sufficient to insure perfect efficiency.

After being made up the empty bags are to be inspected, and those which are sewed with too long stitches, or in any other than the prescribed manner, are to be rejected. The dimensions of each bag are to be verified, first by laying it flattened out, between two marks on a table showing the width of a pattern bag. A variation of 0.1 inch greater or less is allowed. The bags are also to be tried on mandrels, or formers, made according to the dimensions given on the preceding page.

513. *Preservation from moths.*—Serge or any other woolen material employed for making cartridge bags is never to be exposed on the shelves in store, either in the piece or when made up. It is to be protected by packing with the hydraulic press, by sewing it up in linen cloth, or by enveloping it in water-proof paper, hermetically sealed.

An infusion of coliquintida, in the proportion of  $15\frac{1}{2}$  grains, Troy, to a quart of water, is said to be a good preservative against moths. In case of using this preparation the cartridge bags should be steeped in the infusion, and, after being *thoroughly* dried, may be packed by the hydraulic press, and headed up in old whiskey barrels, if stored on shore, or packed in empty tanks if on board ship.

Cartridge bags, as well as the material for making them, are to be frequently examined to prevent their being damaged by *moisture*, as well as to guard against moths.

## SELVAGEE WADS.

514. *Selvagee wads* are made by the wad machine at the navy yards. This consists of pairs of disks adapted to each calibre of guns, which, being placed face to face on a spindle and keyed, present an annular score, grooved in such a way as to make, when filled, a grommet of the requisite size. Transverse notches are cut in the circumference of the disks to the bottom of the score, for the convenience of marling the wad before taking it off the mould.

In making the wad the end of a rope yarn is fixed in the score and the mould is turned by a crank until the score is filled. The grommet thus formed is marled like a selvagee strap, and a section of about an inch is taken out of it, in order to make the wad, when swelled by dampness, enter the bore of the gun readily.

Selvagee wads should be made neither too hard nor too soft, and to avoid either of these extremes a sufficient number of hitches only will be taken to give the wad the consistency required for service.

Sections of one-third or one-fourth of these wads will answer as well, in case of need.

## GUN GEER, IMPLEMENTS AND EQUIPMENTS.

515. Breechings for all guns are to be made of the best hemp, of three-stranded rope, shroud laid and soft, and not to measure less than seven and a half, nor more than eight inches in the coil, excepting those for IX-inch guns, which are to measure nine inches.

In fitting breechings a thimble is to be *spliced* into one end, the strands stuck through twice and marled down. A thimble is to be *turned into* the other end, so that the length of the breeching may be conveniently altered. Thus fitted, when the gun is run in and levelled, breechings must be long enough to allow the muzzle of the gun to come a foot inside of the upper port sill, if the breadth of the vessel will allow it. With guns of violent recoil this distance may be advantageously doubled, where there is room enough, as thereby the strain will be much lessened.

Breechings are neither to be covered, nor blacked, nor rendered less pliable.

516. Gun-tackle falls will be made of Manilla, or such other pliable rope as may be directed from time to time by the Bureau of Ordnance. It is prohibited to blacken them or to diminish their pliability. Three-inch rope will be found large enough for the heaviest, and from  $2\frac{1}{2}$  to  $2\frac{1}{4}$ -inch for the lighter guns.

The rope being well stretched, the falls are to be cut of sufficient length to allow the full recoil, leaving end enough to hitch round the straps of their double blocks, when hooked to the middle bolts.

517. *Blocks* for gun tackles should have pins of hardened copper, turned smooth, and sheaves of lignumvitæ without bouching. Those to reeve 3-inch falls to be 10 inches, those for 2½-inch falls 9 inches, and those for 2¼-inch falls 8 inches long.\* The hooks of gun-tackle blocks are not to be less than one and a half-inch diameter at the bend for heavy, and one and a quarter for light broadside guns.

## GRIOLET.

518. The GRIOLET PURCHASE for dismounting guns on covered decks is composed of—

A *toggle block*, made of elm or oak, the outer end or *head* of which is made rather larger in diameter than the inner one, which exactly fits the bore of the 32-pdr. The *head* has two sheaves in it, so as to form the lower block of the *muzzle purchase*, and is bound at the outer end with an iron band.

A double *casable block* of iron is made either with a shackle or to fit between the jaws of the casable, where it is secured by the casable pin. The iron pins on which the sheaves revolve are formed with eyes, for the convenience of hitching the standing part of the purchase.

Two *iron treble blocks*, one for the muzzle and the other for the breech purchase.

The *muzzle purchase block* is so fitted as to be either shackled or toggled to the housing bolt above the port, and the *breech purchase block* has an iron strap terminating above, with an eye by which it is shackled to a bolt passing through the deck above the gun. This bolt has an eye in one end, and a screw or key-slit at the other, and, when in place, is secured above the deck with a nut or key, between which and the deck a washer of hard wood or iron of suitable breadth and thickness is placed.

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\* The metallic blocks with *nibs*, proposed by Commander Dahlgren, which keep the blocks fair with the falls, and thus prevent the falls from fouling in the recoil, have upon trial proved successful, and will probably take the place of the wooden blocks now in use.

The hole through which this bolt is put should be directly above the cascable block when the muzzle of the gun is under the housing bolt, and may be bored at the time the gun is to be dismantled; and stopped afterwards with a plug of wood coated with white lead.

But, as it is desirable that every division on the gun-deck should be exercised in mounting and dismantling its guns, a hole may be made in the deck above each division, and bouched with a composition screw-tap.

The purchase falls should not be less than three and a half inches in size, and should be made of Manilla rope, of sufficient length to reeve full, the gun being supposed to be on deck and the upper blocks in place, allowing also sufficient end for splicing in the thimbles and hitching the standing part of the purchase when rove.

An iron thimble, large enough to hook the double block of a side or train-tackle, is spliced into the end of each purchase fall.

#### FIRE SCREENS,

519. Are made of thick fearnought, or of double baize, with holes through which to pass the powder—these holes to be covered by broad flaps of the same material. One screen is to be hung abaft, and another forward of the magazine passing-hatch and scuttles, in sloops of war; in ships-of-the-line and frigates, one is usually to be hung abaft the fore, and one forward of the after magazine scuttle; but as ships are differently arranged, two to each magazine will be allowed, if required.

#### MAGAZINE DRESSES,

520. Are to be of worsted, like a simple shirt, to reach to the knees—no metal buttons to be worn.

The shoes are to be made with soft soles and light uppers.

#### RATTLES FOR CALLING BOARDERS,

521. To be made like those used by watchmen, of white oak, or some other similar wood. Rattle, 12 inches long; ratchet, 2 inches in diameter; spring, one inch in width, and of sufficient thickness and elasticity to produce the requisite sound. Weight enough should be given to the butt to cause it to revolve round the handle with ease.

Fixed rattles of greater power will be attached to suitable places on each deck.



## SHELL WHIPS,

522. To be made of two-inch rope, rove through two single blocks, one above the other, in the shell hatchway, and the ends knotted together. A hook is fixed on each part of the whip, near the block, so that the parts being bowsed on alternately, a full box is brought up on one hook, and an empty one lowered by the other, at the same time.

## FLASH PANS.

523. Shallow copper bowls, large enough to hold an ounce of powder, with a handle two feet long.

## DARK LANTERNS,

524. To be made of copper, tinned inside, with two handles at the side that the shade may be turned without *taking hold of the top*. The whole height, 12 inches; diameter, 4 inches.

## BOAT GRAPNELS,

525. Are made of round iron, quite light, for throwing into the rigging or chains of the enemy, for the purpose of holding on when boarding; their prongs are barbed.

Six feet of small chain are to be attached to the ring and connected with six fathoms of one and three quarter rope.

## TARGETS.

526. In the construction of targets for practice at sea the chief object will be to give buoyancy and stability to the screen, with sufficient development of its surface. To these ends whiskey or beef barrels, supporting boards of sufficient length, will afford staging for the masts, yards, and screen; the heel of the mast passing through the stage and having ballast attached to it. The stage should be so fitted as to be readily put together, when wanted, and taken apart for stowage.

Harbour targets may be anchored, or be supported on stakes; but it would conduce to good practice to stretch a screen of sufficient length to show, distinctly, four or six ports, with the proper intervals between. This will the better exhibit the lateral effect of the firing of each gun, and of the concentration of fire from several guns at known distances.

#### PACKING BOXES.

527. Cartridges for small arms, primers, spur-tubes, percussion caps, spare fuzes, false fires, blue lights, port fires, and signal rockets, will generally be supplied to vessels in boxes, in which they can be kept with little liability to injury, until wanted for use.

These boxes are to be safely kept, and returned into store, or accounted for in the same manner as other articles of Ordnance stores, by those persons in whose charge they may be placed.

#### GUN SLINGS,

528. Are to be made of chain of  $\frac{3}{4}$  inch iron and tested to secure proper strength; the rings are to be of  $1\frac{1}{4}$  inch iron. The length of the slings should exceed by one foot that of the longest gun on board. The two parts should be parcelled and marled together for a space of two feet before and one foot behind the trunnions of the longest gun, and a piece of three-inch rope spliced around both parts in the wake of the parcelling, long enough to take four or five turns round the chase of the largest gun.

#### TRUNNION SIGHT.

529. The *trunnion sight* is designed to be used only when the required elevation passes the limits of the other sights. It is formed of a bar of mahogany, or other hard wood not liable to warp, of about eighteen inches in length, two inches wide, and one inch thick, with a brass notch at the rear end and a point at the other, fixed in, and parallel to, the upper edge. It is attached, by a stout thumbscrew, to the axis of the left trunnion, around which it revolves when the screw is slack.

The face of the trunnion is graduated into degrees, so that the sight may be used with the tables showing the corresponding ranges of the several classes of guns with their distant firing charge.

The upper edge of the sight-bar corresponds with  $0^\circ$  when the line of sight is parallel to the axis of the bore.

In using this sight the thumbscrew is first loosened and the sight directed at the object, in which position it is held until the desired elevation above it is given to the gun, when it is screwed fast again.

#### RAMMERS.

530. *Rammer heads* are to be made of well seasoned ash, birch, beech, or other tough wood, of the form and dimensions given in the drawings furnished by the Bureau to the different navy yards. The face of the rammer is hollowed, so as to embrace the front of the ball and press the selvagee wad home in its place. A hole is bored lengthwise *through* the head to admit the tenon, which is fastened by a pin of hard wood three-tenths of an inch in diameter, passing transversely through the head and tenon. The diameter of the staff is 1.75 and that of the tenon 1.5 inch. The diameter of the rammer head will be 0.25 inch less than that of the bore or chamber to which it is adapted.

For all chambered guns the rammers will be adapted to the chamber, but, as above described, will answer equally well for the shot and selvagee wad.

Staves are made of tough ash, and are one foot longer than the bores of the guns for which they are intended, and are to have *raised* marks on them to show when the 'ordinary charges' are in place, and, by due allowances, the others also.

#### SPONGES.

531. *Sponge heads* are to be made of poplar, or other suitable light wood. A hole 1.5 inch in diameter is bored through the axis to admit the tenon of the staff, into which the worm is previously secured by means of a brass pin which passes through an eye in its shank and the tenon. The worm is intended to project half an inch beyond the face of the sponge head, when the tenon is in place, and to have free play back into its socket when pressed against the bottom of the bore. It must be two inches in length and one and a quarter inch in diameter, and be made of elastic brass or composition wire two-tenths of an inch in diameter, and tapering at the points, so as to preserve its elasticity and firmness. It is to be *left-handed*, in order to *act* when turned to the right, or with the sun.

The wood of which sponge heads are made should be well seasoned, and should be gotten out of a size but little greater than the diameter of the heads for which it is intended, so that there may be as little shrinkage as possible in the finished heads.

The heads, when finished, should also be primed with several coats of boiled linseed oil or varnish, as the porous wood of which they are made is apt to become water-soaked.

532. For chambered guns the sponges are to fit the chambers and slopes, and a portion of the main bore, as shown in the drawings furnished by the Bureau. When of wool the whole surface will be covered, and so sheared as to have no windage, and to be even with the points of the worm, that they may take effect. The heads for woolen sponges should be one inch less in diameter than the bores or chambers of the guns for which they are intended.

533. The heads for the sponges of unchambered guns are to be eight inches long; and all sponge heads intended to be covered with woolen material are to be slightly tapered, and secured by a thin copper hoop, fastened with copper tacks, on the inner end.

534. *For bristle sponges* the heads must be made 1.5 inch less in diameter than the bores or chambers for which they are designed, as the bristles project  $\frac{3}{4}$  of an inch, and, yielding but slightly, are to be sheared to have one-tenth of an inch windage. The worm must project  $\frac{1}{4}$  of an inch in order to act, and will yield enough, when pressed home, to enable the bristles to act also. Spiral spaces are to be left in the parts adapted to the chambers and slopes, in order to bring out the fragments of the cartridges; but the portion adapted to the main bore of chambered guns is to have the whole surface filled up.

Great care is necessary in stowing them to prevent the bristles from being crushed down by contact with hard substances. For this purpose 'fenders' will be provided, to protect the sponge.

535. Sponge staves are to be made of tough ash, 1.75 inch in diameter, and must be 18 inches longer than the bores of the gun for which they are intended.

536. *Sponge caps* are made of duck, and, except for spar-deck guns, when they are exposed to the weather, should not be painted, but they, as well as the staves, should be kept clean by scrubbing.

*Sponges* should be carefully dried after use before putting the caps on, and frequently examined and dried to prevent their rotting.

Bristle sponges, when not in use, should always be carefully protected from damage by contact with other articles.

## ROBINSON'S WORM.

537. *This worm* consists of a screw,  $1\frac{1}{4}$  inch in diameter, of two turns, at the end of a cylindrical iron shank, with a socket and straps riveted to the staff, which is 1.5 inch in diameter. The worm is supported in the axis of the bore by means of a guide ring of composition, kept in place on the shank, six inches from the end, by a shoulder and forelock.

Thus adjusted, it is used to draw the junk wad and cartridge; the latter being laid hold of by the tie, if the staff be held in the axis of the bore, is uninjured.

When the ring is removed the worm will be equally efficient in drawing the selvagee wad.

## LADLES.

538. *Ladles*, when required, are to be made according to the patterns sent to each of the navy yards. Ladles which may be on hand are to be tried in drawing projectiles from the guns before they are issued for service.

## SCRAPERS FOR BOTTOM OF BORE.

539. They consist of two steel blades, crossing each other in the middle, and having their edges conformed to the curve of the bottom of the bore. These are inserted in a sponge head, and are designed to remove the cake usually caused by the adherence of the bottoms of the cylinders to the bottom of the bore.

The edges of the scrapers are so bevelled as to act only when turned to the right, or with the sun.

## HANDSPIKES.

540. Handspikes are to be made of well seasoned white hickory, of the form and dimensions directed by the Bureau. They are always to be shod, to be stained black, and oiled. The Ordnance Officer of the navy yard will ascertain that they ship freely in the training loops or sockets.

For IX-inch guns Lieutenant Beaumont's roller handspike has been adopted.

## PASSING-BOXES.

541. Passing-boxes are to be made of strong and well tanned harness leather, strongly sewed, or of such other material as may be directed.

For 8-inch and 32-pdr. guns they are to be of sufficient height to contain *two* 'near firing' charges.

Their diameters, in the clear, are to be half an inch greater than those of the cartridges they are to contain.

Their tops are to be distinctly lettered with the calibre and class of gun they are intended to serve, and are to slide on the becketts.

542. For GUN DECKS, passing-boxes, for both shot and shell guns having the *same* charges, are to be painted *black*. Those of guns requiring lighter charges than the rest are to be painted *red* on the lower half and *white* on the upper.

543. For spar decks, passing boxes for *shot guns* requiring lighter charges than those upon the gun decks, and also those for steamers having no gun deck, and for sloops-of-war, are to be painted *black* on the lower half and *white* on the upper; for shell guns, *all red*; and for chase guns, similarly to those for like charges on other decks.

## FIRE-TUBS.

544. Fire-tubs are to be made of oak, of the patterns furnished by the Bureau, the hoops being of iron. The top is to be provided with a stout hoop of wood, to ship and unship, with a grating across it of stout copper wire, the meshes of which are to be small enough to prevent the passing-boxes from falling into the water when struck over the tub.

## FIRE-BUCKETS.

545. Fire-buckets are to be made of light well tanned sole leather, according to pattern.

## THE GROMMET MUZZLE LASHING FOR HOUSING GUNS.

546. Consists of a grommet made of rope double the size of the gun-tackle falls; with two cringles worked into it for the frapping lashing; which will be of stuff half the size of the tackle falls.

The grommet will be made large enough just to slip over the swell of the muzzle when the bight is over the housing hook bolt, and the gun is in position for housing. It will be wormed throughout, and parcelled in the wake of the housing bolt and frapping lashing, and when there is no swell, in the wake of the muzzle ring.

When the housing bolt is an eye-bolt the grommet is secured to it by means of a toggle which has a laniard.

#### FUZE WRENCHES,

547. Of steel, shank round, four inches long, four-tenths of an inch in diameter. Prongs round, one and a half inch long, three-tenths of an inch diameter. Cross handle of wood, with small forked screwdriver in one end for water cap. The prongs of wrench are flattened at the ends, and are one and a half inch apart.

#### RIGGING STOPPERS.

548. Standing rigging, when stranded or shot away, is most readily and effectually secured for the moment by using stoppers composed of two small dead-eyes, fitted with double selvagee tails and laniards, of sizes suitable to the rigging, whether lower or topmast. These are to be fitted on board ship, and are set up by means of pendant-tackles or of jiggers, as the case may require.

#### MAST BANDS.

549. Are to be made to suit the several lower masts and the bowsprit, and their respective fishes.

They are to be either hinged or in two pieces; in both cases to key together. The iron of which they are made to be  $2 \times \frac{3}{16}$  inches. In use they are to be put on at intervals of two or three feet, and are to be wedged and filled in solidly.

#### HARNESS CASKS FOR BOATS.

550. For expeditions the launches and first cutters of all vessels are each to be provided with an iron-hooped harness cask, made light and of suitable size to contain, between them, a week's supply of pork for all the boat's crews of the ship, and adapted to the form of the boat and to convenient stowage.

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ACCOUTREMENTS FOR CAPTAINS OF GUNS, BOARDERS, AND  
SMALL-ARM MEN.

551. WAIST BELTS, to be made of buff leather, 2 inches wide and from forty to forty-four inches long; a standing loop and eyelet-holes at one end and brass hook riveted to the other.

The same belt is used by Captains of guns and boarders, as well as by small-arm men and the crews of field howitzers, the *frogs* and *boxes* to hold the arms and ammunition being fitted with loops to slip on and off the belt as circumstances require, and in the following order:

*1st and 2nd Captains of guns, and of field and boat howitzers*, wear the primer box in front; if they are boarders the sword on the *left* and the *pistol frog* on the *right* hip. These equipments, consequently, will be slid on towards the loop end of the belt, in the order just named.

*Other boarders and guns' crews of howitzers, when used as field guns*, wear their arms, as in the preceding case, *without the primer box*.

*Men armed with muskets*, and acting on shore, will wear musket cartridge boxes, fitted with shoulder belt, and frog and scabbard for bayonet on the waist belt.

*Men who may be armed with carbines* on shore duty will wear cartridge boxes with shoulder belts. For boat duty, or *when armed with pistols and swords*, they will wear the waist belt with the proper frog and boxes.

552. Instead of the sword frog the new sword scabbards of Lieutenant D. D. Porter's pattern, are fitted with a loop to slide on the waist belt. This scabbard also dispenses with the brass mountings, which are replaced by leather ones. The whole is fastened by copper rivets instead of being sewed.

553. PRIMER BOXES, of black bridle leather, rectangular in form, and of the size to contain, loosely, the tin *packing box*. Flap covering the top and front with a button-hole *strap* one inch in width, sewed near the bottom; *brass button* riveted to the bottom of the box. *Loop*, two inches wide, placed upright on the back of the box for the waist belt to pass through.

554. PISTOL FROG (buff leather), wide enough at the mouth to cover the cock of the pistol, and at the lower part to accommodate the stock; upper part of the back of it turned down to form a loop large enough to admit the waist belt. The stitches forming the side seams not to come nearer than 0.25 inch from the edges of the leather.



*Pocket*, (thin bridle leather,) to contain three cartridges; flap, tongue, and loop.

*Cap pocket*, like the cartridge pocket; *lining*, a strip of sheepskin with the wool on, glued with fish glue and sewed to the back at the mouth of the pocket.

These two pockets are of the same depth, and occupy the whole breadth of the pistol frog.

555. THUMBSTALLS, of buckskin, with hair-stuffed pad, and thongs for the wrist.

556. MUSKET CARTRIDGE BOX, (black bridle leather,) length, 7.2 inches; width, 1.6 inch; depth in front, 5.8 inches; inner cover, (upper leather,) 4 inches wide, with end pieces sewed to it so as to cover the ends of the box; flap, (harness leather,) 8.5 inches wide at the bottom, 8 inches at top, stamped C. S. N. in an oval on the outside; a button-hole strap, sewed near the bottom; brass button riveted to the bottom of the box; loop, (bridle leather,) with a hole in the middle to hook the shoulder belt to, sewed to the back of the box for the waist belt to pass through.

*Cap pocket* (light upper leather) sewed to the front of the box; length,  $4\frac{1}{2}$ ; depth,  $2\frac{1}{2}$  inches; flap, tongue, and loop (bridle leather;) *lining*, a strip of sheepskin with the wool on, 1.5 inch wide, glued with fish glue and sewed at the mouth of the pocket; *pocket* for *ballscrew* and *wiper* sewed on the right, and for *conekey* and *conepick* on the left of the cap pocket.

*Two tin linings*, each with a *lower division*, 3 inches by 3.3 inches, open in front, to contain a bundle of 10 cartridges, and two bundles of caps containing 25 each, packed in water-proof paper. Each tin has also *two upper divisions*, 2.7 inches deep—one of 2 inches by 1.35 inch square, for 6 cartridges; the other 1.35 inch square, for four cartridges. The edges of the tins are turned over and soldered down to prevent them from cutting the fingers.

All the tin linings should be made to slide freely in the boxes.

557. CARBINE CARTRIDGE BOX.—The leather parts are like those of the musket cartridge box; length, 6.4 inches; depth in front, 3.7 inches; width, 1.3 inch; *inner cover*, 3.5 inches wide; *flap*, 6.6 inches wide at top, 6.8 at bottom, 6 deep. Tin linings; two lower divisions, two inches deep, 2.9 inches long, 1.2 wide; 5 upper divisions, 1.2 inch wide by 1.15 inch long, and 1.5 inch deep, to contain forty cartridges, those below in bundles of water-proof paper.

558. SHOULDER BELT for musket or carbine boxes, to be made of buff leather, 5 feet long, 1.5 inch wide; brass hook, riveted at each end; 12 eyelet-holes at one end, one inch apart.

559. CONEPICK, (steel wire, No. 18,) 1.5 inch long, with a ring handle 0.5 inch in diameter; it is carried, with the conekey, in the pocket in front of the musket cartridge box.

560. BAYONET SCABBARD, (black bridle leather,) length, 19.3 inches. Frog (buff leather) sewed to a socket of black leather, which is fastened to the top of the scabbard; the loop of the frog to be made wide enough to slide on the waist belt.

NAVAL GUN CARRIAGES.

561. All gun carriages and their equipments are to be made in conformity with directions from the Bureau of Ordnance and Hydrography.

NOMENCLATURE OF ORDINARY NAVAL TRUCK CARRIAGE,

WOODEN PARTS.

*Carriage.*

- 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, let into brackets.
- C. Breast piece in two parts; the inner part fixed, by two bolts, into transom; the outer part movable, connected by hinges.

- D. Front and rear axletrees, consisting each of square body *f*, and arms *g*, jogged into brackets.
- E. Front and rear trucks.
- F. Dumb trucks.
- G. Bed and stool.
- H. Quoin.

*Implements.*

- I. Handspikes.
- K. Chocking quoin.

METAL PARTS.

*Carriage.*

- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>1. Two cap squares.</li> <li>2. Four cap-square bolts and two keys and chains.</li> <li>3. Two bracket bolts.</li> <li>4. Two rear axletree bolts.</li> <li>5. Two side-tackle eye-bolts.</li> <li>6. One train-tackle eye-bolt.</li> <li>7. One transporting eye-bolt.</li> <li>8. Two breast bolts.</li> <li>9. Two hinges of breast pieces.</li> <li>10. Two Transom bolts (upper and lower.)</li> <li>11. Two breeching side-shackles and pins.</li> </ul> | <ul style="list-style-type: none"> <li>12. Bed bolt.</li> <li>13. Four axletree bands.</li> <li>14. Chafing plates of steps and brackets.</li> <li>15. Four linchpins and washers.</li> <li>16. Quoin-plate and stop.</li> <li>17. Ratchet for quoin stop.</li> <li>18. Four training loops.</li> <li>19. Breeching thimble, (cast iron.)</li> <li>20. Side-shackle bolts for breechings.</li> <li>21. Shackle pin, plates, and keys.</li> <li>22. Two axle stays.</li> <li>23. Handspike shoe.</li> </ul> |
|---|--|

NOMENCLATURE OF  
PARTS PECULIAR TO VAN BRUNT'S FRICTION CARRIAGE  
FOR LIGHT GUNS.

OF CARRIAGE.

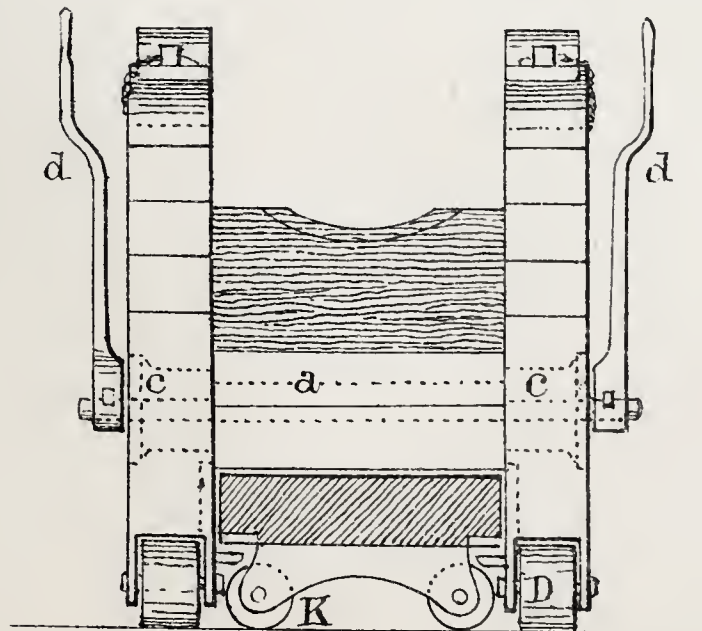
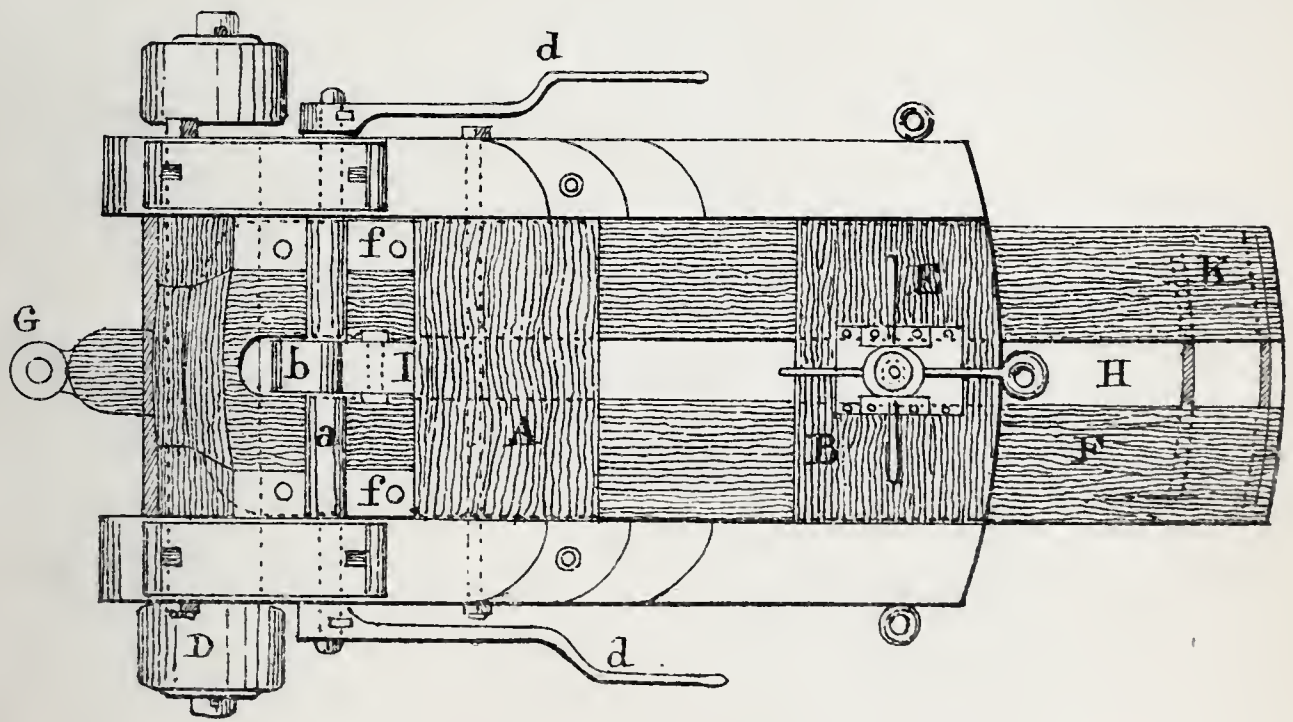
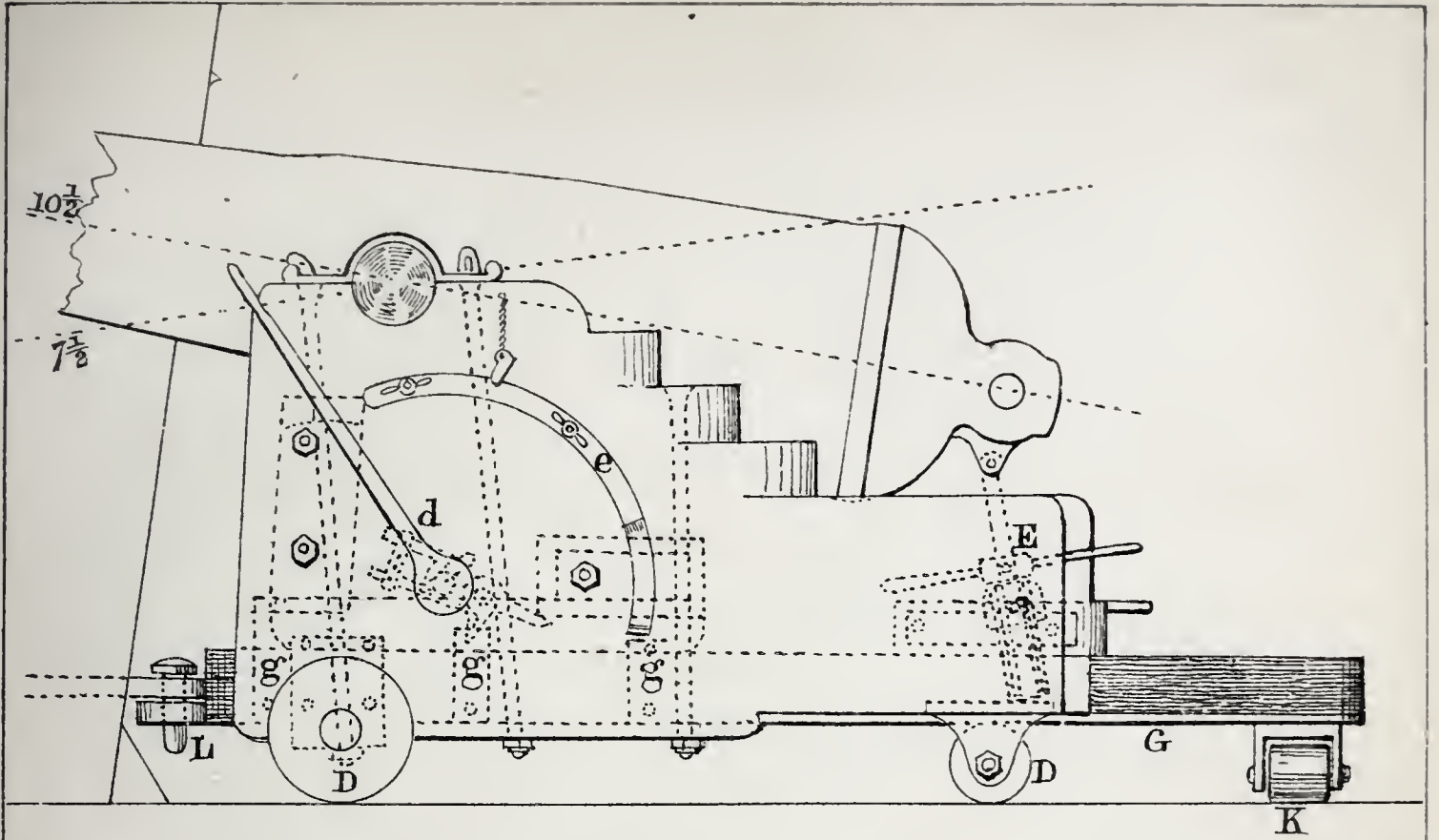
562. A, middle transom; B, rear transom. Compressor, composed of eccentric axle *a*, with catch *b*; journals *c c*; levers *d d*; spring catch for do. *e*; compressor blocks *f f*, and clamps *g g*. Trucks D, attached to brackets by brass box and axles; and elevating screw E (Hart's), with levers, attached to rear transom.

OF SLIDE.

F, Compressor plates, under slide, with nose-piece and pivot-hole G. Slot H, with catch-stop I. Training trucks K, attached by brass box. Pivot-bolt, loop, and socket L.

(Diagram I.)

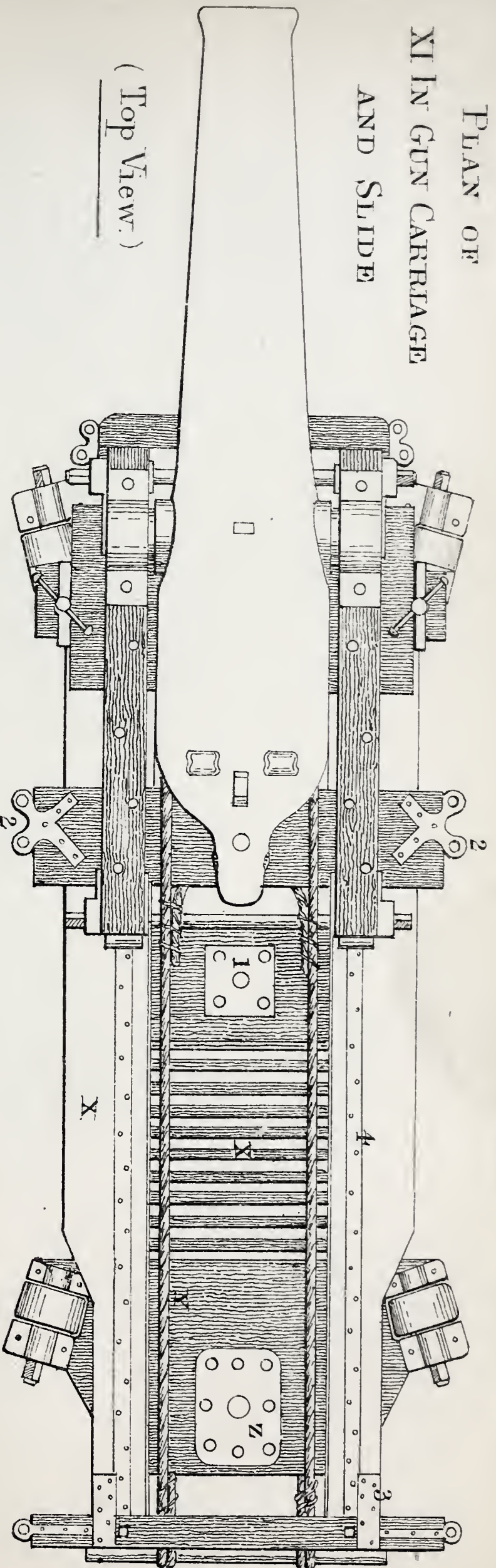
VANBRUNT'S FRICTION CARRIAGE FOR LIGHT GUNS.





PLAN OF  
XI IN GUN CARRIAGE  
AND SLIDE

(Top View.)



WOODEN PARTS.

- X. *Battens and Slats*
- Y. *Rope Stays*

METAL PARTS.

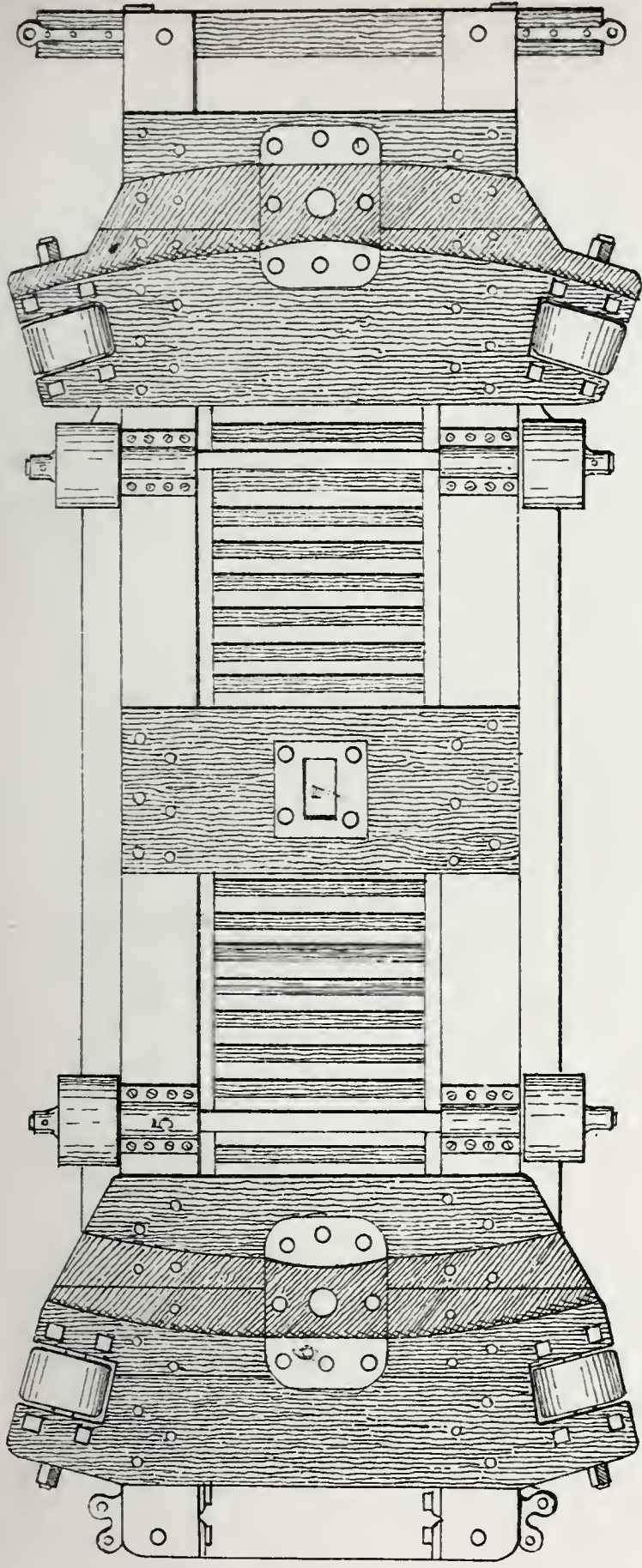
- Z. *Upper pivot plate*
- 1. *Middle Roller plate*
- 2. *Eyes for tackle*
- 3. *Heurtois Straps*
- 4. *Rail Plates*





PLAN OF  
SLIDE FOR  
XI IN GUN CARRIAGE

(Bottom View.)

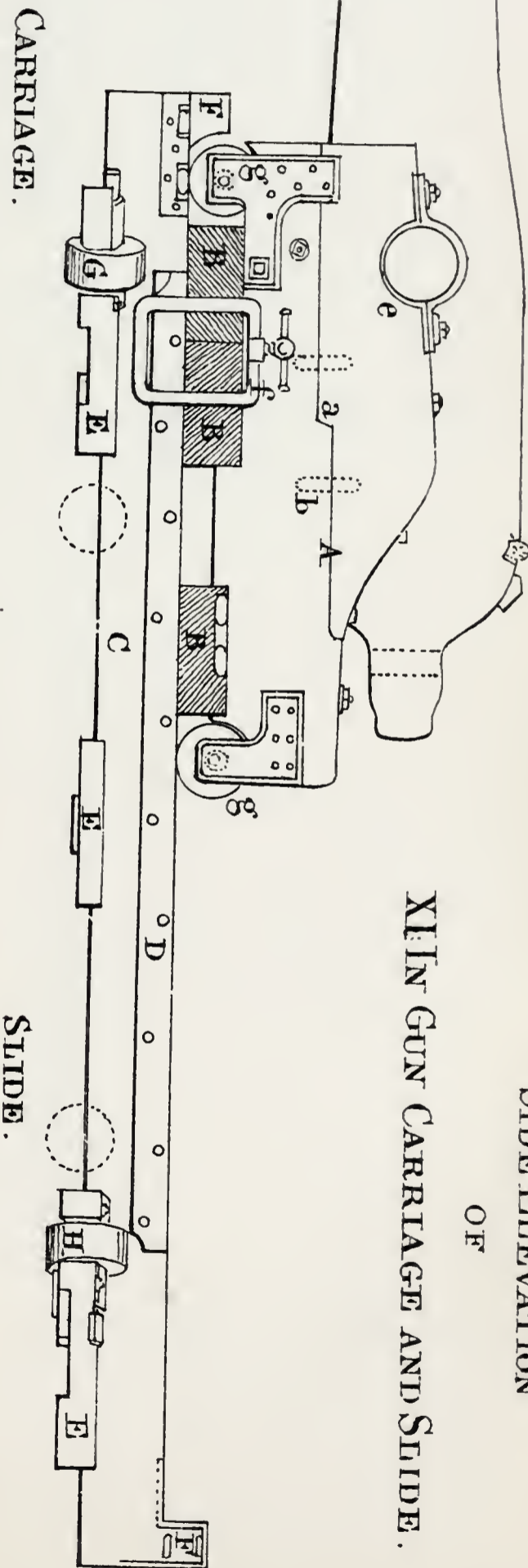


METAL PARTS.

- Note. All metal parts are composition  
except the Axles, Levers, Elevating  
Screw, and Bracket Bolts.
5. Transporting Journals
  6. Pivot Plates and Guide flanges
  7. Middle Roller



SIDE ELEVATION  
OF  
XII IN GUN CARRIAGE AND SLIDE.



WOODEN PARTS.

- A. Brackets of two pieces with jog (a) & dowels (b)
- B. the Rails) Front, Middle & 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.

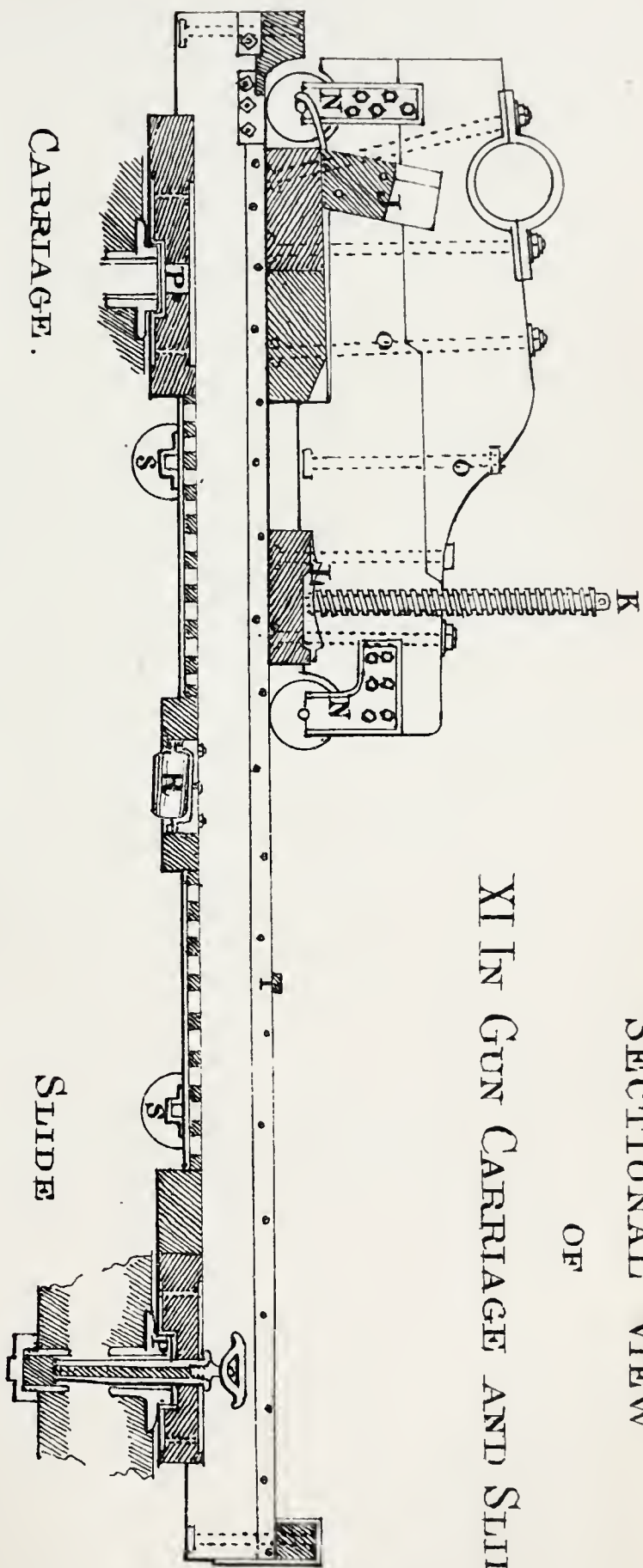
- C. Rails
- D. Compressor battens
- E. Transoms, front and rear, each in two parts; middle in one part
- F. Hunters, front and rear

METAL PARTS.

- G. Shifting Trucks
- H. Trunnion with journals and eccentric axles



SECTIONAL VIEW  
OF  
XI IN GUN CARRIAGE AND SLIDE.



CARRIAGE.

SLIDE

WOODEN PARTS.

METAL PARTS.

METAL PARTS.

- J. *Breast Transom, scored for elevation, as is also the middle transom*
- K. *Elevating Screw*
- I. *Saucer*
- N. *Inside journal plates*
- O. *Bracket bolts*
- P. *Bossed Sockets, Plates, and pivot bolts*
- R. *Middle training Truck with Journals*
- S. *Transporting Trucks, Axles and Journals*
- T. *Guide plates inside of Rails*



## PAINTS, LACKERS, &amp;c.

## COMPOSITION AND PREPARATION.

563. The proportions are given for 100 parts by weight of prepared colours, &c., when not otherwise designated.

A Gallon of Linseed oil weighs . . . . .	7.5 lbs.
Spirits of turpentine . . . . .	7.25 „
Japan varnish . . . . .	7. „
Sperm oil . . . . .	7.12 „
Neatsfoot oil . . . . .	7.63 „

## PAINTS AND LACKERS.

*Boiled Oil.*

Raw linseed . . . . .	103.0 lbs.
Copperas . . . . .	3.15 „
Litharge . . . . .	6.3 „

*Dryings.*

Mixture of copperas and litharge taken from the boiled oil . . . . .	60.0 lbs.
Spirits turpentine . . . . .	56.0 „
Boiled oil . . . . .	2.0 „

*Putty (for filling cracks in wood).*

Spanish whiting, pulverized . . . . .	81.6 lbs.
Boiled oil . . . . .	20.4 „

*Another kind of putty*, for the same purpose, is made by mixing fine sifted oak sawdust with linseed oil which has been boiled till glutinous.

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4. Anti-corrosion . . . . .	40 lbs.
Grant's black, ground in oil . . . . .	4 „
Red lead, as a dryer . . . . .	3 „
Linseed oil . . . . .	4 galls.
Spirits turpentine . . . . .	1 pint.

This mixture, when well stirred and incorporated, will be fit for use; but, as by long keeping in this state it becomes hard, no more should be mixed than may be required for immediate use. It is used in the British service.

<i>Anti-corrosion.</i> —Slag from Iron foundries, pounded . . . . .	12 lbs.
Chalk . . . . .	12 „
Soot, common . . . . .	1 „

In applying lacker the surface of the iron must be first cleaned with a scraper and a wire brush, if necessary, and the lacker applied hot, in two thin coats, with a paint brush. It is best done in summer.

Old lacker should be removed with a scraper, or by scouring, and not by heating the guns or balls, by which the metal is injured.

A. PLANTOU'S COMPOSITION FOR COATING IRON OR WOOD AS A  
PRESERVATIVE.

*First Composition.*

Pulverized rosin . . . . .	3 lbs.
Do. shellac . . . . .	2 oz.
Do. charcoal, or cannel coal . . . . .	1 lb.
Spirits turpentine . . . . .	1 oz.

*Second Composition.*

Pulverized rosin . . . . .	3 lbs.
Beeswax . . . . .	4 oz.
Pulverized charcoal or cannel coal . . . . .	1 lb.
Spirits turpentine . . . . .	1 oz.

The first two articles are to be dissolved in an iron vessel over the fire; the charcoal is then added and briskly stirred until the whole is well intermixed; after which the turpentine is added and stirred until it is well incorporated with the other ingredients. *Not make on board ship!!*



The composition is to be applied when hot with a brush or spatula, and smoothed over with a hot iron. The wood or iron should be perfectly dry, and freed from rust or other loose substances.

*Lacker for Small Arms, or for Water-proof Paper.*

Beeswax . . . . .	13 lbs.
Spirits turpentine . . . . .	13 gals.
Boiled linseed oil . . . . .	1 „

All the ingredients should be pure and of the best quality. Heat them together in a copper or earthen vessel, over a gentle fire, in a water bath, until they are well mixed.

*Lacker for bright Iron work.*

Linseed oil, boiled . . . . .	80.5 lbs.
Litharge . . . . .	5.5 „
White lead, ground in oil . . . . .	11.25 „
Rosin, pulverized . . . . .	2.75 „

Add the litharge to the oil, let it simmer over a slow fire three hours; strain it, and add the rosin and white lead; keep it gently warmed and stir it until the rosin is dissolved. Apply it with a paint brush.

*Varnish for Scabbards, &c., or Patent Leather.*

<i>For 1st and 2nd coats.</i> —Prussian blue, in lumps . . . . .	4 lbs.
Sugar of lead . . . . .	0.7 „
Aqua fortis . . . . .	0.7 „
Linseed oil, boiled . . . . .	70. „
Spirits turpentine . . . . .	24.6 „

The ingredients, except the turpentine, are boiled together, in an *iron* kettle, eight hours, when the mixture will assume a brilliant black color. When the varnish is nearly cool stir in the turpentine. The kettle in which the varnish is made should be of a capacity to hold double the quantity of varnish to be boiled. *Cannot be safely made on board ship!*

*For the third or finishing coat.—COPAL VARNISH.*

Gum copal (in clear lumps) . . . . .	26.5 lbs.
Boiled linseed oil . . . . .	42.5 „
Spirits turpentine . . . . .	31. „

This varnish is made in a *copper* vessel, smallest at the top, in the form of a still.

Put the copal in the vessel, set it on a charcoal fire for one hour, in which time it will melt, and all the watery particles will evaporate. Add the oil whilst the copal is warm, but not boiling hot. When nearly cool add the turpentine, which will give it a proper consistency for use.

For 5 lbs. copal, and the proper proportions of oil and turpentine, the vessel should hold six gallons. *Not safely made on board ship!*

*Japan Varnish.*

Litharge . . . . .	4 lbs.
Boiled oil . . . . .	87 „
Spirits turpentine . . . . .	2 „
Red lead . . . . .	6 „
Umber . . . . .	1 „
Gum shellac . . . . .	8 „
Sugar of lead . . . . .	2 „
White vitriol . . . . .	1 „

Japan varnish is generally purchased from the paint sellers. It is made by boiling on a slow charcoal fire for five hours all the ingredients except the turpentine and a small portion of the oil. The latter is added as required to check the ebullition and to allay the froth which rises to the surface. It must be continually stirred with a wooden spatula, and *great care is necessary to prevent it from taking fire, and therefore it cannot be safely made on board ship!!*

The turpentine is added after the varnish is nearly cool, and is stirred well in. The varnish must be kept in tin cans closely corked.

*Olive Paste.*

Yellow ochre, pulverized . . . . .	68. lbs.
Lampblack . . . . .	1.1 „
Boiled oil . . . . .	37. „
Spirits turpentine . . . . .	0.4 „

Make a thick paste with the ochre and oil in a paint pot, and with the lampblack and oil in another. Grind them together in small portions, and keep the mixture in a tin vessel.

*Liquid Olive Color.*

Olive paste . . . . .	61.5 lbs.
Boiled oil . . . . .	29.5 „
Spirits turpentine . . . . .	5.5 „
Dryings . . . . .	3.5 „
Japan varnish . . . . .	2. „

Stirred together in a paint pot.

*Brainard's Paint.*

Dissolve 10 pounds of shellac in 10 gallons of boiling water, adding 30 ounces of sal æratus. Mix this solution with an equal quantity of paint prepared in the usual manner. This paint is economical and durable.

*Black Stain, (for wood-work of gun carriages.)*

Copperas . . . . .	1 lb.
Nut galls . . . . .	1 „
Sal ammoniac . . . . .	$\frac{1}{4}$ „
Vinegar . . . . .	1 gal.

Stir it occasionally for a few hours and it will be ready for use.

The wood to be clean and smooth, and cracks filled with black putty, which must be allowed to dry. The stain to be applied two or three times and left to dry for a day or two. Then it is to be rubbed with boiled oil until sufficiently polished. Until the oil is applied the color will be blueish. This method of staining and preserving gun carriages has been tried successfully, and possesses the advantages of being cheaper than paint and of greater durability, and dispenses with the inconvenience of the frequent application of that implement erroneously termed a 'dry brush.'



# APPENDIX.

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- A. FORMS OF QUARTER BILLS.
- B. TABLES OF GUNNERY PRACTICE.
- C. FORMS OF REPORTS OF INSPECTION AND  
OF TARGET PRACTICE.
- D. FORM OF EXERCISE AND MANŒUVRE FOR  
BOAT HOWITZERS.
- E. TABLES OF ALLOWANCES.

## APPENDIX A.

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### QUARTER BILLS OF C. S. NAVY.

The following Quarter Bills for the more prominent classes of sailing and steam vessels in the Confederate States Navy, and the Skeleton Watch Bills upon which they are based, are made agreeably to the Tables of Allowances issued July 20th, 1854, as modified by the General Order of the Navy Department of April 8th, 1857. The mode of distributing the men observed in these Bills is recommended.

The same principle of quartering a ship's company may be applied to such other vessels as have been or may be added to the Navy, but are not numerous enough to form a class, and also to Quarter Bills of vessels provisionally armed. The table in article 78 of the foregoing instructions, gives, under the calibre and class of guns, the number of men required to work them respectively.

The Powder division should be manned according to the principles laid down in articles from 392 to 398 inclusive.

The Master's division is to be filled according to the size and rig of the vessel, taking care, in steamers which may be deficient in room, to berth as large a crew as might be desirable, to fill only the indispensable stations in the Master's division, leaving the duties of Bracemen and Riggers to be performed, as circumstances may require, by Sailtrimmers from the guns. The stations and duties of Officers at Quarters will be established in conformity with the instructions in chapter II.

## SKELETON WATCH BILL

FOR A SHIP OF 84 GUNS.

STATIONS	CAPTAINS	COXSWAINS	SEAMEN	ORDINARY SEAMEN	LANDSMEN	BOYS	PETTY OFFICERS TO KEEP WATCH	PETTY OFFICERS, IDLERS	BANDSMEN, IDLERS	TOTAL
Forecastlemen.....	4	2	32	38	12	...	...	...	...	88
Foremastmen .....	...	...	4	4	...	...	...	...	...	8
Foretopmen.....	2	2	28	30	4	10	...	...	...	76
Mainmastmen.....	..	...	4	4	...	...	...	...	...	8
Maintopmen .....	4	2	26	38	4	10	...	...	...	84
Mizenmastmen .....	...	...	2	2	...	...	...	...	...	4
Mizentopmen .....	2	2	16	24	4	12	...	...	...	60
After Guard .....	2	2	12	40	98	12	...	...	...	166
Waisters .....	...	...	18	30	87	4	...	...	...	139
Messengers and Sideboys .....	...	...	...	...	...	16	...	...	...	16
Bandsmen .....	...	...	...	...	...	...	...	...	11	11
Petty Officers .....	...	..	...	...	...	..	47	14	...	61
Total of each Grade ...	14	10	142	210	209	64	47	14	11	721

QUARTER BILL for a Ship of the Line of 84 Guns, with a com-

QUARTER DECK.—CAPTAIN; COMMANDER, OR OTHER EXECUTIVE  
2 MIDSHIPMEN, AS AID;

DECK	No. of Gun	Number of Men	Watch to which Gun's Crew belongs	Petty Officers, Captains of Guns	FORECASTLE MEN			FORETOPMEN				MAINTOPMEN						
					Capt. or Coxns. Capts. of Guns	Seamen	Ord. Seamen	Landsmen	Capt. or Coxns. Capts. of Guns	Seamen	Ord. Seamen	Landsmen	Boys	Capt. or Coxns. Capts. of Guns	Seamen	Ord. Seamen	Landsmen	Boys
LOWER.	1	14 & Boy	S	Q M	..	1	1	1	..	..	1	..	1	..	..	1	..	..
	2	"	P	..	C F	1	1	1	..	..	1	..	1	..	..	1	..	..
	3	"	S	..	..	1	1	1	Capt.	..	1	..	1	..	..	1	..	..
	4	"	P	B M	..	1	1	1	..	..	1	..	1	..	..	1	..	..
	5	"	S	..	..	1	1	1	..	..	1	..	..	Capt.	..	1	..	1
	6	"	P	Q M	..	1	1	1	..	..	1	..	..	..	..	1	..	1
	* 7	16 & Boy	S	..	Cox.	1	1	..	..	..	1	..	..	..	1	1	1	1
	* 8	"	P	..	..	1	1	..	Cox.	..	1	..	..	..	1	1	1	1
	* 9	"	S	B M	..	1	1	..	..	1	1	..	..	..	1	1	..	..
	* 10	"	P	..	..	1	1	..	..	1	1	..	Capt.	1	1	..	..	..
	* 11	"	S	Q M	..	1	1	..	..	1	..	..	..	1	1	..	..	..
	12	14 & Boy	P	..	..	1	1	..	..	1	..	..	..	1	1	..	..	..
	13	"	S	Q M	..	1	1	..	..	1	..	..	..	1	1	..	..	..
	14	"	P	..	..	1	1	..	..	1	..	..	Cox.	1	1	..	..	..
	15	"	S	..	..	1	1	..	..	1	..	..	..	1	1	..	..	..
	16	"	P	..	..	1	1	..	..	1	..	..	..	1	1	..	..	..
MAIN.	1	12 & Boy	S	..	..	1	1	1	..	1	1	..	1	Cox.	..	1	..	..
	2	"	P	B M	..	1	1	1	..	1	1	..	1	..	..	1	..	..
	3	"	S	..	C F	1	1	1	..	1	1	..	1	..	..	1	..	..
	4	"	P	..	..	1	1	1	Capt.	1	1	..	1	..	..	1	..	..
	5	"	S	..	..	1	1	1	..	1	1	..	..	Capt.	..	1	..	1
	6	"	P	..	Cox.	1	1	1	..	1	1	..	..	..	..	1	..	1
	* 7	14 & Boy	S	B M	..	1	1	..	..	1	1	..	..	..	1	1	1	1
	* 8	"	P	Q M	..	1	1	..	..	1	1	..	..	..	1	1	1	1
	* 9	"	S	..	..	1	1	..	Cox.	1	1	..	..	..	1	1	..	..
	* 10	"	P	..	..	1	1	..	..	1	1	..	Capt.	1	1	..	..	..
	* 11	"	S	..	..	1	1	..	..	1	..	..	..	1	1	..	..	..
	12	12 & Boy	P	Q M	..	1	1	..	..	1	..	..	..	1	1	..	..	..
	13	"	S	..	..	1	1	..	..	1	..	..	..	1	1	..	..	..
	14	"	P	B M	..	1	1	..	..	1	..	..	..	1	1	..	..	..
	15	"	S	..	..	1	1	..	..	1	..	..	..	1	1	..	..	..
	16	"	P	..	..	..	1	..	..	..	..	..	..	..	1	..	..	..
SPAR.	1	12 & Boy		..	C F	..	1	..	..	1	1	1	1	..	..	1	..	..
	2	8 & Boy	P	..	..	..	1	..	..	1	1	..	1	..	..	1	..	..
	3	"	S	..	..	..	1	..	..	..	1	..	..	1	..	..	1	
	4	"	P	..	..	..	1	..	..	..	1	1	..	..	1	..	..	1
	5	"	S	..	..	..	1	..	..	..	1	..	..	..	..	..	..	..
	6	"	P	..	..	..	1	..	..	..	1	..	..	..	..	..	..	..
	7	"	S	..	..	..	..	..	..	..	1	..	..	..	..	1	..	..
	8	"	P	..	..	..	..	..	..	..	1	..	..	..	1	1	..	..
	9	"	S	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..
	10	"	P	..	..	..	..	..	..	1	1	..	..	..	..	1	..	..

\* Shell guns.



plement of 721 Men and Boys, exclusive of Officers and Marines.

OFFICER; MASTER; PASSED MIDSHIPMAN, AS SIGNAL OFFICER;  
AND CAPTAIN'S CLERK.

MIZENTOPMEN				AFTER GUARD			WAISTERS			Messenger Boys	OFFICERS OF DIVISIONS			
Capt. or Coxns. Capt. of Guns	Seamen	Ord. Seamen	Landsmen	Boys	Capt. or Coxns. Capt. of Guns	Seamen	Ord. Seamen	Landsmen	Seamen			Ord. Seamen	Landsmen	
...	1	...	...	...	...	1	1	2	...	1	2	...	} <i>1st Division.</i> Lieutenant. Midshipman. 1 Quarter Gunner.	
...	1	...	...	...	...	1	1	3	...	1	1	...		
...	1	...	...	...	...	1	1	3	...	1	1	...		
...	1	...	...	...	...	1	1	2	...	1	2	...		
...	1	...	...	...	...	1	1	3	...	1	2	...		
...	1	...	...	...	...	...	1	3	...	1	3	...	} <i>2nd Division.</i> Lieutenant. Midshipman. 1 Quarter Gunner.	
...	1	...	...	...	...	...	1	4	...	1	2	...		
...	...	...	1	1	...	...	1	3	...	1	3	...		
...	...	...	1	1	1	...	...	1	3	...	1	3	...	} <i>3rd Division.</i> Lieutenant. Midshipman. 1 Quarter Gunner.
Capt.	...	1	1	1	...	...	1	2	...	1	2	...		
...	...	1	...	1	...	...	1	2	...	1	3	...		
Cox.	...	1	...	...	...	...	1	4	...	1	1	...		
...	...	1	...	...	Cox.	...	1	3	...	1	2	1	1	
...	...	...	...	...	...	...	1	2	1	..	1	...	} <i>4th Division.</i> Lieutenant. Midshipman. 1 Quarter Gunner.	
...	...	...	...	...	...	...	1	2	1	...	1	...		
...	...	...	...	...	...	...	1	2	1	...	1	...		
...	...	...	...	...	...	...	1	2	1	...	1	...		
...	...	...	...	...	...	...	1	3	...	...	2	...	} <i>5th Division.</i> Lieutenant. Midshipman. 1 Quarter Gunner.	
...	...	...	...	...	...	...	1	3	...	...	2	...		
...	...	1	...	...	...	...	...	4	...	...	2	1		
...	...	1	...	...	Cox.	...	1	4	...	...	2	1		
...	...	1	...	...	...	...	1	3	...	...	1	1	} <i>6th Division.</i> Lieutenant. Midshipman. 1 Quarter Gunner.	
Capt.	...	1	...	...	...	...	1	3	...	...	1	1		
...	...	1	...	...	...	...	1	3	...	..	1	1		
Cox.	...	1	...	...	Capt.	...	1	2	...	2	2	1		
...	...	1	...	...	...	1	1	3	...	2	1	1		
...	...	1	...	...	...	...	1	2	...	1	1	...	} <i>7th Division.</i> Lieut. or P. Mid'n. Midshipman. 1 Quarter Gunner.	
...	1	1	...	...	...	...	1	...	...	1	...	...		
...	1	1	...	...	...	...	1	...	...	1	...	...		
...	1	1	...	...	...	1	1	1	...	1	...	1		
...	1	1	...	...	...	...	1	1	1	1	...	1	} <i>8th Division.</i> Passed Midshipman. Midshipman. 1 Quarter Gunner.	
...	1	1	...	...	...	...	1	1	1	2	...	1		
...	...	1	...	...	...	1	...	1	...	2	...	1		
...	...	1	...	...	...	1	1	1	1	2	...	1		
...	...	1	...	...	...	1	1	1	...	1	...	1		

## QUARTER BILLS.

## QUARTER BILL FOR A SHIP OF THE LINE OF 84 GUNS—continued.

## 9TH, OR MASTER'S DIVISION.

STATIONS	PETTY OFFICERS		FORECASTLE-MEN		FORETOPMEN		MAINTOPMEN		MIZENTOP-MEN		AFTER GUARD		MASTMEN		OFFICERS	
		Watch		Watch		Watch		Watch		Watch		Watch		Watch		
Conn.....	1 Q. M.	S	..	..	..	..	..	..	..	..	..	..	..	..	Quarter Deck.	
Wheel.....	1 Q. M.	..	1 Sea.	..	..	..	1 Sea.	..	..	..	1 Sea.	..	..	..	Master.	
Signals.....	1 Q. M.	S	..	..	..	..	..	1 Boy	..	..	..	..	..	..	Forecastle.	
Relieving Tackles	1 Q. M.	..	..	..	..	..	..	..	..	..	2 O. S.	1 S	1 P	..	Boatswain.	
Main Braces.....	1 C. A. G.	..	..	..	..	..	..	..	..	..	..	..	..	..	—	
Mizen Top.....	..	..	..	..	..	..	..	2 Sea.	1 S	1 P	..	..	..	..	..	
Mizen Mast.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1 Sea. 1 O. Sea. of each watch.	
Main Mast.....	1 B. M.	S	..	..	..	..	..	..	..	..	..	..	..	..	2 S. 2 O. S. } 4 S. 4 O. S. }	
Main Top.....	..	..	..	..	..	..	3 Sea.	1 S	2 P	..	..	..	..	..	..	
Fore Top.....	..	..	..	2 S. 1 O. S.	2 S	1 P	{	1 Sea. in each watch and 1 O. S. }		..	..	..	..	..	..	
Fore Mast.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2 Sea. 2 O. Sea. of each watch.	
Forecastle.....	1 C. F.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
Bell.....	1 S. C.	S	..	..	..	..	..	..	..	..	..	..	..	..	..	
Total of each..	8	4	4	1	3	2	1	4	2	2	3	1	2	20	10	42 in all.

QUARTER BILL FOR A SHIP OF THE LINE OF 84 GUNS—continued.

10TH, OR POWDER DIVISION.—Lieutenant, or Passed Midshipman to command; Sailmaker, at Shot Lockers; Gunner, in the Fore Magazine; and Carpenter, at the Pumps.

STATIONS	RATINGS
In the Forward Magazine .....	1 Gunner's Mate; 3 Quarter-Gunners; and 2 Boys.
In the After Magazine .....	1 Gunner's Mate; 2 Quarter-Gunners; and 2 Boys.
In the Shell room .....	1 Gunner's Mate; 1 Quarter-Gunner.
At the Shell whips .....	1 Armorer; 4 Landsmen (Waisters).
At the Shot lockers .....	2 Captains Hold; 1 Cooper; 9 Landsmen (Waisters).
At the Pumps .....	1 Carpenter's Mate.
Lights of both Magazines and Shell room .....	1 Master-at-Arms; 2 Ship's Corporals.
Store room and Armory .....	1 Yeoman; 1 Armorer's Mate.
Wings and Force pumps .....	2 Carpenter's Mates; 2 Carpenters (Waisters and rated Seamen).

SUPPLYING POWDER.—SCUTTLES.

The lower deck guns, *forward* of the shell guns, are to be supplied from the *outside* scuttle on the *starboard* side of the forward magazine, through the other scuttles particularly connected with it; which, together, may be regarded as *chain of scuttles* No. 1.

The lower deck guns, *abaft* the shell guns, are to be supplied from the scuttle on the *starboard* side of the after magazine, through the other scuttles particularly connected with it; which, together, may be regarded as *chain of scuttles* No. 2.

The shell guns, on both lower and main gun decks, are to be supplied from the *inside* scuttle on the *starboard* side of the forward magazine, through the other scuttles particularly connected with it; which, together, may be regarded as *chain of scuttles* No. 3.

The main deck guns, *forward* of the shell guns, and also the forward chase guns on spar deck, are to be supplied from the *outside* scuttle on the *port* side of the forward magazine, through the other scuttles particularly connected with it; which, together, may be regarded as *chain of scuttles* No. 4.

The main deck guns *abaft* the shell guns, and also the after chase guns on spar deck, are to be supplied from the scuttle on the *port* side of the after magazine, through the other scuttles particularly connected with it; which, together, may be regarded as *chain of scuttles* No. 5.

The forward half of spar deck guns, excepting chase guns, are to be supplied from the *inside* scuttle on the *port* side of the forward magazine, through the other scuttles particularly connected with it; which, together, may be regarded as *chain of scuttles* No. 6.

The after half of spar deck guns, excepting chase guns, are to be supplied from the middle scuttle of the after magazine, through the other scuttles particularly connected with it; which, together, may be regarded as *chain of scuttles* No. 7.

## DETAILS OF THE POWDER

STATIONS	No. 1
In the passage to receive and pass charges .....	1 W. R. Cook.
At passage scuttle on orlop deck to receive charges thereat and pass them to the screen.	1 Musician.
At outside of screen to receive charges thereat and put them into passing boxes.	1 Master of Band.
At lower extremity of canvas shoot to receive empty passing boxes, strike them over fire-tub, and then deliver them to Runnerboys.	1 Quarter Gunner.
On orlop deck to pass up full boxes through scuttle on lower gun deck.	1 Musician.
On lower gun deck at scuttle to receive and deliver full boxes to Powderboys.	1 Seaman (waister).
On lower gun deck at scuttle to receive full boxes and pass them up through scuttle on main gun deck.	...
On main gun deck at scuttle to receive and deliver full boxes to Powderboys.	...
On main gun deck at scuttle to receive full boxes and pass them up through scuttle on spar deck.	...
On spar deck at scuttle to receive and deliver full boxes to Powderboys.	...
To run with full boxes, from screen to passing scuttle, and back again with empty boxes.	2 Runner-Boys.
<p>One Gunner's Mate is to be stationed on the orlop deck to superintend, generally, the arrangements for passing powder; and, under the authority of the commanding officer of his division, to direct and control the men and boys concerned in passing it on that deck.</p>	

DIVISION OF AN 84-GUN SHIP.

CHAINS OF SCUTTLES					
No. 2	No. 3	No. 4	No. 5	No. 6	No. 7
1 Officer's Steward.	1 Cabin Cook.	1 Musician.	1 Officer's Steward.	1 Painter	1 Landsman (waister.)
1 Musician.	1 Musician.	1 Musician.	1 Musician.	1 Landsman (waister.)	1 Landsman (waister.)
1 Musician.	1 Landsman (waister.)	1 Musician.	1 Musician.	1 Landsman (waister.)	1 Landsman (waister.)
1 Quarter Gunner.	1 Ship's Steward.	1 Quarter Gunner.	1 Quarter Gunner.	1 Sailmaker's Mate.	1 Sailmaker's Mate.
1 Landsman (waister.)	1 Landsman (waister.)	1 Landsman (waister.)	1 Musician.	1 Landsman (waister.)	1 Landsman (waister.)
1 Seaman (waister.)	1 Seaman (waister.)	...	...	...	...
...	1 Landsman (waister.)	1 Landsman (waister.)	1 Landsman (waister.)	1 Landsman (waister.)	1 Landsman (waister.)
...	1 Landsman (waister.)	1 Seaman (waister.)	1 Seaman (waister.)	...	...
...	...	...	...	1 Landsman (waister.)	1 Landsman (waister.)
...	...	...	...	1 Seaman (waister.)	1 Seaman (waister.)
2 Runner-boys.	3 Runner-boys	3 Runner-boys.	3 Runner-boys.	2 Runner-boys.	2 Runner-boys.

Each petty officer stationed to receive empty passing-boxes and strike them over a fire-tub, aided by those immediately about his line of scuttles, is to see that his canvas shoot, fire-tub, and wet swabs are in place, and properly prepared.

## SURGEON'S DIVISION.

The Surgeon, his Assistants, and Steward are to constitute this division, and their station is to be in the cockpit.

## CHAPLAIN.

The Chaplain is also stationed in the cockpit.

## MARINES.

Officers, non-commissioned officers, privates, and musicians, to be stationed on spar deck. When required, the marines may be stationed at the great guns, or howitzers. They are to be distributed as the Captain may direct.

## PURSER.

The Purser and his clerk, in charge of stores.

## SKELETON WATCH BILL

FOR A FRIGATE OF 50 GUNS.

STATIONS	CAPTAINS	COXWAINS	SEAMEN	ORDINARY SEAMEN	LANDSMEN	BOYS	OTHER PETTY OFFICERS TO KEEP WATCH	PETTY OFFICERS, IDLERS	BANDSMEN, IDLERS	TOTAL
Forecastlemen .....	4	2	18	26	8	...	...	...	...	58
Foremastmen .....	...	...	4	...	...	...	...	...	...	4
Foretopmen .....	2	2	16	22	6	6	...	...	...	54
Mainmastmen .....	...	...	4	...	...	...	...	...	...	4
Maintopmen.....	2	2	18	24	6	6	...	...	...	58
Mizenmastmen.....	...	...	2	...	...	...	...	...	...	2
Mizentopmen.....	2	2	8	18	4	6	...	...	...	40
After Guard.....	2	...	7	25	73	7	...	...	...	114
Messenger and Sideboys.....	...	...	...	...	...	12	...	...	...	12
Bandsmen.....	...	...	...	...	...	...	...	...	10	10
Petty Officers.....	...	...	...	...	...	...	32	14	...	46
Total of each grade.....	12	8	77	115	97	37	32	14	10	402

QUARTER BILL for a Frigate of 50 Guns, with a comple-

QUARTER DECK.—CAPTAIN; EXECUTIVE OFFICER;  
AIDS TO CAPTAIN;

DECKS	No. of Gun	No. of Men	Watch to which Gun's Crew belong	Petty Officers, Captains of Guns	FORECASTLE MEN			FORETOPMEN				MAINTOPMEN							
					Captains or Coxwains, Captains of Guns	Seamen	Ordinary Seamen	Landsmen	Captains or Coxwains, Captains of Guns	Seamen	Ordinary Seamen	Landsmen	Boys	Captains or Coxwains, Captains of Guns	Seamen	Ordinary Seamen	Landsmen	Boys	
MAIN	1	12 & Boy	S	...	Capt.	1	1	1	...	1	1	...	1	...	...	1	1	1	...
	2	"	P	...	...	...	1	1	...	Capt.	1	1	1	...	...	1	1	1	...
	3	"	S	...	...	...	...	1	...	...	1	...	1	...	...	1	1	...	1
	4	"	P	...	...	...	1	1	...	...	...	1	1	1	Capt.	1	1	...	...
	5	"	S	...	...	...	1	1	...	...	1	1	...	...	...	1	...	...	
	* 6	14 & Boy	P	...	...	Capt.	1	2	...	...	1	1	1	...	...	...	1	...	1
	* 7	"	S	...	...	...	1	2	...	Capt.	...	1	...	...	...	1	1	1	...
	* 8	"	P	B M	...	...	1	2	1	...	1	1	...	1	...	1	1	...	...
	* 9	"	S	...	...	...	1	2	...	...	1	1	...	...	Capt.	1	1	...	...
	* 10	"	P	Q M	...	...	1	2	1	...	1	1	...	...	...	1	1	1	1
	11	12 & Boy	S	...	...	Cox.	1	1	1	...	...	...	...	...	...	1	1	1	1
	12	"	P	B M	...	...	...	1	1	...	...	1	1	...	...	...	1	1	...
	13	"	S	...	...	...	...	1	...	...	...	1	1	...	Cox.	1	...	...	...
	14	"	P	...	...	...	1	1	1	...	...	1	...	...	...	1	...	...	...
	15	"	S	Q M	...	...	1	1	1	...	...	1	1	...	...	1	1	...	...
SPAR	1	12 & Boy	S	...	Capt.	1	1	1	...	...	1	2	1	1	...	...	...	...	...
	2	8 & Boy	P	...	...	...	1	...	...	Cox.	...	...	...	...	...	1	1	...	...
	3	"	S	B M	...	...	1	...	...	...	...	1	...	...	...	1	...	...	
	4	"	P	...	...	...	1	...	...	...	...	...	...	Cox.	1	1	...	...	
	5	"	S	Q M	...	...	1	...	...	...	1	...	...	...	...	1	...	...	
	6	"	P	...	...	Cox.	...	...	...	...	...	1	...	...	...	1	1	...	...
	7	"	S	...	...	...	1	...	...	Cox.	...	1	...	...	...	1	...	...	
	8	"	P	...	...	...	1	1	...	...	...	1	...	...	...	1	...	...	
	9	"	S	...	...	...	...	...	...	...	1	1	...	...	...	2	...	...	
	10	12 & Boy	P	Q M	...	...	1	...	...	...	1	2	...	...	...	2	...	...	

\* Shell guns.



ment of 402 Men and Boys, exclusive of Officers and Marines.

MASTER; PASSED MIDSHIPMAN, AS SIGNAL OFFICER;  
AND CAPTAIN'S CLERK.

MIZENTOPMEN					AFTER GUARD				Messenger Boys	OFFICERS OF DIVISIONS
Captains or Coxwains, Captains of Guns	Seamen	Ordinary Seamen	Landsmen	Boys	Captains or Coxwains, Captains of Guns	Seamen	Ordinary Seamen	Landsmen		
..	..	1	..	..	..	..	1	1	..	} <i>1st Division.</i> Lieutenant. Midshipman. 1 Quarter Gunner.
..	..	1	..	1	..	..	..	2	..	
Capt.	..	1	..	..	..	..	1	4	..	
Cox.	..	1	1	..	..	..	..	3	..	
..	..	1	1	1	..	..	1	4	..	} <i>2nd Division.</i> Lieutenant. Midshipman. 1 Quarter Gunner.
..	1	1	..	..	..	..	1	3	..	
..	1	1	..	1	..	..	1	3	..	
..	..	1	..	..	..	..	1	3	..	
..	..	1	1	1	..	..	1	3	..	} <i>3rd Division.</i> Lieutenant. Midshipman. 1 Quarter Gunner.
..	1	..	..	1	..	..	1	3	..	
..	1	1	..	..	..	..	1	4	1	
Cox.	..	1	1	..	..	..	1	3	1	
..	..	..	..	..	..	..	1	3	1	} <i>4th Division.</i> Lieutenant. Midshipman. 1 Quarter Gunner.
..	1	1	..	..	..	..	1	1	..	
..	..	1	..	..	..	..	1	2	1	
..	..	1	..	..	..	..	1	2	1	
..	..	1	..	..	..	..	1	2	1	} <i>5th Division.</i> Lieut. or Passed Midn. Midshipman. 1 Quarter Gunner.
..	..	1	..	..	..	1	1	2	1	
Capt.	..	..	..	..	..	..	1	2	1	
..	..	..	..	..	Capt.	..	1	2	1	
..	1	..	..	..	..	..	1	3	1	

QUARTER BILL FOR A FRIGATE CARRYING 50 GUNS—continued.

6TH, OR MASTER'S DIVISION.

STATIONS	PETTY OFFICERS.		FORECASTLE-MEN		FORETOPMEN		MAINTOPMEN		MIZENTOP-MEN		AFTER GUARD		MASTMEN		OFFICERS
		Watch		Watch		Watch		Watch		Watch		Watch		Watch	
Conn. ....	1 Q. M.	S	..	..	..	..	..	..	..	..	..	..	..	..	<i>Quarter Deck.</i> Master.  <i>Forecastle.</i> Boatswain.
Wheel .....	1 Q. M.	..	1 Sca.	..	1 Sca.	..	..	..	..	..	1 Sca.	..	..	..	
Signals.....	1 Q. M.	S	..	..	..	..	1 Boy	..	..	..	..	..	..	..	
Relieving Tackles	1 Q. M.	..	..	..	..	..	..	..	..	..	2 O. S.	..	..	..	
Main Braces ....	1 C.A.G.	..	..	..	..	..	..	..	..	..	..	..	..	..	
Mizen Top .....	..	..	..	..	..	..	..	..	2 Sca.	S	..	..	..	..	
Mizen Mast.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
Main Mast .....	1 B. M.	S	..	..	..	..	..	..	..	..	..	..	2 Sca.	P	
Main Top .....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
Fore Top .....	..	..	2 Sca.	..	..	..	..	..	..	..	..	..	..	..	
Fore Mast .....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
Forecastle .....	1 C. F.	..	..	..	..	..	..	..	..	..	..	..	..	..	
Bell .....	1 S. C.	S	..	..	..	..	..	..	..	..	..	..	..	..	
Total of each ..	8	4	1	2	3	2	1	3	1	2	3	1	2	10	5
														5	30 in all

7TH, OR POWDER DIVISION.—*Lieutenant, or Passed Midshipman to command; Sailmaker at Shot lockers; Gunner in the Fore Magazine; and Carpenter at the Pumps.*

QUARTER BILL FOR A FRIGATE OF 50 GUNS—*continued.*

STATIONS	RATINGS
In the Forward Magazine.....	1 Gunner's Mate; 1 Quarter Gunner; 1 Seaman (F. C.—S. W.)
In the After Magazine.....	1 Gunner's Mate; 1 Quarter Gunner; 1 Seaman (A. G.—P. W.)
In and at the Shell room.....	1 Quarter Gunner; 1 Ship's Corporal.
Receive and whip Shells .....	1 Armorer; 2 Landsmen (A. G., 1 in each watch.)
Shot lockers .....	2 Captains Hold; 1 Cooper; 1 Landsman (A. G.—S. W.)
Pumps.....	1 Carpenter's Mate.
To light Magazines and Shell room, and other prescribed places, if there be any, and attend to all lights.	1 Master-at-Arms; 1 Ship's Corporal.
Store room.....	1 Yeoman.
Wings and Force pumps .....	1 Carpenter's Mate.
SUPPLYING POWDER.—SCUTTLES.	
<p>The main deck guns, forward of the shell guns, and also the forward chase guns on the spar deck, are to be supplied from the starboard scuttle of the forward magazine, through the other scuttles particularly connected with it; which, together, may be regarded as chain of scuttles No. 1.</p>	
<p>The main deck guns, abaft the shell guns, and also the chase guns aft on spar deck, are to be supplied from the starboard scuttle of the after magazine, through the other scuttles particularly connected with it; which, together, may be regarded as chain of scuttles No. 2.</p>	
<p>The shell guns are to be supplied from the middle scuttle of the forward magazine, through the other scuttles particularly connected with it; which, together, may be regarded as chain of scuttles No. 3.</p>	
<p>The forward half of the spar deck guns, excepting chase guns, are to be supplied from the port scuttle of the forward Magazine, through the other scuttles particularly connected with it; which, together, may be regarded as chain of scuttles No. 4.</p>	
<p>The after half of the spar deck guns, excepting chase guns, are to be supplied from the port scuttle of the after magazine, through the other scuttles particularly connected with it; which, together, may be regarded as chain of scuttles No. 5.</p>	

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 DETAILS OF THE POWDER

 STATIONS
 

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- In the passage to receive and pass charges .....
- At passage scuttle on orlop deck, to receive charges thereat and pass them to the screen
- At outside of screen, to receive charges thereat and put them into passing boxes.....
- At lower extremity of canvas shoot, to receive empty passing boxes, strike them over fire-tub, and then deliver them to Runnerboys
- On orlop deck, to pass up full boxes through scuttle on main deck.....
- On main deck, at scuttle, to receive and deliver full boxes to Powderboys ... ..
- On main deck, at scuttle, to receive full boxes, and pass them up through scuttle on spar deck.
- On spar deck, at scuttle, to receive and deliver full boxes to Powderboys.....
- To run with full boxes from screen to passing scuttle, and back again with empty boxes.

Each petty officer stationed to receive empty passing boxes, and strike them over a fire tub, aided by those immediately about his line of scuttles, is to see that his canvas shoot, fire-tub, and wet swabs are in place, and properly prepared.

DIVISION OF A 50 GUN SHIP.

CHAINS OF SCUTTLES				
No. 1	No. 2	No. 3	No. 4	No. 5
1 W. R. Cook.	1 Officer's Steward.	1 Painter.	1 Cabin Cook.	1 Officer's Steward.
1 Musician.	1 Musician.	1 Musician.	1 Musician.	1 Musician.
1 Master of Band.	1 Musician.	1 Musician.	1 Musician.	1 Musician.
1 Qr. Gunner.	1 Qr. Gunner.	1 Qr. Gunner.	1 Ship's Steward.	1 Qr. Gunner.
1 Musician.	1 Landsman (A. G.—S. W.)	1 Landsman (A. G.—P. W.)	1 Landsman (A. G.—P. W.)	1 Landsman (A. G.—P. W.)
1 Sailmaker's Mate.	1 Seaman (A. G.—S. W.)	1 Seaman (A. G.—P. W.)	.....	.....
.....	.....	.....	1 Landsman (A. G.—P. W.)	1 Landsman (A. G.—P. W.)
.....	.....	.....	1 Seaman (A. G.—S. W.)	1 Seaman (A. G.—P. W.)
2 Runnerboys.	2 Runnerboys.	3 Runnerboys.	2 Runnerboys.	2 Runnerboys.

## SURGEON'S DIVISION.

The Surgeon, his Assistants, and Steward, are to constitute this division, and their station is to be in the cockpit.

## CHAPLAIN.

The Chaplain is also stationed in the cockpit.

## MARINES.

Officers, non-commissioned officers, musicians, and privates, to be stationed on spar deck. When required, the marines may be stationed at the great guns or howitzers. They are to be distributed as the Captain of the ship may direct.

## PURSER.

The Purser and his clerk in charge of stores.

## SKELETON WATCH BILL

FOR A RAZEE SLOOP (*Frigate cut down*), ARMED WITH TWO  
X-Inch GUNS OF 12,000 Lbs. EACH; SIXTEEN  
8-Inch OF 63 Cwt. EACH; AND FOUR  
32-Pdrs. OF 57 Cwt. EACH.

STATIONS	CAPTAINS	COXSWAINS	SEAMEN	ORDINARY SEAMEN	LANDSMEN	BOYS	OTHER PETTY OFFICERS TO KEEP WATCH	PETTY OFFICERS, IDLERS	TOTAL
Forecastlemen.....	2	2	14	14	8	.	...	...	40
Foremastmen.....	...	...	2	...	...	...	...	...	2
Foretopmen.....	2	2	10	16	4	2	...	..	36
Mainmastmen .....	...	...	2	...	...	...	...	...	2
Maintopmen.....	2	2	10	18	4	2	...	...	38
Mizenmastmen.....	...	...	...	...	...	...	...	...	...
Mizentopmen .....	2	1	5	12	2	6	..	...	28
After Guard.....	2	...	5	14	29	...	...	...	50
Messenger and Sideboys.....	...	...	...	...	...	7	...	...	7
Petty Officers .....	...	...	...	...	...	...	20	12	32
Total of each grade.....	10	7	48	74	47	17	20	12	235

QUARTER BILL for a Razeed Sloop with 22 Guns, and a com-  
 QUARTER DECK.—CAPTAIN; FIRST LIEUTENANT; MASTER;

DECKS	No. of Gun	Number of Men	Watch to which Gun's Crew belongs	Petty Officers, Captains of Guns	FORECASTLE-MEN			FORETOPMEN					
					Captains or Coxswains, Captains of Guns	Seamen	Ordinary Seamen	Landsmen	Captains or Coxswains, Captains of Guns	Seamen	Ordinary Seamen	Landsmen	Boys
MAIN.	1	12 and Boy	S	...	Cox.	1	1	1	...	1	1	1	...
	2	14 and Boy	P	...	...	1	1	1	Capt.	1	2	1	...
	3	"	S	...	...	1	1	1	Capt.	1	1	1	...
	4	"	P	...	Cox.	1	1	1	...	1	1	1	...
	5	"	S	Q M	...	1	1	1	Co.	1	2	...	...
	6	"	P	...	...	1	1	1	...	1	1	...	...
	7	"	S	...	...	1	1	1	...	...	1	...	...
	8	"	P	B M	...	1	1	1	Cox.	1	2	...	...
	9	"	S	...	...	1	1	...	...	1	1	...	...
	10	12 and Boy.	P	...	...	1	1	...	...	...	1	...	...
SPAR.	Pivot forwrd.	18 & P. Man.	S	...	Capt.	1	1	...	...	...	1	...	
			P	Q M	...	1	1	...	...	...	1	...	
	Pivot Aft.	18 & P. Man.	S	B M	...	...	1	...	...	...	1	...	
			P	...	...	...	1	...	...	...	...	...	



plement of 235 Men and Boys, exclusive of Officers and Marines.

SIGNAL OFFICER; AID TO CAPTAIN; AND CAPTAIN'S CLERK.

MAINTOPMEN					MIZENTOPMEN					AFTER GUARD					OFFICERS OF DIVISIONS	
Captains or Coxwains, Captains of Guns	Seamen	Ordinary Seamen	Landsmen	Boys	Captains or Coxwains, Captains of Guns	Seamen	Ordinary Seamen	Landsmen	Boys	Captains or Coxwains, Captains of Guns	Seamen	Ordinary Seamen	Landsmen	Messenger Boys		Marines
...	...	1	1	...	...	...	1	...	1	...	...	...	1	...	1	} 1st Division. Lieutenant. Midshipman. 1 Qr. Gunner.
...	1	1	1	...	...	...	1	...	1	...	...	1	...	...	1	
...	1	2	1	...	...	...	1	...	1	...	...	1	...	...	1	
Capt.	1	2	...	...	...	...	1	...	1	...	...	1	...	...	1	
...	1	1	...	...	...	...	1	...	...	...	...	1	1	1	1	
Cox.	...	2	1	...	Capt.	1	1	...	...	...	...	1	...	1	1	} 2nd Division. Lieutenant. Midshipman. 1 Qr. Gunner.
Capt.	1	2	...	...	...	1	1	1	...	...	...	1	1	1	1	
...	1	1	...	...	...	...	1	...	...	...	...	1	1	1	1	
Cox.	1	1	...	...	Capt.	...	2	...	...	...	...	1	2	1	1	
...	...	1	...	...	Cox.	1	1	1	...	...	...	...	3	1	1	
...	...	1	...	...	...	...	...	...	...	...	...	1	...	...	4	} 3rd Division. Lieutenant. Midshipman. 1 Qr. Gunner.
...	...	1	...	...	...	...	1	...	...	...	...	...	...	...	3	
...	...	1	...	...	...	...	...	...	...	...	1	1	1	...	3	
...	...	1	...	...	...	...	...	...	...	Capt.	1	2	1	...	2	

QUARTER BILL FOR A RAZEE SLOOP OF 22 GUNS—continued.

4TH, OR MASTER'S DIVISION.

STATIONS	PETTY OFFICERS		FORECASTLE-MEN		FORETOPMEN		MAINTOPMEN		MIZENTOP MEN		AFTER GUARD		MASTMEN		Messenger Boy	OFFICERS
		Watch		Watch		Watch		Watch		Watch		Watch		Watch		
Conn.....	1 Q. M.	S	..	..	..	..	..	..	..	..	..	..	..	..	..	Qr. Deck.
Wheel.....	1 Q. M.	..	1 Sea.	S	..	..	P	..	..	..	..	..	..	..	..	Master.
Signals.....	1 Q. M.	S	..	..	..	..	..	..	..	..	..	..	..	..	1 PW	
Relieving Tackles	1 Q. M.	..	..	..	..	..	..	..	..	..	2 O. S.	S	..	..	..	
Main Braces.....	1 C. A. G.	S	..	..	..	..	..	..	..	..	..	..	..	..	..	
Mizen Top.....	..	..	..	..	..	..	..	..	2 Sea.	S	..	..	..	..	..	
Main Mast.....	1 B. M.	S	..	..	..	..	..	..	..	..	..	..	2 Sea.	S	..	Forecastle.
Main Top.....	..	..	..	..	..	..	..	2 Sea.	..	..	..	..	..	..	..	Boatswain.
Fore Top.....	..	..	..	..	2 Sea.	S	..	..	..	..	..	..	..	..	..	
Fore Mast.....	..	..	..	..	..	..	..	..	..	..	..	..	2 Sea.	S	..	
Forecastle.....	1 C. F.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
Bell.....	1 S. C.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
Total of each..	8	4	4	1	1	2	1	1	3	1	1	2	1	1	1	24 in all.

QUARTER BILL FOR A RAZEE SLOOP OF 22 GUNS—continued.

5TH, OR POWDER DIVISION.—*Lieutenant, or Passed Midshipman, to command; Sailmaker, at Shell Lockers; Gunner, in the Fore Magazine; and Carpenter, at the Pumps.*

STATIONS	RATINGS
In the Forward Magazine..... In the After Magazine..... In and at the Shell rooms..... Receive and whip Shells ..... Pumps ..... Light Magazines and Shell rooms, and other prescribed places, and attend to all lights..... Store room ..... Wings and Force pumps .....	2 Quarter Gunners; 1 Seaman (F.C.—P.W.) 1 Gunner's Mate; 1 Quarter Gunner; 1 Seaman (A.G.—S.W.) 1 Sailmaker's Mate; 1 Yeoman; 1 Landsman (A.G.—P.W.) 1 Capt. Hold; 1 Ship's Corporal; 4 Lands. (A.G., 2 in each watch.) 1 Carpenter's Mate.  1 Master-at-Arms; 1 Ship's Corporal.  1 Cooper; 1 Landsman (A.G.)
<p style="text-align: center;">SUPPLYING POWDER.—SCUTTLES.</p> <p>The <i>forward</i> half of the <i>main deck guns</i> are to be supplied from the <i>starboard</i> scuttle of the forward magazine, through the other scuttles particularly connected with it; which, together, may be regarded as chain of scuttles No. 1.</p> <p>The <i>after</i> half of the <i>main deck guns</i> are to be supplied from the scuttle of the after magazine, through the other scuttles particularly connected with it; which, together, may be regarded as chain of scuttles No. 2.</p> <p>Both <i>pivot guns</i> on the <i>spar deck</i> are to be supplied from the <i>port</i> scuttle of the forward magazine, through the other scuttles particularly connected with it; which, together, may be regarded as chain of scuttles No. 3.</p>	

DETAILS OF THE POWDER DIVISION OF A RAZEE SLOOP OF 22 GUNS.

STATIONS	CHAINS OF SCUTTLES		
	No. 1.	No. 2.	No. 3.
In the passage to receive and pass charges.....	W. room Cook.	1 Officer's Steward.	Cabin Cook.
At passage scuttle on orlop deck to receive charges thereat, and pass them to the screen.	1 Landsman (A. G.—S. W.)	1 Landsman (A. G.—P. W.)	1 Landsman (A. G.—S. W.)
At outside of screen to receive charges thereat, and put them into passing boxes.....	1 Landsman (A. G.—P. W.)	1 Officer's Steward.	1 Landsman (A. G.—P. W.)
At lower extremity of canvas shoot to receive empty passing boxes, strike them over fire tub, and then deliver them to Runnerboys.	1 Ship's Steward	1 Armorer.	1 Scaman (A. G.—P. W.)
To pass up full boxes through scuttle on main deck.....	1 Landsman (A. G.—S. W.)	1 Landsman (A. G.—S. W.)	1 Landsman (A. G.—S. W.)
On main deck, at scuttle, to receive and deliver full boxes to Powderboys.....	1 Landsman (A. G.—S. W.)	1 Landsman (A. G.—S. W.)	...
On main deck, at scuttle, to receive full boxes, and pass them up through scuttle on spar deck.	1 Landsman (A. G.—P. W.)	...	1 Landsman (A. G.—P. W.)
On spar deck, at scuttle, to receive and deliver full boxes to Powdermen.....	...	...	1 Landsman (A. G.—S. W.)
To run with full boxes from screen to passing scuttle, and then back again with empty boxes	2 Runnerboys.	2 Runnerboys	2 Runnerboys
The petty officers and seamen stationed to receive empty passing boxes, and strike them over the fire tubs, aided by those immediately about their respective lines of scuttles, are to see that their canvas shoots, fire tubs, and wet swabs, are in place, and properly prepared.			

SURGEON'S DIVISION.—The Surgeon, his Assistants, and Steward, are to constitute this division, and their station is to be in the apartment to receive the wounded.

The CHAPLAIN'S station is also in the same apartment.

MARINES.—Officers, non-commissioned officers, musicians, and privates, to be stationed on deck. When required, the marines may be stationed at the great guns, or howitzers. They may be distributed as the Captain of the ship may direct.

The PURSER and his Clerk in charge of stores.

## SKELETON WATCH BILL

FOR A SLOOP OF WAR OF THE FIRST CLASS, ARMED WITH  
EIGHT 8-Inch GUNS OF 55 Cwt. EACH, AND  
TWELVE 32-Pdrs. OF 42 Cwt. EACH.

STATIONS.	CAPTAINS	COXSWAINS	SEAMEN	ORDINARY SEAMEN	LANDSMEN	BOYS	OTHER PETTY OFFICERS TO KEEP WATCH	PETTY OFFICERS, IDLERS	TOTAL
Forecastlemen.....	2	2	8	10	2	...	...	...	24
Foremastmen .....	...	...	2	...	...	...	...	...	2
Foretopmen.....	2	2	6	10	2	2	...	...	24
Mainmastmen .....	...	...	2	...	...	...	...	...	2
Maintopmen .....	2	2	6	10	2	4	...	...	26
Mizentopmen .....	2	...	4	7	...	4	...	...	17
After Guard .....	2	...	2	10	16	...	...	...	30
Messenger and Sideboys.....	...	...	...	...	...	4	...	...	4
Petty Officers .....	...	...	...	...	...	...	16	11	27
Total of each grade .....	10	6	30	47	22	14	16	11	156

QUARTER BILL for a Sloop of war of the first class, with  
55 cwt., and a complement of 156 Men and

QUARTER DECK.—COMMANDER; FIRST LIEUTENANT; MASTER;

DECK	No. of Gun	Number of Men	Watch to which Gun's Crew belongs.	Petty Officers, Captains of Guns.	FORECASTLE MEN			FORETOPMEN				MAINTOPMEN						
					Captains or Coxswains, Captains of Guns	Seamen	Ordinary Seamen	Landsmen	Captains or Coxswains, Captains of Guns	Seamen	Ordinary Seamen	Landsmen	Boys	Captains or Coxswains, Captains of Guns	Seamen	Ordinary Seamen	Landsmen	Boys
Upper	1	10 & Boy	S	...	Capt.	1	1	1	Cox.	1	1	...	...	...	...	1	...	1
	2	"	P	...	...	1	1	1	Capt.	1	1	1	...	...	...	1	1	1
	3	"	S	...	Cox.	1	1	...	...	...	1	1	...	...	...	1	1	...
	4	"	P	...	...	1	1	...	Cox.	...	1	...	...	Capt.	...	1	...	...
	5	"	S	B M	...	1	1	...	...	...	1	...	...	...	...	1	...	...
	6	"	P	...	Cox.	1	1	...	...	...	1	...	...	...	1	1	...	...
	7	12 & Boy	S	...	...	1	1	...	Capt.	...	1	...	...	Cox.	1	1	...	...
	8	"	P	B M	...	1	1	...	...	...	1	...	...	...	...	1	...	...
	9	"	S	...	...	...	1	...	...	1	1	...	...	Capt.	1	1	...	...
	10	"	P	...	...	...	1	...	...	1	1	...	...	Cox	1	1	...	...

20 Guns, viz.: Twelve 32-pdrs. of 42 cwt., and eight 8-inch of Boys, exclusive of Officers and Marines.

SIGNAL OFFICER; AID TO COMMANDER; AND COMMANDER'S CLERK.

MIZENTOPMEN					AFTER GUARD						OFFICERS OF DIVISIONS									
Captains or Coxwms, Captains of Guns	Seamen	Ordinary Seamen	Landsmen	Boys	Captains or Coxwms, Captains of Guns	Seamen	Ordinary Seamen	Landsmen	Messenger Boys	Marines										
...	...	1	...	...	...	...	1	...	...	...	} 1st Division.	} One Quarter Gunner must attend from No. 1 to 5, both inclusive; and one from No. 6 to 10, both inclusive. Two divisions of guns may be preferred to three.								
...	...	...	...	...	...	...	1	...	...	...			} Lieutenant.							
...	1	...	...	...	...	...	1	1	1	...				} Midshipman.						
...	1	1	...	...	...	...	1	1	1	...					} ———					
Capt.	1	1	...	...	...	...	1	1	1	...						} 2nd Division.				
...	...	...	...	...	...	...	1	2	1	1							} Lieutenant.			
...	...	1	...	1	...	...	1	2	...	1								} Midshipman.		
Capt.	...	1	...	1	...	1	1	2	...	1									} ———	
...	...	1	...	1	Capt.	1	1	2	...	...										} 3rd Division.
...	...	1	...	1	Capt.	...	1	1	...	2										
...	...	1	...	1	Capt.	...	1	1	...	2	} Midshipman.									

QUARTER BILL FOR A SLOOP OF WAR, FIRST CLASS, WITH 20 GUNS—continued.

4TH, OR MASTER'S DIVISION.

STATIONS	PETTY OFFICERS		FORETOPMEN		MAINTOPMEN		MIZENTOPMEN		MASTMEN		OFFICERS
		Watch		Watch		Watch		Watch		Watch	
Conn .....	1 Q. M.	S	...	...	...	...	...	...	...	...	Quarter Deck.
Wheel .....	2 Q. M.	S	...	...	...	...	...	...	...	...	Master.
Relieving Tackles ...	1 Q. M.	P	...	...	...	...	...	...	...	...	
Mizen Top .....	...	...	...	...	...	...	1 Sea.	...	...	...	
Main Mast .....	1 B. M.	S	...	...	...	...	...	...	1 Sea.	S	
Main Top .....	...	...	...	...	2 Sea.	S	...	...	...	...	Forecastle.
Fore Top .....	...	...	2 Sea.	...	...	P	...	...	...	...	Boatswain.
Fore Mast .....	...	...	...	...	...	...	...	...	1 Sea.	P	
Forecastle .....	1 C. F.	P	...	...	...	...	...	...	...	...	
Total of each ...	6	3	2	1	2	1	1	...	2	1	13 in all.



QUARTER BILL FOR A SLOOP OF WAR, FIRST CLASS, WITH 20 GUNS—continued.

5TH, OR POWDER DIVISION.—Lieutenant, or Passed Midshipman, to command; Sailmaker, at Shell and Shot Lockers; Gunner, in the Magazine; and Carpenter, at the Pumps.

STATIONS	RATINGS
In the Magazine ..... In and at Shell room..... Receive and whip shells ..... Shot Lockers ..... Pumps ..... Light Magazine and Shell room, and other prescribed places, if any, and attend to all lights below .....	1 Gunner's Mate; 1 Quarter Gunner. 1 Quarter Gunner; 1 Sailmaker's Mate. 1 Ship's Corporal; 1 Armorer; 1 Cooper. 1 Captain of Hold; 1 Ship's Cook. 1 Carpenter's Mate. 1 Master-at-Arms.
SUPPLYING POWDER.—SCUTTLES.	
The 32-pounders are to be supplied from the <i>starboard</i> scuttle of the magazine, through the other scuttles particularly connected with it; which, together, may be regarded as chain of scuttles No. 1.  The 8-inch shell guns are to be supplied from the <i>port</i> scuttle of the magazine, through the other scuttles particularly connected with it; which, together, may be regarded as chain of scuttles No. 2.	

DETAILS OF THE POWDER DIVISION FOR A SLOOP OF WAR OF 20 GUNS.

STATIONS	CHAINS OF SCUTTLES	
	No. 1	No. 2
In the passage to receive and pass charges .....	1 Cabin Cook.	1 Ward room Cook.
At passage scuttle on orlop deck to receive charges thereat, and pass them to the screen .....	1 Officer's Steward.	1 Officer's Steward.
At outside of screen to receive charges thereat, and put them into passing boxes .....	1 Landsman. (A. G.—S. W.)	1 Landsman. (A. G.—P. W.)
At lower extremity of canvas shoot to receive empty passing boxes, strike them over fire tub, and then deliver them to Runnerboys.	1 Yeoman.	1 Ship's Steward.
To pass up full boxes through scuttle on deck .....	1 Landsman. (A. G.—P. W.)	1 Landsman. (A. G.—S. W.)
On deck, at scuttle, to receive and deliver full boxes to Powderboys.....	1 Foremastman. (S. W.)	1 Mainmastman (P. W.)
To run with full boxes from screen to passing scuttle, and then back again with empty boxes .....	2 Runnerboys.	2 Runnerboys.

The petty officers stationed to receive empty passing boxes, and strike them over the fire tubs, aided by those immediately about their respective lines of scuttles, are to see that their canvas shoots, fire tubs, and wet swabs, are in place, and properly prepared.

SURGEON'S DIVISION.

The Surgeon, his Assistants, and Steward, are to constitute this division, and their station is to be in the apartment to receive the wounded.

MARINES.

Officers, non-commissioned officers, musicians, and privates, to be stationed on deck. When required, the marines may be stationed at the great guns, or howitzers. They may be distributed as the Captain of the ship may direct.

The PURSER and his Clerk in charge of stores.

## SKELETON WATCH BILL

FOR A SLOOP OF WAR OF THE THIRD CLASS, ARMED WITH  
TWO 32-Pdrs. OF 33 Cwt., AND TWELVE  
32-Pdrs. OF 27 Cwt.

STATIONS	CAPTAINS	COXSAINS	SEAMEN	ORDINARY SEAMEN	LANDSMEN	BOYS	OTHER PETTY OFFICERS TO KEEP WATCH	PETTY OFFICERS, IDLEERS	TOTAL
Forecastlemen.....	2	1	4	7	...	...	...	...	14
Foretopmen.....	2	2	3	6	...	1	...	...	14
Maintopmen .....	2	2	3	6	...	2	...	...	15
Mizentopmen.....	...	...	4	4	...	4	...	...	12
After Guard.....	2	...	1	4	7	...	...	...	14
Messenger and Sideboys.....	...	...	...	...	...	4	...	...	4
Petty Officers.....	...	...	...	...	...	...	13	11	24
Total of each grade.....	8	5	15	27	7	11	13	11	97

QUARTER BILL for a Sloop of war of the third class, with  
27 cwt., and a complement of 27 Men and

QUARTER DECK.—COMMANDER; FIRST LIEUTENANT;

DECK	No. of Gun	Number of Men	Watch to which Gun's Crew belongs	Petty Officers, Captains of Guns	FORECASTLEMEN				FORETOPMEN			
					Captains or Coxswins, Captains of Guns	Seamen	Ordinary Seamen	Landsmen	Captains or Coxswins, Captains of Guns	Seamen	Ordinary Seamen	Boys
UPPER.	1	8 & Boy	S	...	Capt.	1	1	...	Cox.	...	1	1
	2	6 & Boy	P	B. M.	...	1	1	...	Cox.	...	1	...
	3	"	S	...	Cox.	1	1	...	...	...	1	...
	4	"	P	...	...	1	1	...	Capt.	...	1	...
	5	"	S	...	...	...	1	...	Capt.	1	1	...
	6	"	P	...	...	...	1	...	...	...	1	...
	7	"	S	...	...	...	1	...	...	...	...	...

14 Guns, viz.: Two 32-pdrs. of 33 cwt. and twelve 32-pdrs. of Boys, exclusive of Officers and Marines.

MASTER; AID TO COMMANDER; AND COMMANDER'S CLERK.

MAINTOPMEN				MIZENTOPMEN			AFTER GUARD				Messenger and Sideboys	OFFICERS OF DIVISIONS	
Captains or Coxswains, Captains of Guns	Seamen	Ordinary Seamen	Boys	Seamen	Ordinary Seamen	Boys	Captains, Captains of Guns	Seamen	Ordinary Seamen	Landsmen			
...	...	1	...	1	1	...	...	...	...	...	...	<i>1st Division.</i> Lieutenant. Midshipman. <hr/> <i>2nd Division.</i> Lt.; Midn. <hr/> <i>3rd Division.</i> Lt.; Midn.	One Quarter Gunner must attend from No. 1 to 4, both inclusive; and one from No. 5 to 7, both inclusive. Two divisions of guns may be preferred to three, in which case the Master's division becomes the 3rd, and the Powder division the 4th.
...	...	1	1	...	...	...	...	...	...	...			
Cox.	...	1	1	...	...	...	...	...	...	...			
Cox.	...	1	...	...	...	...	...	...	...	1			
...	...	...	...	1	1	...	...	...	...	1			
Capt.	1	1	...	1	...	...	...	...	...	1			
Capt.	...	1	...	...	...	...	Capt.	1	1	...	1		

QUARTER BILL FOR A SLOOP OF WAR, THIRD CLASS, WITH 14 GUNS—continued.

4TH, OR MASTER'S DIVISION.

STATIONS	PETTY OFFICERS		FORETOPMEN		MAINTOPMEN		MIZENTOPMEN		OFFICERS
		Watch		Watch		Watch		Watch	
Conn .....	1 Q. M.	S	...	...	...	...	...	...	<i>Quarter Deck</i> Master
Wheel .....	2 Q. M.	S	...	...	...	...	...	...	
Relieving Tackles .....	1 Q. M.	...	...	...	...	...	...	...	
Main Braces .....	1 C.A.G.	...	...	...	...	...	...	...	
Mizen Top .....	...	...	...	...	...	...	1 Seaman	P	<i>Forecastle</i> Boatswain
Main Mast .....	1 B. M.	S	...	...	...	...	...	...	
Main Top .....	...	...	...	...	2 Seamen	S	...	P	
Fore Top .....	...	...	2 Seamen	S	...	...	...	...	
Forecastle .....	1 C. F.	...	...	...	...	...	...	...	13 in all
Bell .....	1 S. C.	S	...	...	...	...	...	...	
Total of each .....	8	4	2	1	1	2	1	1	1

QUARTER BILL FOR A SLOOP OF WAR, THIRD CLASS, WITH 14 GUNS—continued.

5TH, OR POWDER DIVISION.—Lieutenant, or Passed Midshipman to command; Sailmaker, at Shell and Shot Lockers; Gunner, in the Magazine; and Carpenter, at the Pumps.

STATIONS	RATINGS
<p>In the Magazine .....</p> <p>In and at Shell Room.....</p> <p>Receive and Whip Shells.....</p> <p>Shot Lockers.....</p> <p>Pumps.....</p> <p>Light Magazine and Shell Room, and other prescribed places, if any, and attend to all lights.</p>	<p>1 Gunner's Mate; 1 Quarter Gunner.</p> <p>1 Sailmaker's Mate; 1 Landsman (A. G.—S. W.)</p> <p>1 Armorer; 1 Cooper; 1 Landsman (A. G.—P. W.)</p> <p>1 Captain Hold; 3 Landsmen (A. G.—2 S. W., and 1 P. W.)</p> <p>1 Ordinary Seaman (A. G.—P. W.) Carpenter's crew.</p> <p>1 Master-at-Arms; 1 Ship's Corporal.</p>
<p style="text-align: center;">SUPPLYING POWDER.—SCUTTLES.</p> <p>The 32-pounders of 27 <i>cwt.</i> are all to be supplied from the <i>starboard</i> scuttle of the magazine, through the other scuttles particularly connected with it; which, together, may be regarded as chain of scuttles No. 1.</p> <p>The 32 pounders of 33 <i>cwt.</i> are to be supplied from the port scuttle of the magazine, through the other scuttles particularly connected with it; which, together, may be regarded as chain of scuttles No. 2.</p>	

DETAILS OF THE POWDER DIVISION OF A SLOOP OF 14 GUNS.

STATIONS	CHAINS OF SCUTTLES	
	No. 1	No. 2.
In the passage to receive and pass charges.....	1 Cabin Cook.	1 Ward Room Cook.
At passage scuttle on orlop deck to receive charges thereat and pass them to the screen.....	1 Officer's Steward.	1 Officer's Steward.
At outside of screen to receive charges thereat and put them into passing boxes.....	1 Landsman (A. G.—P. W.)	1 Landsman (A. G.—S. W.)
At lower extremity of canvas shoot to receive empty passing boxes, strike them over fire-tub, and then deliver them to Runnerboys.	1 Yeoman.	1 Ship's Steward.
To pass up full boxes through scuttle on deck.....	1 Ord. Seaman (A. G.—S. W.)	1 Ord. Seaman (A. G.—P. W.)
On deck, at scuttle, to receive and deliver full boxes to Powderboys.....	1 Ord. Seaman (Mz. T.—P. W.)	1 Ord. Seaman (Mz. T.—P. W.)
To run with full boxes, from screen to passing scuttle, and then back again with empty boxes.....	2 Runnerboys.	2 Runnerboys.
<p>The petty officers stationed to receive empty passing-boxes and strike them over a fire-tub, aided by those immediately about their respective lines of scuttles, are to see that their canvas shoots, fire-tubs and wet swabs, are in place, and properly prepared for use.</p>		

SURGEON'S DIVISION.

The Surgeon, his Assistant, and Steward, are to constitute this division, and their station is to be in the apartment to receive the wounded.

MARINES.

Officers, non-commissioned officers, musicians, and privates, to be stationed on deck. When required, the marines may be stationed at the great guns, or howitzers. They are to be distributed as the Captain of the ship may direct.

The PAYMASTER and his Clerk, in charge of stores.



## SKELETON WATCH BILL

FOR A SCREW FRIGATE OF THE FIRST CLASS, ARMED WITH  
24 GUNS OF 9-Inch; 14 OF 8-Inch; AND 2 OF 10-Inch.

STATIONS	CAPTAINS	COXSWAINS	SEAMEN	ORDINARY SEAMEN	LANDSMEN	BOYS	OTHER PETTY OFFICERS TO KEEP WATCH	PETTY OFFICERS, IDLERS	BANDSMEN, IDLERS	FIREMEN	COALHEAVERS	TOTAL
Forecastlemen .....	4	1	23	30	12	...	...	...	...	...	...	70
Foremastmen .....	...	...	4	...	...	...	...	...	...	...	...	4
Foretopmen .....	2	2	20	28	10	2	...	...	...	...	...	64
Mainmastmen .....	...	...	4	...	...	...	...	...	...	...	...	4
Maintopmen .....	2	2	22	30	10	2	...	...	...	...	...	68
Mizenmastmen .....	...	...	...	2	...	...	...	...	...	...	...	2
Mizentopmen .....	2	2	8	24	8	4	...	...	...	...	...	48
After Guard .....	2	..	8	20	84	...	...	...	...	...	...	114
Messenger & Sideboys	...	...	...	...	...	12	...	...	...	...	...	12
Bandsmen .....	...	...	...	...	...	...	...	...	10	...	...	10
Petty Officers .....	...	...	...	...	...	...	33	14	...	...	...	47
Firemen .....	...	...	...	...	...	...	...	...	...	24	...	24
Coalheavers .....	...	...	...	...	...	...	...	...	...	...	20	20
Total of each grade....	12	7	89	134	124	20	33	14	10	24	20	487





QUARTER BILL for a Screw Frigate of the first class with  
of Officers

QUARTER DECK.—CAPTAIN; EXECUTIVE OFFICER;  
AIDS TO CAPTAIN;

DECKS	No. of Gun	No. of Men	Watch to which Gun's Crew belongs	Petty Officers, Captains of Guns	FORECASTLEMEN			FORETOPMEN					
					Captains or Coxswains, Captains of Guns	Seamen	Ordinary Seamen	Landsmen	Captains or Coxswains, Captains of Guns	Seamen	Ordinary Seamen	Landsmen	Boys
MAIN.	1	16 & P. Man.	S	...	Capt.	1	2	1	...	...	1	1	...
	2	"	P	...	...	1	1	1	Capt.	...	2	1	...
	3	"	S	...	Cox.	1	2	1	...	...	1	1	...
	4	"	P	...	...	1	1	1	...	1	1	1	...
	5	"	S	Q M	...	1	1	1	...	1	2	1	...
	6	"	P	...	Capt.	1	2	1	...	1	1	...	...
	7	"	S	B M	...	1	1	1	...	1	2	...	...
	8	"	P	...	...	1	2	1	...	1	1	1	...
	9	"	S	...	...	1	1	...	Cox.	1	1	1	...
	10	"	P	B M	...	1	1	...	...	1	2	...	...
	11	"	S	...	...	1	2	1	...	1	1	...	...
	12	"	P	Q M	...	1	2	...	...	1	1	...	...
SPAR.	Pivot	20 & P. Man.	{ P S	B M	...	1	1	1	...	...	2	1	...
	1	14 and Boy.	S	...	Capt.	1	1	1	...	1	1	1	...
	2	"	P	...	...	1	1	1	...	1	1	1	...
	3	"	S	...	...	1	1	...	...	1	1	...	...
	4	"	P	...	...	1	2	...	Cox.	1	1	...	...
	5	"	S	...	...	1	1	...	...	1	2	...	...
	6	"	P	...	...	1	1	...	...	1	1	...	...
	7	"	S	...	...	1	1	...	...	1	1	...	...
	Pivot	20 & P. Man.	{ P S	Q M Q M	...	...	1	...	...	1	1	...	...
						...	1	1	...	...	...	...	...

40 Guns, and a complement of 487 Men and Boys, exclusive and Marines.

MASTER; PASSED MIDSHIPMAN, AS SIGNAL OFFICER;  
AND CAPTAIN'S CLERK.

MAINTOPMEN					MIZENTOPMEN					AFTER GUARD				Messenger Boys	OFFICERS OF DIVISIONS
Captains or Coxwms, Captains of Guns	Seamen	Ordinary Seamen	Landsmen	Boys	Captains or Coxwms, Captains of Guns	Seamen	Ordinary Seamen	Landsmen	Boys	Captains or Coxwms, Captains of Guns	Seamen	Ordinary Seamen	Landsmen		
...	1	2	1	...	...	1	1	1	...	...	...	1	2	...	} 1st Division. Lieutenant. Midshipman. 1 Qr. Gunner.
...	1	1	1	...	...	1	1	1	...	...	...	1	3	...	
Capt.	1	2	1	...	...	...	1	1	...	...	...	1	3	...	
...	1	1	1	...	...	...	1	1	...	...	...	1	3	...	} 2nd Division. Lieutenant. Midshipman. 1 Qr. Gunner.
...	1	2	...	...	...	...	1	...	...	...	...	1	5	...	
...	1	1	1	...	Capt.	...	1	...	...	...	...	1	5	...	
...	1	2	...	...	...	...	1	...	...	...	...	1	6	...	} 3rd Division. Lieutenant. Midshipman. 1 Qr. Gunner.
...	1	1	1	...	...	...	1	...	...	...	...	1	6	...	
Cox.	1	1	...	...	...	...	1	...	...	...	...	1	6	...	
...	1	2	...	...	...	...	1	...	...	...	...	1	6	...	
...	...	1	1	...	...	1	1	1	...	...	...	1	...	...	} 4th Division. Lieutenant. Midshipman. 1 Qr. Gunner.
...	1	1	...	...	...	...	1	...	...	...	...	...	1	...	
Capt.	1	1	1	...	Cox.	...	1	...	...	...	...	1	2	1	
...	1	1	1	...	...	...	1	...	...	...	...	1	2	1	
...	1	2	...	...	...	...	1	...	...	...	...	...	5	1	
...	1	1	...	...	...	...	1	...	...	...	...	...	5	1	
...	1	1	...	...	Capt.	...	1	...	...	...	...	...	5	1	} 5th Division. Lieutenant. Midshipman. 1 Qr. Gunner.
Cox.	...	1	...	...	...	...	1	1	...	...	1	1	4	1	
...	...	1	...	...	Cox.	1	1	1	...	...	...	1	4	1	
...	1	2	...	...	...	1	2	...	...	...	...	...	3	...	
...	...	1	...	...	...	...	1	...	...	CAG	1	1	...	...	

QUARTER BILL FOR A SCREW FRIGATE, FIRST CLASS, WITH 40 GUNS—continued.

6TH, OR MASTER'S DIVISION.

STATIONS	PETTY OFFICERS		FORECASTLE-MEN		FORETOPMEN		MAINTOPMEN		MIZENTOP-MEN		AFTER GUARD		MASTMEN		OFFICERS	
		Watch		Watch		Watch		Watch		Watch		Watch		Watch		
Conn. ....	1 Q. M.	S	..	..	..	..	..	..	..	..	..	..	..	..		
Wheel .....	1 Q. M.	P	1 Sea.	S	..	P	..	P	..	..	1 Sea.	..	..	..		
Signals .....	1 Q. M.	S	..	..	..	..	..	..	1 Boy	..	..	..	..	..	Quarter Deck.	
Relieving Tackles	1 Q. M.	P	..	..	..	..	..	..	..	..	2 O. S.	S	..	..	Master.	
Main Braces ....	1 C.A.G.	P	..	..	..	..	..	..	..	..	..	..	..	..		
Mizen Top .....	..	..	..	..	..	..	..	..	2 Sea.	S	..	..	..	..		
Mizen Mast .....	..	..	..	..	..	..	..	..	..	..	..	..	..	..		
Main Mast .....	1 B. M.	S	..	..	..	..	..	..	..	..	..	..	2 O. S.	S	Forecastle.	
Main Top .....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	Boatswain.	
Fore Top .....	..	..	2 Sea.	S	..	P	..	..	..	..	..	..	..	..		
Fore Mast .....	..	..	..	..	..	..	..	..	..	..	..	..	..	..		
Forecastle .....	1 C. F.	P	..	..	..	..	..	..	..	..	..	..	4 Sea.	S		
Bell .....	1 S. C.	S	..	..	..	..	..	..	..	..	..	..	..	..		
Total of each....	8	4	4	1	1	1	3	1	3	1	2	3	1	2	5	30 in all.

QUARTER BILL FOR A SCREW FRIGATE, FIRST CLASS, WITH 40 GUNS—*continued.*

7TH, OR POWDER DIVISION.—*Lieutenant, or Passed Midshipman, to command; Sailmaker, at Shell Lockers; Gunner, in the Fore Magazine; and Carpenter, at the Pumps.*

STATIONS	RATINGS
In the Forward Magazine.....	1 Gunner's Mate; 1 Quarter Gunner; 1 Seaman (F. C.—P. W.); 1 Boy (Mizentop—S. W.)
In the After Magazine.....	1 Gunner's Mate; 1 Quarter Gunner; 2 Seamen (A. G.—1 each W.); 2 Boys (Mizentop—1 of each W.)
In and at the Forward Shell Room.....	1 Quarter Gunner; 1 Sailmaker's Mate.
In and at the After Shell Room.....	1 Quarter Gunner; 1 Ship's Corporal.
Receive and whip Shells from Forward Shell Room.....	1 Captain Hold; 4 Firemen; 3 Coalheavers.
Receive and whip Shells from After Shell Room.....	1 Captain Hold; 4 Firemen; 3 Coalheavers.
Pumps.....	1 Carpenter's Mate.
Light Magazines and Shell Rooms, and other prescribed places, if there be any, and attend to all lights	1 Master-at-Arms; 1 Ship's Corporal.
Store Rooms.....	1 Yeoman; 1 Coalheaver.
Wings and Force Pumps.....	1 Carpenter's Mate; 1 Cooper.

SUPPLYING POWDER.—SCUTTLES.

The *forward half* of the *main deck guns* are to be supplied from the *starboard* scuttle of the forward magazine, through the other scuttles particularly connected with it; which, together, may be regarded as chain of scuttles No. 1.

The *after half* of the *main deck guns* are to be supplied from the *starboard* scuttle of the *after* magazine, through the other scuttles particularly connected with it; which, together, may be regarded as chain of scuttles No. 2.

The *spar deck guns*, excepting those on pivot carriages, are to be supplied from the *port* scuttles of the *forward* magazine, through the other scuttles particularly connected with it; which, together, may be regarded as chain of scuttles No. 3.

The *spar deck guns* on *pivot carriages*, are to be supplied from the *port* scuttle of the *after* magazine, through the other scuttles particularly connected with it; which, together, may be regarded as chain of scuttles No. 4.

DETAILS OF THE POWDER DIVISION OF A SCREW FRIGATE OF 40 GUNS.

STATIONS	CHAINS OF SCUTTLES			
	No. 1	No. 2	No. 3	No. 4
In the passage to receive and pass charges.....	1 Ward Room Cook.	1 Officer's Steward.	1 Cabin Cook.	1 Officer's Steward.
At passage scuttle on orlop deck, to receive charges thereat and pass them to the screen.	1 Musician.	1 Musician.	1 Musician.	1 Musician.
At outside of screen, to receive charges thereat and put them into passing boxes.	1 Musician.	1 Musician.	1 Musician.	1 Musician.
At lower extremity of canvas shoot, to receive empty passing boxes, strike them over fire-tub, and then deliver them to Runnerboys.	1 Ship's Steward.	1 Qr. Gunner.	1 Qr. Gunner.	1 Qr. Gunner.
To pass up full boxes through scuttle on main deck.....	1 Musician.	1 Master Band.	1 Musician.	1 Coalheaver.
On main deck, at scuttle, to receive and deliver full boxes to Powdermen.	1 Seaman (A. G.—S. W.)	1 Scaman. (A. G.—P. W.)	...	...
On main deck, at scuttle, to receive full boxes, and pass them up through scuttle on spar deck.	...	...	1 Armorer.	1 Painter.
On spar deck, at scuttle, to receive and deliver full boxes to Powdermen and Boys.	...	...	1 Scaman (A. G.—S. W.)	1 Armorer's Mate.
To run with full boxes from screen to passing scuttle, and back again with empty boxes.	2 Runnerboys.	2 Runnerboys.	2 Runnerboys.	3 Runnerboys.

Each petty officer stationed to receive empty passing boxes, and strike them over a fire-tub, aided by those immediately about his line of scuttles, is to see that his canvas shoot, fire-tub, and wet swabs are in place, and properly prepared.



QUARTER BILL FOR A SCREW FRIGATE OF THE FIRST CLASS, WITH 40 GUNS—continued.

8TH, OR ENGINEER'S DIVISION.—CHIEF ENGINEER; 2 FIRST ASSISTANTS; 2 SECOND ASSISTANTS;  
AND 2 THIRD ASSISTANTS.

ENGINE WATCHES			WATCH AT ENGINE		FIRST RELIEF		SECOND RELIEF	
PORT		STARBOARD	PORT	STARBOARD	PORT	STARBOARD	PORT	STARBOARD
Engine Numbers			Firemen		Firemen		Firemen	
1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd
2	10	18	1	9	17	Receive and whip shells	Receive and whip shells	Receive and whip shells
4	12	20	3	11	19	Do. ....	Do. ....	Do. ....
6	14	22	5	13	21	Do. ....	Do. ....	Do. ....
8	16	24	7	15	23	Do. ....	Do. ....	Do. ....
Engine Numbers			Coalheavers		Coalheavers		Coalheavers	
1st	2nd	3rd	1st	2nd	3rd	Coalheavers	Coalheavers	Coalheavers
26	34	40	25	33	41	Coalheavers	Coalheavers	Coalheavers
28	36	42	27	35	43	Coalheavers	Coalheavers	Coalheavers
30	38	44	29	37	45	Coalheavers	Coalheavers	Coalheavers
...	...	...	31	39	...	Coalheavers	Coalheavers	Coalheavers
32	...	...	...	...	...	Coalheavers	Coalheavers	Coalheavers

On going to Quarters, when under steam, the watch on duty at the Engine will remain there, whilst the First and Second Reliefs will repair to their stations designated in the Quarter Bill. When not under steam, the First Watch is to be considered the "Watch at Engine," and to repair to that station. The Second Watch then becomes the First Relief, and the Third Watch the Second Relief.

On an alarm of fire whilst under steam, the "Watch at Engine" will remain there, and attach hose to steam pumps, &c. The First Relief will lead along the hose, pass water buckets, &c.; and the Second Relief will assist in clearing away a passage to the fire, pointing hose, and passing water. If not under steam, the First Engine Watch will repair to the Fire Room, attach the hose to the hand pumps, and man them. The Second and Third Watches will perform the duties of the First and Second Reliefs, as above directed, when under steam.

## SURGEON'S DIVISION.

The Surgeon, his Assistants, and Steward, are to constitute this division, and their station is to be in the cockpit.

## CHAPLAIN.

The Chaplain is also stationed in the cockpit.

## MARINES.

Officers, non-commissioned officers, musicians, and privates, to be stationed on spar deck. When required, the marines may be stationed at the great guns or howitzers. They are to be distributed as the Captain of the ship may direct.

## PAYMASTER.

The Paymaster and his Clerk in charge of stores.

## SKELETON WATCH BILL

FOR A SCREW STEAMER OF THE SECOND CLASS ARMED WITH TWO  
XI-Inch GUNS AND TWENTY IX-Inch GUNS

STATIONS	CAPTAINS	COXSWAINS	SEAMEN	ORDINARY SEAMEN	LANDSMEN	BOYS	OTHER PETTY OFFICERS TO KEEP WATCH	PETTY OFFICERS, IDLERS	FIREMEN	COALHEAVERS	TOTAL
Forecastlemen .....	2	2	16	18	12	...	...	...	...	...	50
Foremastmen .....	...	...	2	...	...	...	...	...	...	...	2
Foretopmen .....	2	2	14	18	8	2	...	...	...	...	46
Mainmastmen .....	...	...	2	...	...	...	...	...	...	...	2
Maintopmen .....	2	2	14	24	8	...	...	...	...	...	50
Mizenmastmen .....	...	...	...	2	...	...	...	...	...	...	2
Mizentopmen.....	2	1	6	12	6	2	...	...	...	...	29
After Guard .....	2	...	6	16	48	...	...	...	...	...	72
Messenger and Sideboys.	...	...	...	...	...	6	...	...	...	...	6
Petty Officers .....	...	...	...	...	...	...	22	12	...	...	34
Firemen.....	...	...	...	...	...	...	...	...	22	...	22
Coalheavers .....	...	...	...	...	...	...	...	...	...	18	18
Total of each grade .	10	7	60	90	82	10	22	12	22	18	333

## ENGINE WATCH BILL

To be similar, in every respect, to that given for a Screw Frigate of the first class, which see. The only modification necessary is a slight one concerning the number of Firemen and Coalheavers. The Frigate is allowed 24 Firemen and 20 Coalheavers; whereas this vessel is to have but 22 of the former, and 18 of the latter; or 2 less of each of these grades.



22 Guns, viz: Two of XI-inch and twenty of IX-inch, and a exclusive of Officers and Marines.

SIGNAL OFFICER; AID TO CAPTAIN; AND CAPTAIN'S CLERK.

MAINTOPMEN					MIZENTOPMEN					AFTER GUARD					OFFICERS OF DIVISIONS
Captains or Coxwains, Captains of Guns	Seamen	Ordinary Seamen	Landsmen	Boys	Captains or Coxwains, Captains of Guns	Seamen	Ordinary Seamen	Landsmen	Boys	Captains or Coxwains, Captains of Guns	Seamen	Ordinary Seamen	Landsmen	Mizennastmen Ordinary Seamen	
..	1	2	1	...	..	..	1	1	...	..	..	1	1	..	} <i>1st Division.</i> Lieutenant. Midshipman. 1 Quarter Gunner.
..	1	2	1	...	..	..	1	1	...	..	..	1	1	..	
..	1	2	1	...	..	..	1	1	...	..	..	1	1	..	
Capt.	1	2	1	..	..	..	..	1	...	..	..	..	2	..	
..	1	2	1	...	..	..	..	1	...	..	..	..	2	..	
Cox.	1	2	1	...	Capt.	..	1	1	...	..	..	1	2	..	} <i>2nd Division.</i> Lieutenant. Midshipman. 1 Quarter Gunner.
Capt.	1	2	..	..	..	..	1	..	..	..	..	1	4	..	
..	1	..	..	..	..	..	1	..	..	..	..	1	5	..	
Cox.	1	2	..	..	Capt.	..	2	..	..	..	..	2	5	..	
..	1	4	..	..	Cox.	..	1	..	..	..	..	1	4	..	
..	1	1	1	...	..	..	..	..	..	..	..	1	1	..	} <i>3rd Division.</i> Lieutenant. Midshipman. Midshipman. 1 Quarter Gunner.
..	..	1	1	...	..	..	1	..	..	..	1	1	1	..	
..	..	1	..	..	..	2	1	..	..	..	..	2	4	1	
..	..	1	..	..	..	2	1	..	..	Capt.	..	2	3	1	

## QUARTER BILLS.

## QUARTER BILL FOR A SCREW STEAMER OF THE SECOND CLASS, 22 GUNS—continued.

## 4TH, OR MASTER'S DIVISION.

STATIONS	PETTY OFFICERS		FORECASTLE-MEN		FORETOPMEN		MAINTOPMEN		MIZENTOP-MEN		AFTER GUARD		MASTMEN		OFFICERS	
		Watch		Watch		Watch		Watch		Watch		Watch		Watch		
Conn.....	1 Q. M.	S	..	..	..	..	..	..	..	..	..	..	..	..		
Wheel.....	1 Q. M.	..	1 Sea.	S	..	P	..	..	..	..	1 Sea.	S	..	..		
Signals.....	1 Q. M.	S	..	..	..	..	..	..	1 Boy	..	..	..	..	..		
Relieving Tackles	1 Q. M.	..	..	..	..	..	..	..	..	..	1 O. S.	..	..	..	Quarter Deck.	
Main Braces.....	1 C. A. G.	S	..	..	..	..	..	..	..	..	..	..	..	..	Master.	
Mizen Top.....	..	..	..	..	..	..	..	..	2 Sea.	S	..	..	..	..		
Main Mast.....	1 B. M.	S	..	..	..	..	..	..	..	..	..	..	2 Sea.	S	Forecastle.	
Main Top.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	Boatswain.	
Fore Top.....	..	..	2 Sea.	S	P	..	..	..	..	..	..	..	..	..		
Fore Mast.....	..	..	..	..	..	..	..	..	..	..	..	..	2 Sea.	S		
Forecastle.....	1 C. F.	..	..	..	..	..	..	..	..	..	..	..	..	..		
Bell.....	1 S. C.	P	..	..	..	..	..	..	..	..	..	..	..	..		
Total of each..	8	4	4	1	1	2	1	1	3	1	2	2	4	2	2	23 in all.

QUARTER BILL FOR A SCREW STEAMER OF THE SECOND CLASS, 22 GUNS—continued.

5TH, OR POWDER DIVISION.—*Lieutenant, or Passed Midshipman, to command; Sailmaker, at Shell Lockers; Gunner, in the Fore Magazine; and Carpenter, at the Pumps.*

STATIONS	RATINGS
In the Forward Magazine .....	2 Quarter Gunners; 1 Seaman (F. C.—P. W.); 1 Boy (Mizentop—S. W.)
In the After Magazine.....	1 Gunner's Mate; 1 Quarter Gunner; 2 Seamen (A. W.—1 in each W.); 2 Boys (F. top—1 of each W.)
In and at the Forward Shell room.....	1 Sailmaker's Mate; 1 Painter.
In and at the After Shell room ...	1 Armorer; 1 Ship's Corporal.
Receive and whip shells from Forward Shell room .....	1 Captain of Hold; 4 Firemen; 3 Coalheavers.
Receive and whip shells from After Shell room .....	4 Firemen; 3 Coalheavers.
Pumps .....	1 Carpenter's Mate.
Light Magazines, Shell rooms, and other prescribed places, if there be any, and attend to all lights .....	1 Master-at-Arms; 1 Ship's Corporal.
Store rooms .....	1 Yeoman; 1 Coalheaver.
Wings and Force pumps .....	1 Cooper; 1 Armorer's Mate.

SUPPLYING POWDER.—SCUTTLES.

The *forward* half of the *main deck guns* are to be supplied from the starboard scuttle of the forward magazine, through the other scuttles particularly connected with it; which, together, may be regarded as chain of scuttles No. 1.

The after half of the *main deck guns* are to be supplied from the scuttle of the after magazine, through the other scuttles particularly connected with it; which, together, may be regarded as chain of scuttles No. 2.

Both *pivot guns* on the spar deck are to be supplied from the *port* scuttle of the forward magazine, through the other scuttles particularly connected with it; which, together, may be regarded as chain of scuttles No. 3.

DETAILS OF THE POWDER DIVISION

STATIONS

In the passage, to receive and pass charges .....

At passage scuttle on orlop deck, to receive charges thereat and pass them to the screen.

At outside of screen, to receive charges thereat and put them into passing boxes.

At lower extremity of canvas shoot, to receive empty passing boxes, strike them over fire-tub, and then deliver them to Runnerboys.

To pass up full boxes through scuttle on main deck ... ..

On main deck, at scuttle, to receive and deliver full boxes to Powdermen .....

On main deck, at scuttle, to receive full boxes and pass them up through scuttle on spar deck.

On spar deck, at scuttle, to receive and deliver full boxes to Powdermen.....

To run with full boxes from screen to passing scuttle, and then back again with empty boxes.

N.B.—The after magazine of the “Lancaster,” like that of our propellers generally, consists of two separate compartments, with the alley-way of the propeller shaft between them; and hence the reason why one more Seaman and one more Boy are detailed for it than the other. If, however, only one of the compartments is to be used at a time, (and no more need be by the above arrangements), then the Seaman and Boy in question may be assigned to service elsewhere—to



OF A SCREW STEAMER, 22 GUNS.

CHAINS OF SCUTTLES		
No. 1	No. 2	No. 3
1 Ward Room Cook.	1 Officer's Steward.	1 Cabin Cook.
1 Lands. (A. G.—S. W.)	1 Lands. (A. G.—P. W.)	1 Lands. (A. G.—S. W.)
1 Lands. (A. G.—P. W.)	1 Officer's Steward.	1 Lands. (A. G.—P. W.)
1 Ship's Steward.	1 Seaman (A. G.—S. W.)	1 Seaman (A. G.—P. W.)
1 Lands. (A. G.—S. W.)	1 Lands. (A. G.—S. W.)	1 Lands. (A. G.—S. W.)
1 Lands. (A. G.—P. W.)	1 Lands. (A. G.—P. W.)	...
...	...	1 Lands. (A. G.—P. W.)
...	...	1 Lands. (A. G.—S. W.)
2 Runnerboys.	2 Runnerboys.	2 Runnerboys.

take the places, for instance, of any of the Powder Division who may happen to be sick.

Each man stationed to receive empty passing boxes, and strike them over a fire-tub, aided by those immediately about his line of scuttles, is to see that his canvas shoot, fire-tub, and wet swabs, are in place and properly prepared.

## 6TH, OR ENGINEER'S DIVISION.

To be similar, in every respect, to that given for a Screw Frigate of the 1st class, (which see); only a reduction is to be made in the number of Firemen and Coalheavers of two each.

## SURGEON'S DIVISION.

The Surgeon, his Assistants, and Steward, are to constitute this division, and their station is to be in the apartment to receive the wounded.

## CHAPLAIN.

The Chaplain's station is also in the apartment to receive the wounded.

## MARINES.

Officers, non-commissioned officers, musicians, and privates, to be stationed on the spar deck. When required, the marines may be stationed at the great guns or howitzers. They are to be distributed as the Captain of the ship may direct.

## PURSER.

The Purser and his Clerk in charge of stores.

## SKELETON WATCH BILL

FOR A SCREW STEAMER OF THE THIRD CLASS, ARMED WITH  
TWO XI-Inch GUNS AND FOUR 32-Pdrs. OF  
57-Cwt. EACH.

STATIONS	CAPTAINS	COXSWAINS	SEAMEN	ORDINARY SEAMEN	LANDSMEN	BOYS	OTHER PETTY OFFICERS TO KEEP WATCH.	PETTY OFFICERS, IDLERS	FIREMEN	COALHEAVERS	TOTAL
Forecastlemen .....	1	1	5	4	1	...	...	...	...	...	12
Foremastmen .....	...	...	...	2	...	...	...	...	...	...	2
Foretopmen .....	1	1	4	4	2	...	...	...	...	...	12
Mainmastmen .....	...	...	2	...	...	...	...	...	...	...	2
Maintopmen .....	1	1	5	4	1	...	...	...	...	...	12
After Guard .....	2	...	...	6	10	...	...	...	...	...	18
Messenger & Sideboys	...	...	...	...	...	4	...	...	...	...	4
Petty Officers .....	...	...	...	...	...	...	11	9	...	...	20
Firemen .....	...	...	...	...	...	...	...	...	14	...	14
Coalheavers .....	...	...	...	...	...	...	...	...	...	14	14
Total of each grade	5	3	16	20	14	4	11	9	14	14	110

## ENGINE WATCH BILL.

To be similar, in every respect, to those already mentioned, reducing the number of Firemen and Coalheavers so as to correspond with the above allowance.

QUARTER BILL for a Screw Steamer of the third class, with  
and a complement of 110 Men and Boys,

QUARTER DECK.—COMMANDER; FIRST

No. of Gun	Number of Men	Watch to which Gun's Crew belongs	Petty Officers, Captains of Guns	FORECASTLEMEN				FORETOPMEN			
				Captains or Coxswains, Captains of Guns	Seamen	Ordinary Seamen	Landsmen	Captains or Coxswains, Captains of Guns	Seamen	Ordinary Seamen	Landsmen
Pivot	} 24 & P.M.	{ S	.....	Capt.	1	1	...	.....	1	1	1
Forward			{ P	.....	Cox.	1	1	...	.....	1	1
1	12 & P.B.	S	Q M	... ..	1	1	...	Capt.	1	...	...
2	12 & P.B.	P	Q M	.....	...	1	...	.....	1	...	...
Pivot	} 24 & P.M.	{ S	Q M	.....	1	...	...	... ..	...	1	...
Aft.			{ P	B M	.....	1	...	1	.....	...	1

six Guns, viz.: Two XI-inch and four 32-pounders of 57 cwt., exclusive of Officers and Marines.

LIEUTENANT; MASTER; AND CAPTAIN'S CLERK.

MAINTOPMEN				AFTER GUARD				Messenger Boys	Mastmen	Coalheavers	Marines	Petty Officers at the Guns, but not as Captains	OFFICERS OF DIVISIONS		
Captains or Coxswains, Captains of Guns	Seamen	Ordinary Seamen	Landsmen	Captains	Seamen	Ordinary Seamen	Landsmen								
...	1	1	...	...	...	2	...	1 O. S.	...	...	S. M. Mate.	} 1st Division. Lieutenant. Midshipman. 1 Qr. Gunner.			
...	...	1	...	...	...	2	...	1 O. S.	...	1	Arm. & S. Ck.				
...	...	...	...	...	...	1	1	1	1	1	Sea.		1	2	O. Cook.
Capt.	1	...	...	...	...	1	1	1	1	1	Sea.	1	2	O. Cook.	} 2nd Division. Lieutenant. Midshipman. 1 Qr. Gunner.
...	1	1	1	Capt.	...	2	2	...	...	...	1	Cox. M. Top.			
...	1	1	...	Capt.	...	2	2	...	...	...	...	Cox. F. Top.			

QUARTER BILL FOR A SCREW STEAMER OF THE THIRD CLASS, 6 GUNS--continued.

3RD, OR MASTER'S DIVISION.

STATIONS	RATINGS
At the Wheel ..... On the Forecastle.....	1 Quartermaster; 1 Seaman (M. T.—P. W.) 1 Boatswain's Mate (S. W.)

4TH, OR POWDER DIVISION.—Passed Midshipman, or Midshipman, to command; Gunner, in the Magazine; and Carpenter, at the Pumps.

STATIONS	RATINGS
In the Magazine ..... In and at Shell-room ..... Receive and whip shells and pass up shot ..... Light Magazine and Shell-room, and elsewhere, if prescribed, and attend all lights .....	1 Gunner's Mate. 1 Yeoman; 1 Fireman. 1 Captain of Hold; 1 Fireman; 2 Coalheavers. 1 Master-at-Arms.

SUPPLYING POWDER.—SCUTTLES.

The number of guns to be supplied being few, the difference in the form and dimensions of charges for a XI-inch and a 32-pounder too great to admit of mistaking one for the other, and the number of men to man the guns themselves large in proportion to that of the whole crew allowed, only one chain of scuttles is to be established. The scuttle on deck, up through which the powder is to be passed for all the guns, and the one alongside of it for returning empty boxes, should be as nearly midway between the pivot guns as practicable; and, of course, large enough to receive the larger passing-boxes.

DETAILS OF THE POWDER DIVISION OF A SCREW STEAMER OF 6 GUNS.

STATIONS	CHAIN OF SCUTTLES
In the passage to receive and pass charges.....	1 Fireman.
At passage scuttle to receive charges thereat and pass them to the screen.....	1 Officer's Steward.
At outside of screen to receive charges thereat and put them into passing boxes.....	1 Officer's Steward.
At lower extremity of canvas shoot to receive empty boxes, strike them over fire-tub, and then deliver them to Runnerboys.	1 Fireman.
To pass up full boxes through scuttle on deck .....	1 Coalheaver.
On deck, at scuttle, to receive and deliver full boxes to Powdermen and Boys .....	1 Coalheaver.
To run with full boxes from screen to passing scuttle, and then back again with empty boxes .....	2 Runnerboys.

The Fireman stationed to receive empty passing-boxes and strike them over a fire-tub, aided by those immediately about his line of scuttles, is to see that his canvas shoot, fire-tub, and wet swabs, are in place and properly prepared.

## 5TH, OR ENGINEER'S DIVISION.

To be similarly arranged to those already mentioned, reducing, however, the number of Firemen and Coalheavers so as to correspond with that allowed for this class of vessel, and modifying it a little so as to quarter some of the Firemen and Coalheavers, as directed above, in the Powder Division.

## SURGEON'S DIVISION.

The Medical Officers and the Surgeon's Steward are to constitute this division, and their station is to be in the apartment to receive the wounded.

## MARINES.

They are to be distributed as the Captain of the vessel may direct. Their services, in action, will probably be most needed at the great Guns.

## PURSER.

The Purser and his Clerk in charge of stores.



## SKELETON WATCH BILL

FOR A SIDE-WHEEL STEAMER, FIRST CLASS, ARMED WITH THREE  
64-Pdrs. (Pivots) OF 106 Cwt., AND TWELVE 8-Inch (Broadside)  
OF 63 Cwt.

STATIONS	CAPTAINS	COXSWAINS	SEAMEN	ORDINARY SEAMEN	LANDSMEN	BOYS	OTHER PETTY OFFICERS TO KEEP WATCH	PETTY OFFICERS, IDLERS	BANDSMEN, IDLERS	FIREMEN	COALHEAVERS	TOTAL
Forecastlemen .....	2	2	8	14	4	...	...	...	...	...	...	30
Foremastmen .....	...	...	...	2	...	...	...	...	...	...	...	2
Foretopmen .....	2	2	8	10	2	2	...	...	...	...	...	26
Mainmastmen .....	...	...	2	...	...	...	...	...	...	...	...	2
Maintopmen .....	2	2	8	10	2	4	...	...	...	...	...	28
After Guard .....	2	1	3	9	27	...	...	...	...	...	...	42
Messenger & Sideboys	...	...	...	...	...	6	...	...	...	...	...	6
Bandsmen .....	...	...	...	...	...	...	...	...	9	...	...	9
Petty Officers .....	...	...	...	...	...	...	20	13	...	...	...	33
Firemen.....	...	...	...	...	...	...	...	...	...	24	...	24
Coalheavers .....	...	...	...	...	...	...	...	...	...	...	22	22
Total of each grade	8	7	29	45	35	12	20	13	9	24	22	224

## ENGINE WATCH BILL.

When under steam to be similar to that given for a screw Frigate of the first class, which see.

QUARTER BILL for a Side-wheel Steamer of the first class,  
exclusive of Officers

QUARTER DECK.—CAPTAIN; EXECUTIVE OFFICER; MASTER;

No. of Gun	Number of Men	Watch to which Gun's Crew belongs	Petty Officers, Captains of Guns	FORECASTLEMEN				FORETOPMEN					
				Captains or Coxswains, Captains of Guns	Seamen	Ordinary Seamen	Landsmen	Captains or Coxswains, Captains of Guns	Seamen	Ordinary Seaman	Landsmen	Boys	
No. 1. Pivot. Forward	} 18 & P. Man.	{ S	...	Capt.	1	2	1	...	...	...	...	...	
			{ P	...	Cox.	1	2	1	...	1	...	...	
No. 2. Pivot. Forward	} 18 & P. Man.	{ S	...	Cox.	1	1	1	...	1	1	...	...	
			{ P	...	Capt.	1	1	1	...	1	1	...	
BROADSIDE.	} 14 and P. Boy	S	...	...	1	1	...	Capt.	...	1	1	...	
			P	B M	...	1	1	...	...	...	1	1	...
			S	...	...	...	1	...	Cox.	1	1	...	...
			P	...	...	...	1	...	Capt.	1	1	...	...
			S	Q G	...	...	1	...	...	1	1	...	...
			P	...	...	...	1	...	Cox.	1	1	...	...
No. 3. Pivot. Aft.	} 12 & P. Man.	{ S	B M	...	1	1	...	...	...	1	...	...	
			{ P	Q G	...	1	1	...	...	...	1	...	

with 15 Guns, and a complement of 224 Men, and Boys, and Marines.

SIGNAL OFFICER; AID TO CAPTAIN; AND CAPTAIN'S CLERK.

MAINTOPMEN					AFTER GUARD									OFFICERS OF DIVISIONS	
Captains or Coxswains, Captains of Guns	Seamen	Ordinary Seamen	Landsmen	Boys	Captains, Captains of Guns	Seamen	Ordinary Seamen	Landsmen	Messenger and Sideboys	Firemen	Coalheavers	Petty Officers stationed at Guns, but not as Captains	Mastmen		
...	1	1	...	...	...	...	...	2	...	...	...	...	1 O. S.	} 1st Division.	
...	...	1	...	...	...	...	...	1	...	...	...	Armorer	F. M.		} Lieutenant.
...	...	1	...	...	...	...	...	1	...	...	...	Sh. Cook	...		
...	...	1	...	...	...	...	1	1	...	...	...	...	1 O. S.		---
Cox.	...	1	...	...	...	1	1	3	1	1	...	Off. Cook	...	} 2nd Division.	
...	...	1	...	...	Capt.	1	1	3	1	...	1	Off. Cook	...		} Lieutenant.
Capt.	1	...	1	...	...	...	1	4	1	...	1	Ar. Mate	...	} Midship'n.	
Cox.	1	...	1	...	...	...	1	3	1	1	1	...	1 Sea.		} 3rd Division.
...	1	1	...	...	Capt.	...	1	3	1	1	1	...	1 Sea.	} Lieutenant.	
Capt.	1	1	...	...	...	...	1	3	1	1	1	Painter	M. M.		
...	1	1	...	...	...	...	1	1	...	...	...	Cox. (A G)	...	} 4th Division.	
...	1	1	...	...	...	...	1	2	...	...	...	S. M. Mate	...		} Lieut.—Mid.

But two Quarter Gunners can be spared for the divisions of guns, therefore one must attend to the 1st and 2nd divisions, and the other to the 3rd and 4th.

QUARTER BILL FOR A SIDE-WHEEL STEAMER, FIRST CLASS, 15 GUNS—*continued.*  
 MASTER'S, OR 5TH DIVISION.

STATIONS	RATINGS	OFFICERS
Wheel .....	2 Q. M. (1 of each Watch) and 1 Seaman (A. G.—S. W.)	<i>Quarter Deck.</i> Master.
Relieving Tackles .....	2 Q. M. (1 of each Watch)	
Mainmast .....	1 B. M. (S. W.)	
Foretop .....	1 Seaman (S. W.)	<i>Forecastle.</i> Boatswain.
Maintop .....	1 Seaman (P. W.)	

6TH, OR POWDER DIVISION.—*Lieutenant, or Passed Midshipman, to command; Sailmaker, at Shell Lockers; Gunner, in the Fore Magazine; and Carpenter, at the Pumps.*

STATIONS	RATINGS
In the Forward Magazine .....	1 Gunner's Mate; 1 Yeoman.
In the After Magazine .....	1 Gunner's Mate; 1 Cooper.
In and at the Forward Shell-room .....	1 Fireman; 1 Coalheaver.
In and at the After Shell-room or Shot-locker .....	1 Fireman; 1 Ship's Steward.
Receive and whip Shells from Forward Shell-room .....	1 Captain Hold; 2 Firemen; 2 Coalheavers.
Receive and whip Shells from After Shell-room or Shot-locker.....	1 Captain Hold; 2 Firemen; 2 Coalheavers.
Pumps.....	1 Carpenter's Mate.
Light Magazines and Shell-rooms, and other prescribed places, if any, and attend to all lights .....	1 Master-at-Arms; 1 Ship's Corporal.
Wings and Force pumps .....	1 Carpenter's Mate.

SUPPLYING POWDER.—Scuttles.

The 8-inch guns are to be supplied from the scuttle of the Forward Magazine, through the other scuttles particularly connected with it; which, together, may be regarded as chain of scuttles No. 1.

The pivot guns are to be supplied from the scuttle of the After Magazine, through the other scuttles particularly connected with it: which, together, may be regarded as chain of scuttles No. 2.

DETAILS OF THE POWDER DIVISION FOR A SIDE-WHEEL STEAMER, FIRST CLASS, OF 15 GUNS.

STATIONS	CHAINS OF SCUTTLES	
	No. 1	No. 2
In the passage to receive and pass charges.....	1 Musician.	1 Musician.
At passage scuttle on orlop deck, to receive charges thereat and pass them to the screen.....	1 Musician.	1 Musician.
At outside of screen, to receive charges thereat and put them into passing boxes.....	1 Musician.	1 Cabin Stew'd.
At lower extremity of canvas shoot, to receive empty passing boxes, strike them over fire-tub, and then deliver them to Runnerboys.	1 Master Band.	1 W. R. Stew'd.
To pass up full boxes through scuttle on deck .....	1 Musician.	1 Musician.
On deck, at scuttle, to receive and deliver full boxes to Powdermen and Boys .....	1 Musician.	1 Musician.
To run with full boxes from screen to passing scuttle, and back again with empty boxes .....	3 Runnerboys.	3 Runnerboys.

Each person stationed to receive empty passing boxes, and strike them over the fire-tubs, aided by those immediately about his line of scuttles, is to see that his canvas shoots, fire-tubs, and wet swabs, are in place, and properly prepared.

## 7TH, OR ENGINEER'S DIVISION.

To be similar to that given for a screw Frigate of the first class (which see), but modified so as to correspond with the several stations assigned to Firemen and Coalheavers, as expressed above.

## SURGEON'S DIVISION.

The Surgeon, his Assistants, and Steward, are to constitute this division, and their station is to be in the apartment to receive the wounded.

## CHAPLAIN.

The Chaplain's station is also in the apartment to receive the wounded.

## MARINES.

Officers, non-commissioned officers, musicians, and privates, to be stationed on deck. When required, the marines may be stationed at the great guns, or howitzers. They are to be distributed as the Captain of the ship may direct.

## PURSER.

The Purser and his Clerk in charge of stores.

APPENDIX B.—No. I.

GRADUATION OF SIGHTS

AND MEAN RANGES

OF C. S. NAVAL GUNS.

The Graduation commences from the bottom of the sight-notch, in the line of sight parallel to axis of bore, the head of the bar resting on the sight-box.

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

		32-POUNDER OF 27 CWT.		32-POUNDER OF 33 CWT.	
Charge.....		4 lbs.		4½ lbs.	
Axis of bore above load line }		7 feet		7½ feet	
Distance between sights...		Old Model 29¼ in.	New Model 26¾ in.	} 31 inches	
Elevation	Range	Graduation	Graduation	Range	Graduation
Degrees	Yards	Inches	Inches	Yards	Inches
Level	250	0.353	0.324	287	0.350
1°	545	0.746	0.684	581	0.792
2°	800	1.266	1.161	857	1.343
3°	1047	1.801	1.652	1140	1.909
4°	1278	2.337	2.144	1398	2.478
5°	1469	2.870	2.633	1598	3.044
6°	1637	3.398	3.116	...	...

APPENDIX B.—No. II.

		32-POUNDER OF 42 CWT.		32-POUNDER OF 57 CWT.	
Charge .....		6 lbs.		9 lbs.	
Axis of bore above load } line }		7½ feet		8 feet	
Distance between sights		Old Model 40.5 in.	New Model 37.1 in.	42.5 inches	
Elevation	Range	Graduation	Graduation	Range	Graduation
Degrees	Yards	Inches	Inches	Yards	Inches
Level	313	0.446	0.408	360	0.412
1°	672	1.016	0.931	760	1.042
2°	988	1.742	1.596	1150	1.808
3°	1274	2.488	2.280	1440	2.597
4°	1505	3.235	2.964	1710	3.384
5°	1756	3.974	3.641	1930	4.162
6°	...	...	...	2140	4.930



APPENDIX B.—No. III.

8-INCH OF 55 CWT.			8-INCH OF 63 CWT.		
Charge..... 7 lbs.			9 lbs.		
Shell..... 51½ lbs.			51½ lbs.		
Axis of bore above load } 7½ feet. line			8 feet.		
Distance between sights... 37 in.			{ Old model 43.50 in.		New model 38.20 in.
Elevation	Range	Graduation	Range	Graduation	Graduation
Degrees	Yards	Inches	Yards	Inches	Inches
Level.	283	0.429	330	0.460	0.402
1°	579	0.949	660	1.100	0.964
2°	869	1.603	970	1.878	1.647
3°	1148	2.280	1260	2.678	2.350
4°	1413	2.958	1540	3.478	3.051
5°	1657	3.632	1770	4.273	3.749
6°	1866	4.300	...	...	...

## APPENDIX B.—No. IV.

	IX-INCH SHELL GUN		XI-INCH SHELL GUN		XI-INCH SHELL GUN	
Charge .....	10 lbs.		15 lbs.		15 lbs.	
Shell.....	72 lbs.		135 lbs.		135 lbs.	
Axis of bore above load line	10 feet.		10 feet. [Screw Sloops.]		20 feet. [2nd deck above water.]	
Distance be- tween sights	39 inches.		48 inches.		48 inches.	
Elevation	Range	Graduation	Range	Graduation	Range	Graduation
Degrees	Yards	Inches	Yards	Inches	Yards	Inches
Level	340	0.461	306	0.600	420	0.87
	700	0.983	500	0.945	700	1.48
	900	1.514	700	1.442	900	2.01
	1100	2.073	900	2.040	1100	2.62
	1300	2.646	1100	2.651	1300	3.25
	1500	3.222	1300	3.295	1500	4.92
	1700	3.813	1500	3.953	...	...
	...	...	1700	4.681	...	...

APPENDIX B.—No. V.

Angles subtended by the Mainmasts of British Ships of war between the Water-line and the Truck, and also between the Water-line and the Topmast Cross-Trees, at distances expressed in yards, the eye of the observer being placed 20 feet above the level of the water. (See Article 278, page 83.)

DISTANCES	SHIPS OF THE LINE						FRIGATES				SLOOPs		BRIGs	
	120 GUNS 3 DECKs		FROM 92 TO 80 GUNS 2 DECKs		50 GUNS		42 GUNS		26 GUNS		16 GUNS			
	Truck 208 feet	Cross-trees 152 feet	Truck 198 feet	Cross-trees 144 feet	Truck 176 feet	Cross-trees 125 feet	Truck 168 feet	Cross-trees 120 feet	Truck 121 feet	Cross-trees 85 feet	Truck 125 feet	Cross-trees 85 feet		
Yards	° /	° /	° /	° /	° /	° /	° /	° /	° /	° /	° /	° /	° /	° /
100	35 53	27 34	34 30	26 16	31 17	23 6	30 4	22 15	22 25	16 2	23 6	16 2	16 2	16 2
200	19 18	14 19	18 26	13 35	16 29	11 50	15 46	11 22	11 28	8 5	11 50	8 5	8 5	8 5
300	13 4	9 37	12 27	9 7	11 6	7 55	10 37	7 37	7 40	5 24	7 55	5 24	5 24	5 24
400	9 52	7 14	9 23	6 51	8 22	5 57	7 59	5 43	5 46	4 3	5 57	4 3	4 3	4 3
500	7 55	5 47	7 32	5 29	6 42	4 46	6 24	4 35	4 37	3 15	4 46	3 15	3 15	3 15
600	6 36	4 50	6 17	4 35	5 35	3 58	5 21	3 49	3 51	2 42	3 58	2 42	2 42	2 42
700	5 40	4 9	5 24	3 56	4 58	3 24	4 35	3 16	3 18	2 19	3 24	2 19	2 19	2 19
800	4 57	3 38	4 43	3 26	4 12	2 59	4 1	2 52	2 53	2 2	2 59	2 2	2 2	2 2
900	4 24	3 13	4 12	3 3	3 44	2 39	3 33	2 33	2 34	1 48	2 39	1 48	1 48	1 48
1000	3 58	2 54	3 57	2 45	3 22	2 23	3 12	2 17	2 19	1 37	2 23	1 37	1 37	1 37
1100	3 36	2 38	3 26	2 30	3 3	2 10	2 55	2 5	2 6	1 28	2 10	1 28	1 28	1 28
1200	3 18	2 25	3 9	2 17	2 48	1 59	2 40	1 55	1 56	1 21	1 59	1 21	1 21	1 21
1300	3 3	2 14	2 54	2 7	2 35	1 50	2 28	1 46	1 47	1 14	1 50	1 14	1 14	1 14
1400	2 50	2 4	2 42	1 58	2 24	1 42	2 18	1 38	1 39	1 9	1 42	1 9	1 9	1 9
1500	2 39	1 56	2 31	1 50	2 15	1 35	2 8	1 32	1 32	1 5	1 35	1 5	1 5	1 5



## APPENDIX B.—No. VII.

*Tangent practice with eight-inch and thirty-two-pounder Guns, with the charge for distant firing.* The line of sight is parallel to the axis of the bore. The point supposed to be struck is in the water-line.

ELEVATION	DISTANCE	HEIGHT of the PARTS aimed at, above the water		POINTS AIMED AT	
				IN A FRENCH SHIP OF 82 GUNS	IN A FRENCH FRIGATE OF 44 GUNS
				8-INCH GUN OF 63 CWT.—1 shell and 9 lbs. powder.	
Degrees	Yards	Ft.	In.		
Level	330	9	0	At the upper part of lower ports—Gun deck.	Middle of Gun-deck ports.
1	660	43	7	About half way between rail and fore yard.	About midway between water and Main cap.
2	970	108	6	3½ feet below Mizzen topmast cross-trees.	Fore topmast cross-trees.
3	1260	207	1	Above Main truck.	
				8-INCH GUN OF 55 CWT.—Charge 7 lbs. 1 shell.	
Level	283	7	6	Middle of lower-deck ports.	Sills of Gun-deck ports.
1	579	37	10	10 feet above hammock rail.	About midway between water and Fore cap.
2	689	79	8	Main top.	A little below Main cap.
3	1148	188	0	Just below Main truck.	Above Main truck.
				32-POUNDER OF 57 CWT.—Charge 9 lbs. 1 shot.	
Level	360	9	0	At upper part of Lower-deck ports.	Middle of Gun-deck ports.
1	760	48	9	About midway between Main cap and water.	Just under Fore yard.
2	1150	129	6	3 Feet above Fore topmast cross-trees.	Main topmast cap
3	...	...		Above Main truck.	
				32-POUNDER OF 27 CWT.—Charge 4 lbs. 1 shot.	
Level	250	7	0	Middle of lower-deck ports.	Sills of Gun-deck ports.
1	545	35	6	About 10 feet above hammock rail.	Midway between water and Main top.
2	800	90	9	Main cap.	6 feet above Main cap.
3	1047	171	6	Head of Main top-gallant rigging.	Main truck.

NOTE.—This mode of firing presents serious disadvantages. The points aimed at have often to be estimated as well as the distance of the enemy's vessel, the class of which can seldom be accurately determined; the men are taught to aim where they are not expected to hit, and the chances of the ricochet are lost; hence tangent firing should only be resorted to when there are no other means of regulating the elevation of the guns. The spars of English ships are rather less than those of French ships of the same class.

APPENDIX C.—No. I.

REPORT OF AN INSPECTION

Of the C. S. \_\_\_\_\_, \_\_\_\_\_ Commanding,  
 made by \_\_\_\_\_, this \_\_\_\_\_ day of \_\_\_\_\_, 186 ,  
 at \_\_\_\_\_.

ARMAMENT.

{ \_\_\_\_\_ }

[These inspections are required to be made of each vessel—when first commissioned and before proceeding to sea, chiefly with reference to the completeness of her equipment and the proper stationing of her crew; semi-annually during the cruise; and at the end of it before being paid off. As a general rule the first and last inspections are *not* to take place alongside of the navy yard, but in the stream.]

1. What time has the vessel been in commission, and what opportunities has she had for exercise and target practice?
2. Date of last inspection?
3. Date of last target practice?

		<i>Gun Divisions.</i>	<i>Hours.</i>	<i>Minutes.</i>
Times that each 5. division reported ready for action.	{	1st, commanded by		
		2nd,     "     "		
		3rd,     "     "		
		4th,     "     "		
		5th, &c. "     "		
		Master's     "     "		
		Powder     "     "		
		Engineer     "     "		
		Marine     "     "		

- 
6. Were *all* the divisions properly prepared? If not, state what divisions were found defective, in what particulars, and from what causes. Include in the answer to this question the condition of *division boxes, spare implements, and equipments*, and their readiness for use.
  7. Are the men well skilled in the exercise of the great guns, including working both sides at once, and in pointing and firing?
  8. Time required to dismount, shift carriage, remount, load and run out any broadside gun selected by the Inspecting Officer. State its position and weight.
  9. Time required to transport a gun from one side to the other, and back, in both cases ready for firing, giving numbers of ports and weight of gun.
  10. Time required to shift breechings, trucks, etc.
  11. Have the prescribed arrangements been correctly made for supplying the batteries with powder and projectiles; are the men properly stationed for these purposes, and are they expert in the performance of these duties? Is the supply ample and without confusion of charges?
  12. Condition of magazines, shell rooms, shot lockers, and lighting apparatus?
  13. Are the men well trained in securing masts and spars, stoppering rigging and repairing injuries to the steering apparatus, and in getting springs on the cables? State the time required to perform *efficiently* the most important of these operations; for instance:  
Bowsprit shot away, to secure foremast;  
Port main rigging and main stays disabled, to secure mainmast;  
To fish a lower mast and yard;  
Steering apparatus disabled, what means of repairs or substitutes prepared?
  14. Are the prescribed arrangements for stopping shot-holes complete, and the men well trained to that duty?
  15. Are the arrangements for boarding and repelling boarders efficient? Note the time required to assemble each division properly armed. Are the Boarders and others well trained in the use of the single-stick or broadsword?

16. Is the *whole crew* well trained in the use of small arms, and in company and battalion drill? If not, state the reasons assigned. State also the condition of the armory, small arms and their ammunition.
17. What is the state of the equipment and preparation of boats for armed service? If defective, in what particulars and for what assigned reasons?
18. Times from the call 'ARM AND AWAY' to the shoving off of each boat? Time to form a line abreast? Time required for other evolutions? Time required to land small-arm men, from the signal or order given when near the shore? Time to land howitzers, specifying their weights? Time to embark them; to shift from bow to stern? Time to load properly and fire safely three rounds? Are the crews expert in these points?
19. Are the arrangements and apparatus for extinguishing fire efficient? If not, state deficiencies and their causes. Times required to get the several streams of water to the designated point; time required for complete readiness.
20. Have the 'Ordnance Instructions' been fully complied with in this ship? State exceptions and reasons assigned, if any.
21. General condition of the vessel in point of armament, carriages and other ordnance equipments, and of the crew as to efficiency for action, stating particular exceptions, if any, and what remedies have been suggested or applied.



## APPENDIX C.—No. II.

## FORM OF REPORTS OF TARGET PRACTICE.

QUESTIONS TO BE ANSWERED AT LENGTH IN THE 'REMARKS'  
ON TARGET PRACTICE, IN ADDITION TO FILLING  
THE TABLES ON THE NEXT PAGES.

Was the ship at anchor or underway?

Under what sail?

Water rough or smooth?

Force and direction of wind in reference to line of fire?

Roll of the ship, in degrees by pendulum, during firing?

When 'carrying sail' by the wind, does heel of ship cause weather or lee guns to 'wood' before they are level?

Was target to windward or to leeward?

How was its distance measured?

Append sketch of target, showing its dimensions, mode of construction and materials, and the 'hits' and the fall of projectiles around it.

The degree of strain on breechings of weather batteries?

Were the chocking quoins necessary?

Probable causes of the failure of shells to burst?

Such other remarks as appear important or suggestive of improvement; such as the best mode of constructing a floating target of 20 by 10 feet, (the size used at the experimental battery, Washington,) etc.







## PRESERVATION OF SMALL ARMS.

The Captain will take care that the Small Arms are carefully cleaned and wiped dry after every exercise or use of them, before they are put away.

He will cause them to be frequently examined at other times, to prevent their being clogged with oil or licker, and to be sure that they are always ready for use.

He will strictly prohibit their being marked or otherwise defaced.

It is recommended that the men who use them be taught to clean them properly, and to remedy any slight defects or obstructions to their use.

Chests *not lined* preserve them best, if there be no proper armory.

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 APPENDIX D.
 

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 FORM OF EXERCISE AND MANŒUVRE  
 FOR THE BOAT HOWITZERS OF THE C. S. NAVY.
 

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## NOMENCLATURE.

THE CASCABEL is the part of the gun in the rear of the base ring; it is composed of—

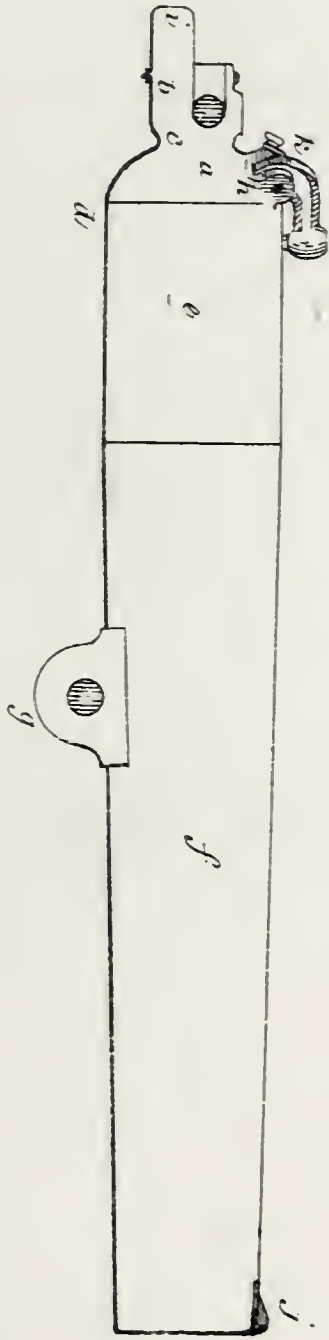
- (a) The breech plate.
- (b) The knob.
- (c) The neck.
  
- (d) Base ring.
- (e) Cylinder.
- (f) Chase.
- (g) Loop, with hole for bolt.
- (h) Lock lugs.
- (i) Lip for elevator.
- (j) Muzzle sight.
- (k) Mass for breech sight.

The BORE includes all the part bored out, viz :

- Cylinder of bore.
- Chamber.

These guns should not be rubbed bright, which might render it difficult to point them with a bright sun.

Boat Howitzer  
U. S. Navy.







## BOAT CARRIAGE.

- Bed.
- Slide.
- Compressor plate.
- „ bolts.
- „ handles.
- Lugs for loop.

## FIELD CARRIAGE.

- Axle.
- Trail.
- Braces.
- Lugs for loop.
- Trail wheel or runner.
- Bolt for do.
- Socket for handspike.
- Elevator.
- Disc of elevator.
- Box for elevator

## EXERCISE OF THE BOAT-HOWITZER.

WHILE preparations are in progress for clearing out the boats, the officer of the boat will see that the howitzer, and its various equipments, are also got in readiness. The junior Officer or Officers of the piece will attend to the gun itself and its carriages.

The Quarter Gunner will have the ammunition got up from below ; also the lock, sights, sponges, spare fuzes, ammunition pouches, primers, &c. (Breeching, if deemed necessary.)

This will be the proper occasion for charging the shrapnel and shells with powder, which should receive the particular attention of the officer who is to command the boat.

The Captain of the gun will look after the traverses, tracks, pivot-plates, &c.

The Coxswain will have ready the thwarts, oars, masts, sails, &c.

When the boat has been cleared for hoisting out, lay the thwarts and traverses, bolt the pivot-plates on the bows and quarters ; if the stem and stern pivot-plates interfere with the purchases, they can be secured after the boat is in the water. If the field carriage is to accompany the gun, lay the wheel and trail tracks.

In a sea-way, it may be better also to place the howitzer in the launch, laying it athwartships, and bolting the two ends of the slide into the bow pivot-plates, which will hold it perfectly firm.

As a general rule, the howitzer is not to be handled separately from one of its carriages. It may be hoisted into the launch on either field or boat carriage, as circumstances may dictate.

When the boat carriage is preferred, sling it with a stout strap passed through the loop-lugs and brought up round the gun, into which hook the purchase ; previously shove the bed a little towards the rear end of the slide, so as to have the carriage hang square, and set the compressors tight.

When the boat has been hoisted out, the howitzer, its ammunition, and equipments, will be stowed in it conformably to the requirements of the occasion.

Supposing the arrangements to be of a general character, and to be adapted, subsequently, to the service as circumstances may require.

---

The howitzer may be in the bow on its boat carriage, bolted to the stem pivot.

The field carriage aft, the wheels resting on the floor of the stern sheets and bearing against the after thwart; the trail laid over the quarter rail, so as not to interfere with the steering.

The ammunition can be stowed in the stern sheets, or elsewhere, as may be most convenient for trim of launch, or for its own preservation.

The Captain of the howitzer slings his haversack, and deposits in it a supply of primers, a vent bit, and vent cloth, which are handed to him by the Quarter Gunner.

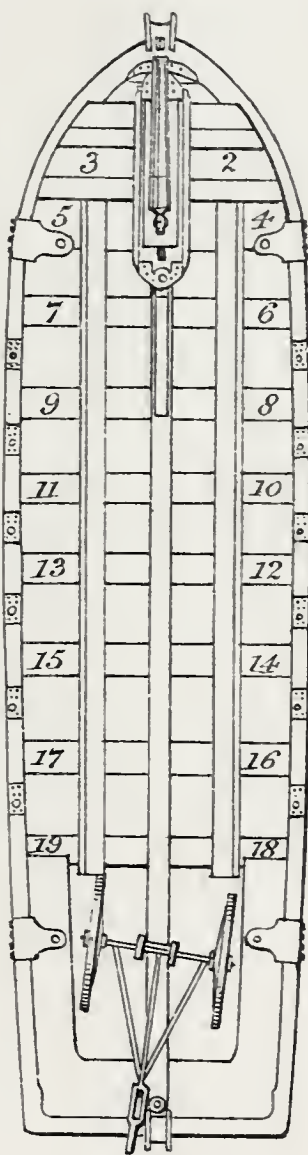
The stations in the boat and at the howitzer will be as follows, for 20 men ; if fewer are employed, the higher numbers are to be omitted :

BOAT.		HOWITZER.
<i>Stations.</i>		<i>Duty.</i>
Quarter Gunner, Coxswain, No. 1.	Ammunition, Helm. Bow.	Ammunition.  <i>Captain</i> of howitzer—points and fires the gun, superintends orders, and gives orders in absence of an officer.
<i>Port.</i>	<i>Starboard.</i>	
2. ———	Bow oar.	<i>Sponger</i> —sponges and rams home charge.
3. Bow oar.	————	<i>Loader</i> —receives and enters ammunition.
4. ———	2nd oar.	Tends forward compressor.
5. 2nd oar.	————	Tends after compressor.
6. ———	3rd oar.	Train rope.
7. 3rd oar.	————	Tends vent and puts in primer.
8. ———	4th oar.	
9. 4th oar.	————	
10. ———	5th oar.	
11. 5th oar.	————	
12. ———	6th oar.	
13. 6th oar.	————	
14. ———	7th oar.	
15. 7th oar.	————	
16. ———	8th oar.	
17. 8th oar.	————	
18. ———	9th oar.	
19. 9th oar.	————	

Officer of launch directs the whole operations, or may take especial charge of the howitzer.

Officer of the gun is in command of the piece, unless otherwise ordered by the Officer of the boat.

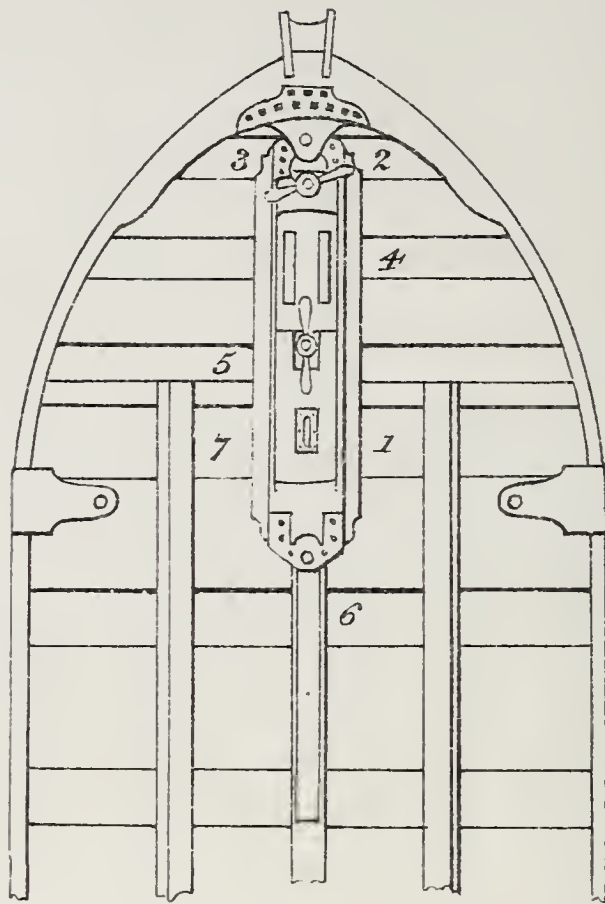
Stations in Boat.







Stations at Howitzer  
in Boat.





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(Preliminary Order)—MAN THE HOWITZER.

The Captain of the gun is to see that the elevator, sight, and lock are in order for firing.

Nos. 2, 3, 4, 5, 6, 7. Trail oars.

No. 2 goes to starboard side of muzzle, having the sponge and rammer ready.

No. 3 goes to port side of muzzle, takes out tompon.

No. 4 to starboard side, near forward compressor.

No. 5 port side, near after compressor.

No. 6 after end of slide, and hooks training-rope.

No. 7 tends the vent and puts in primer.

If the gun is unloaded, it must be run in.

1. SPONGE.

No. 7 closes vent. (*a*)

No. 2 enters the sponge, and, pressing it firmly to the bottom, turns it round and withdraws it. (*b*)

Quarter Gunner takes a round from the ammunition-box, and, if shell or shrapnel be used, holds it for the officer in command of gun to adjust the fuze.

2. LOAD.

Quarter Gunner passes forward with the fixed charge, protecting it under his jacket. (*c*)

No. 3 receives from Quarter Gunner and enters charge.

No. 2 rams home to the mark on rammer handle. (*d*)

No. 7 puts in primer, and covers it with his hand until Nos. 1 and 2 are clear of the gun. (*e*)

## 3. POINT.

Nos. 4 and 5 ease compressors. (*f*)

All six men and Captain of gun run out the howitzer. (*g*)

Nos. 4 and 5 then tighten compressors.

Officer of gun puts up the sight as directed by Officer of launch. (*h*)

Captain of gun brings the elevation within the limits of the boat's motion.

And causes No. 6, with the assistance of some others, to train nearly to object, if the boat is under way.

## 4. FIRE.

If the boat have motion, or is under way, a discretionary execution of this order is necessarily implied.

The assumed elevation having been given by the elevator, a slight motion of the helm is made to sweep the piece laterally, so as to cross the object.

The Captain of the gun closely watches this movement, with his eye down on the sights, and holding the lock laniard firmly, draws as soon as the sights coincide with the object.

Immediately after firing, he coils up the laniard, and pulls from the vent any pieces of the quill that may remain, also enters the bit to clear it entirely through. (*i*)

---

NOTES TO THE FORM OF BOAT EXERCISE.

(a) The necessity of closing the vent is now a mooted question ; as the operation itself is a slight one, having no appreciable effect in complicating or delaying the manœuvre of the gun, it is not deemed advisable to lay it aside in this 'Form.' The practice here shows that the most ready, and equally sure method, is merely to lay a piece of untwilled woolen cloth over the vent, and press it down with the hand, or else turn the lock on it, and hold that down.

(b) Too much care cannot be used in sponging ; as a premature explosion endangers life and limb : a moist sponge is to be preferred, for contact with it must surely extinguish every trace of fire in the bore.

It may be considered a safeguard against accident, if the absence of a single instance of the kind, in several years' practice, can be admitted as evidence ; during this time, the habit has been, in proving pieces, and exercising the men, to fire rapidly—ordinarily, seven or eight times in a minute.

(c) The head of the fuze composition must be guarded against moisture from the fingers, rain, or spray of the sea ; otherwise, there will be a failure to ignite.

(d) The ammunition is never to be struck with the rammer-head, but pushed home, and with very moderate force ; particularly omitting a very common practice of forcing the charge after it reaches the bottom of the bore. In ramming home the charge, No. 2 should always keep his body at the side of the chase, not before the muzzle.

(e) It is not necessary to pierce the cylinder of the charge when percussion primers are used ; their power being always sufficient to pass through it.

(f) It is only necessary to give the compressors a turn, or a part of a turn ; this will relieve the compression completely, and time is saved subsequently in compressing.

(g) Some will take hold of the standard of the carriage-bed that receives the loop of the piece, others of the breech or bed, as may be convenient, to run out the gun.

(*h*) In tightening the thumb-screw that retains the breech sight in position, do not turn it too hard ; the thread may be stripped by continuing to do so. The sight may descend by the shock of the discharge, but this is of no moment.

In point-blank firing, the breech sight is not required ; the eye must then range along the cylinder and muzzle sight.

(*i*) The charge may refuse fire ; if this arises from not properly drawing the lock, it will be evident at sight, as the wafer of the primer will not flash, in which case No. 7 will throw back the lock.

If the primer explodes without acting on the charge care must be taken not to approach the piece too soon, as it may only hang fire, and the recoil will injure any one in the way of it. After a seasonable pause, the Captain of the howitzer will remove the residue of the primer, pass the bit down the vent, and insert another primer.

---

### PIVOTING THE HOWITZER.

The sweep allowed by the stem pivot is about one point and a half starboard or port; if it is not sufficient to train the piece on the object, without diverging inconveniently from the course or position of the boat, then the bow pivots may be used.

The Officer of the launch gives the order—

#### PIVOT ON THE PORT (or Starboard) Bow.

No. 6, with the assistance of the others, trains the rear end of the slide into the bow pivot which is *not* to be used. No. 7 bolts it in. No. 2 draws bolt out of stem pivot and, with assistance, draws round the forward end of the slide into the pivot *to be used*; drops in the bolt. No. 6 withdraws the bolt from rear end of slide.

The sweep on the bow pivots includes an arc of about 120 degrees.

It is not advisable to train the howitzer more than a point abaft the beam if forward, or more than a point forward the beam if aft; as the accidental explosion of a shell near the muzzle, and even of a shrapnell, might be dangerous to those in the boat.

On the bow pivot, the piece may be pointed nearly from the direction of the keel to a little abaft the beam.

### SHIFTING THE HOWITZER.

If this does not bear on the object with such assistance as is admissible from the helm, then the Officer of the launch may direct the howitzer to be shifted to the other end of the boat.

The light 12-pounders, with their boat carriages, average 660 lbs. each; and can be transported by hand from one end of the boat to another.

With their boat carriages the 12-pounders of 750 average 1,200 lbs. each; the 24-pounders about 2,000 lbs., and will probably be more conveniently managed, especially if the boat have motion, by placing rollers ( $2\frac{1}{2}$  to  $2\frac{3}{4}$  inches in diameter) on the tracks laid for the field-carriage. On these the boat carriage can be shifted from one end to the other, using light falls at each end to keep it under command.

---

## DISEMBARKATION OF THE HOWITZER.

### 1. PREPARE TO LAND.

The Quarter Gunner fills the pouches or passing-boxes with one round each, and passes them to the men, each of whom, except No. 2, slings a pouch over the right shoulder, and buckles the strap as short as possible, so as to keep the ammunition clear of the water when leaving the boat.

The Captain of the gun also shortens the strap of his haversack.

### TRAIL BOW AND STROKE OARS.

Nos. 2 and 3 will adjust the bed of the boat carriage to its proper place on the slide for shifting; place the muzzle-block, and make the muzzle bear on it by means of the elevator; pass the strap around the neck of the cascable, and put the shifting-spar through the strap; the Quarter Gunner, assisted by the men from the after oars, raises the field carriages up on the tracks.

### 2. TRAIL.

The boat being beached in season, the men trail their oars and jump to their stations.

Nos. 4 and 5 over the bow to adjust the skids, which are launched by Nos. 6 and 7.

No. 2 attends the elevator.

No. 3 attends the muzzle.

Nos. 8, 10, 11, and 13 the shifting-spar, assisted by as many of the crew as can take hold.

No. 9 draws the loop-bolt.

The Stroke Oarsmen run the field carriage forward, the Quarter Gunner guiding it on the track by the trail.

### 2. SHIFT THE HOWITZER.

Now clear the elevator; heave up the breech of the gun by the spar; Nos. 6 and 7 back the bed on the slide; run the field carriage a little forward, so that its lugs come under the loop of the howitzer; lower the piece; put in the loop-bolt and elevator; hook on the drag-rope and ship the trail-handspike in its socket.

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#### 4. LAND.

Nos. 2, 3, 6, and 7 now jump out of the boat, and, with Nos. 4 and 5, divide to each skid; not standing between them, but keeping outside of them. The Stroke Oarsmen wheel the piece up to the gunwale by the spokes, the Quarter Gunner guiding the trail by the trail-handspike; so as to ease the howitzer down from the bow, the Quarter Gunner guiding it on the skids with care, so that the wheels may not run off sideways.

When down off the skids and on the bottom, the drag-rope may be hooked around the axle, and the howitzer run up on the beach.

The Captain of the howitzer superintends, and assists whenever it may be necessary.

The sponges and rammers are now to be attached in their places on the trail.

If required, one or two boxes or double boxes may be lashed under the axles.

The boxes contain 9 rounds each, the double boxes 18 rounds each.

#### EMBARKATION OF THE HOWITZER.

When the howitzer is to be embarked, the ammunition-boxes, if slung to the axle, should be cast off from it, and put in the boat separately.

The men unslung the ammunition-pouches or passing-boxes, and pass them into the boat, which is to be brought to a convenient distance from the beach, the skids laid and secured.

The field carriage is pointed with the trail towards the boat, and drawn down to the skids, with a wheel resting on each.

Nos. 2, 3, 4, 5, 6, and 7 divide at the wheels, and take hold of the spokes, so as to assist the carriage up. No. 14 ships the trail-handspike, and tends it with No. 15. The rest of the men get into the boat and take hold of the drag-rope. At the word HEAVE! the men at the wheels bear the carriage up on the skids, those in the boat haul on the drag-rope, and the two at the trail bear it up so that the Quarter Gunner, who stands at the bow, can get hold of the trail-handspike and guide the carriage fairly.

When the howitzer is in the boat, the skids are unhooked and put in the boat by Nos. 4, 5, 6, and 7.

The howitzer may now be shifted to the boat carriage, by reversing the process already described in orders Nos. 1, 2, and 3, for the shifting to the field carriage.

## EXERCISE WITH HOWITZER ON FIELD CARRIAGE.

## GUN'S CREW.

<i>Stations.</i>	<i>Duty.</i>
Quarter Gunner.	Charge of ammunition and spare equipments.
No. 1. Rear of breech, to the right.	<i>Captain of piece</i> —points and fires the howitzer, superintends orders, and gives orders in absence of an officer.
2. Starboard side of muzzle.	Sponges and rams home.
3. Port side of muzzle.	Receives and enters ammunition.
4. Rear and outside of starboard wheel.	Assists at starboard wheel.
5. Rear and outside of port wheel.	Passes ammunition, assists at port wheel.
6. Five yards rear of starboard wheel.	Assists at starboard wheel, attends bolt of trail wheel, and trail handspike.
7. Five yards rear of port wheel.	Passes ammunition, assists at port wheel.
8. With No. 6.	Assists at starboard wheel.
9. With No. 7.	Assists at port wheel.
10. Rear of breech, to the left.	Closes the vent, puts in primer.

## (Preparatory Order)—MAN THE HOWITZER.

The men go to their stations as above designated.

If the piece has been just landed, the *Captain of the howitzer* will have been provided with his haversack, previously supplied.

All the men, except No. 2, with one round in a pouch.

No. 2 takes the sponge and rammer.

No. 6 unbolts trail wheel, and ships handspike in its socket of trail.

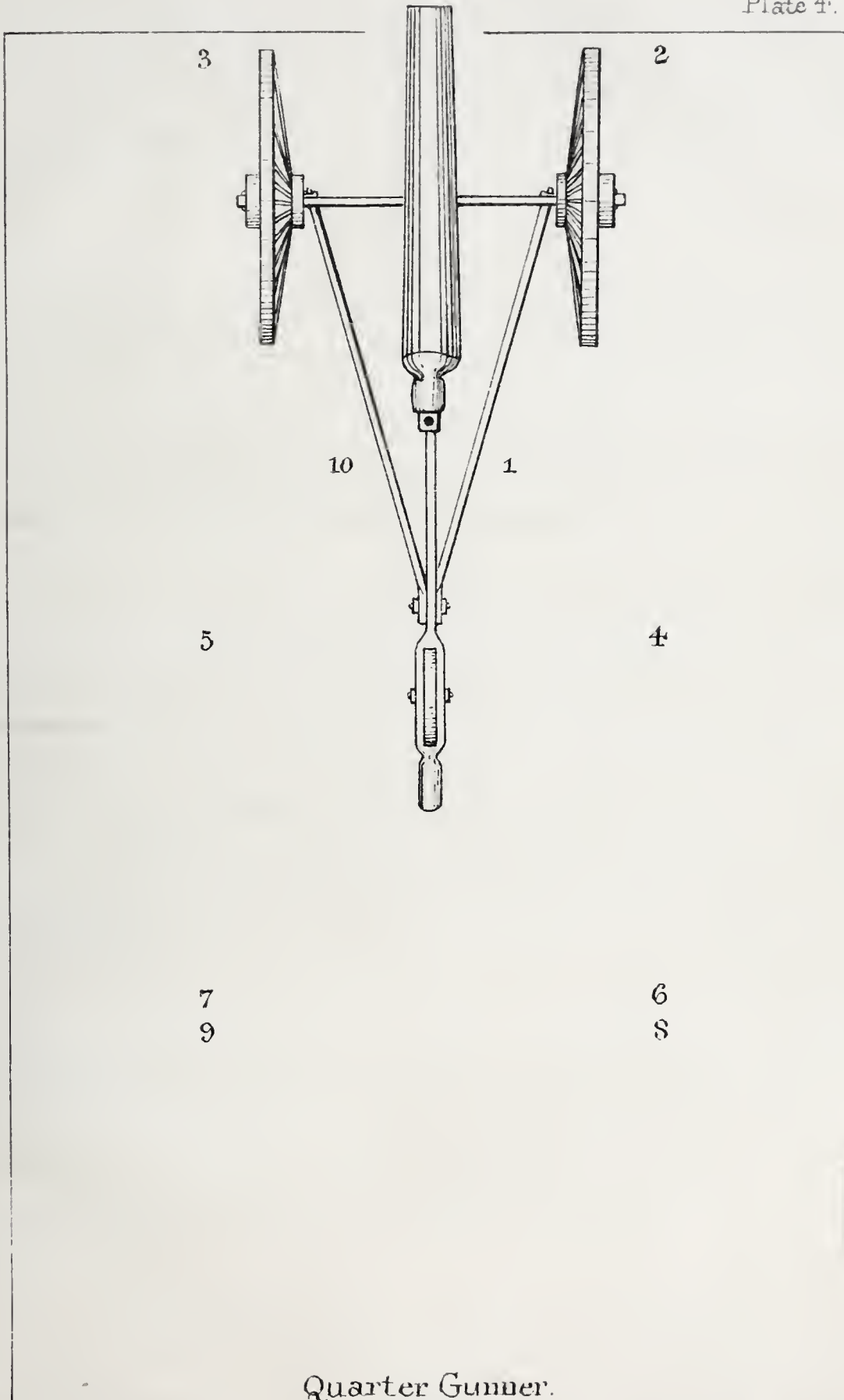
The ammunition-box, if there be any with the howitzer, is to be deposited about twenty-five yards in the rear of the howitzer, in charge of Quarter Gunner.

The drag-rope is deposited with the ammunition-box.



Stations at the Field Carriage .

Plate 4.



Quarter Gunner.

*Ammunition*  
*Box.*



---

### 1. SPONGE.

No. 2 enters the sponge, and, pressing it firmly to the bottom, turns it round and withdraws it.

Quarter Gunner takes a round from the ammunition box, or from the pouch or passing box of one of the men; and, if shell or shrapnel be used, holds it for the Officer in command to adjust the fuze.

### 2. LOAD.

The charge is to be passed along by the Quarter Gunner to No. 7, and by No. 7 to No. 5, and by No. 5 to No. 3, who enters it into the muzzle.

No. 2 rams home to the mark on rammer-handle.

No. 10 puts in primer, and covers it with his hand until Nos. 2 and 3 have withdrawn to their stations outside the wheels.

### 3. POINT.

Officer of gun puts up the sight, as directed by Officer in command.

The Captain of the gun gives the piece the proper elevation with the screw, and causes No. 6 to train the gun with the trail-handspike to the desired direction. He then withdraws as far as the lock laniard permits, standing on the right quarter of the breech, and outside of the wheel.

No. 10 stands outside of the port wheel. Nos. 2 and 3 fall back upon Nos. 1 and 10, and the remainder of the gun's crew take the stations first assigned them.

### 4. FIRE.

The Captain of the howitzer instantly draws the laniard at the word.

No. 10 closes the vent.

Nos. 5, 7, and 9 go to the port wheel; 4, 6, and 8 to the star-board wheel, taking hold of the spokes, ready to wheel the carriage forward, as may be directed by the Officer in command.

(Concluding Order)—SECURE THE HOWITZER.

The Quarter Gunner secures the ammunition-box, and gets ready the beackets or lashing.

The Captain of the howitzer coils the laniard around the lock.

No. 6 bolts the trail wheel.

No. 2 may carry the sponge in his hand if the fire is merely suspended.

No. 6 may also carry the trail-handspike.

Nos. 7 and 8 hook on the drag-rope, and lead its parts fair for taking hold.

Wheel the piece over the ammunition-box, and lash or becket it to the axle.

The piece is now ready for any change of position.

APPENDIX E.

TABLES OF ALLOWANCES OF ORDNANCE EQUIPMENTS AND STORES.

NOTE.—Allowances not proportioned to guns or to ships are proportioned to the complements of Petty Officers, Seamen, Ordinary Seamen, Landsmen, and Boys, and must vary with them.

The ARMAMENTS are designated by special order of the Bureau of Ordnance and Hydrography.

NAMES OF ARTICLES <i>(For contents of Boxes, see Article 497.)</i>	PROPORTION TO EACH GUN	SHIPS OF THE LINE		FRIGATES		SLOOPS OF WAR				BRIGS				STEAMERS			
		CLASSES		CLASSES		RAZEEES		CLASSES		CLASSES		CLASSES		CLASSES		CLASSES	
		1st	2nd	1st	2nd	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
		265	235	156	135	97	67	521	333	110	61	224	187	75	50		
COMPLEMENTS.....	...	721	402	265	235	156	135	97	67	521	333	110	61	224	187	75	50
AMMUNITION	...	26	15	10	10	9	7	6	3	15	11	6	3	10	9	4	3
CAPS, Percussion (200 to each piece).....	...	54	24	16	16	14	12	10	4	24	16	10	4	16	14	6	4
CARTRIDGES, Musket, Ball (100 to each piece). "	...	11	5	3	3	3	3	2	1	5	3	2	1	3	3	2	1
" Musket, Blank (20 to each piece) "	...	12	10	8	8	7	6	5	2	10	7	5	2	8	7	3	2
" Carbine, Ball (100 to each piece) "	...	18	11	8	8	6	5	4	2	12	8	4	2	8	6	3	2
" Revolver " (100 " " ) "	...	18	11	8	8	6	5	4	2	12	8	4	2	8	6	3	2
" Pistol " (100 " " ) "	...	18	11	8	8	6	5	4	2	12	8	4	2	8	6	3	2
FIXED AMMUNITION, } SHRAPNEL.....	6																
with fuzes, &c., for } SHELL.....	2																
HOWITZERS. } CANISTER.....	3																
FUZES, in metal stocks, } $\frac{1}{2}$ of 5"; $\frac{1}{4}$ of 10"; & }																	
for empty shell. } $\frac{1}{4}$ of 15". 1 each. }																	
FUZES, in paper cases, assorted as above.....																	

Spare; hermetically sealed; one to four shells.

TABLES OF ALLOWANCES OF ORDNANCE EQUIPMENTS AND STORES—*continued.*

NAMES OF ARTICLES	PROPORTION TO EACH GUN	SHIPS OF THE LINE	FRIGATES	SLOOPS OF WAR						BRIGS				STEAMERS				
				CLASSES						Classes				Classes				
				Razees		1st		2nd		3rd		1st	2nd	3rd	4th	1st	2nd	3rd
COMPLEMENTS.....	...	721	402															
AMMUNITION— <i>continued.</i>																		
Powder, Cannon .....																		
" Saluting.....																		
" Musket.....																		
" for filling shell.....																		
PRIMERS, for Great guns.....	300																	
" for Boat and Field guns .....	360																	
" Friction, for all guns.....	50																	
SHELL, filled, fuzed, and cased, Shot guns.....	25																	
" " " Shell guns.....	40																	
" " &c., Pivot guns, extra.....	40																	
" empty, for all Shell guns.....	45																	
SHOT, Solid, for Shot guns.....	80																	
" Solid, extra, 64-pounder Pivot.....	20																	
" Grape, stands for each gun.....	...	4	4	8	8	8	8	8	8	4	8	8	8	8	8	8	8	8
ARMS, EQUIPMENTS, AND SPARE PARTS.																		
Axes, Battle, Belts and Frogs*.....	...	170	92	60	54	36	34	20	10	110	60	25	10	60	40	12	10	10
Muskets, Bayonets and Scabbards.....	...	270	120	80	80	70	60	50	20	120	80	50	20	80	70	30	20	20
" Ball Screws and Wipers.....	...	27	12	8	8	7	6	5	2	12	8	5	2	8	7	3	2	2

\* The Belts and Frogs of the portion of Pistols superseded by the Revolvers may be issued for the Battle-axes.

TABLES OF ALLOWANCES OF ORDNANCE EQUIPMENTS AND STORES—continued.

NAMES OF ARTICLES	PROPORTION TO EACH GUN	SHIPS OF THE LINE	FRIGATES	SLOOPS OF WAR						BRIGS	STEAMERS							
				CLASSES							CLASSES							
				RAZEEES							SCREW				SIDE-WHEEL			
				1st	2nd	3rd	1st	2nd	3rd		1st	2nd	3rd	4th	1st	2nd	3rd	4th
COMPLEMENTS .....	...	721	402	265	235	156	135	97	67	521	333	110	61	224	187	75	50	
ARMS, EQUIPMENTS, ETC.—continued.																		
Musket, Bands, sets .....	...	14	6	4	4	3	3	2	1	6	4	3	1	4	3	2	1	
" Bayonets and Scabbards, spare .....	...	14	6	4	4	3	3	2	1	6	4	3	1	4	3	2	1	
" Boxes and Belts .....	...	270	120	80	80	70	60	50	20	120	80	50	20	80	70	30	20	
" Breech Screws .....	...	7	3	2	2	2	2	2	1	3	2	2	1	2	2	1	1	
" Cartridge Formers, sets .....	...	2	2	2	2	2	2	2	1	2	2	2	1	2	2	1	1	
" Hammers .....	...	14	6	4	4	4	3	3	1	6	4	3	1	4	4	2	1	
" Cones .....	...	27	12	8	8	7	6	5	2	12	8	5	2	8	7	3	2	
" Cone Picks .....	...	270	120	80	80	70	60	50	20	120	80	50	20	80	70	30	20	
" Guard Screws .....	...	14	6	4	4	4	3	3	1	6	4	3	1	4	4	2	1	
" Hand Vices, spring .....	...	14	6	4	4	4	3	3	1	6	4	3	1	4	4	2	1	
" Locks, complete .....	...	7	3	2	2	2	2	2	1	3	2	2	1	2	2	1	1	
" Lock Screws, small .....	...	75	30	20	20	18	15	13	5	30	20	13	5	20	18	8	5	
" Screw-drivers and Cone Keys .....	...	27	12	8	8	7	6	5	2	12	8	5	2	8	7	3	2	
" Side Screws .....	...	27	12	8	8	7	6	5	2	12	8	5	2	8	7	3	2	
" Springs, sets .....	...	14	6	4	4	3	3	2	1	6	4	3	1	4	3	2	1	
" Tang Screws .....	...	14	6	4	4	3	3	2	1	6	4	3	1	4	3	2	1	
" Triggers .....	...	7	3	2	2	2	2	2	1	3	2	2	1	2	2	1	1	
" Wire and Tumbler Punches .....	...	14	6	4	4	4	3	3	2	6	4	3	2	4	4	2	2	
" Worms and Scrapers .....	...	14	6	4	4	4	3	3	2	6	4	3	2	4	4	2	2	





TABLES OF ALLOWANCES OF ORDNANCE EQUIPMENTS AND STORES—continued.

ALLOWANCE TABLES.

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NAMES OF ARTICLES	PROPORTION TO EACH GUN	SHIPS OF THE LINE	FRIGATES	SLOOPS OF WAR				STEAMERS							
				CLASSES				SCREW				SIDE-WHEEL			
				RAZES				CLASSES				CLASSES			
1st	2nd	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th		
COMPLEMENTS.....	...	721	403												
MAGAZINES AND SHELL-ROOMS															
ADZE, copper .....	...														
BRUSHES, Dusting .....	No.														
BUCKETS, Water, copper-bound.....	"														
CANS, Water, copper-bound.....	"														
DRESSES and SHOES .....	suits														
DUST PANS, copper .....	No.														
FORMERS, Cartridge Bag .....	sets														
FUNNELS, for Cartridges .....	No.														
" for Shell .....	"														
KNIVES, copper .....	"														
MEASURES, copper .....	"														
SCREENS, baize .....	sets														
TANKS, Powder, copper .....	No.														
" Screws, spare .....	"														
" Heavers .....	"														
" Wrenches .....	"														
THRUMS, woollen, tying bags .....	"														
VICES, copper .....	"														
YARN, worsted, sewing bags .....	lbs.														

ALLOWANCE TABLES.

NAMES OF ARTICLES	PROPORTION TO EACH GUN	SHIPS OF THE LINE				FRIGATES				SLOOPS OF WAR				BRIGS				SCREW				SIDE-WHEEL			
		CLASSES		RAZES		CLASSES		RAZES		CLASSES		RAZES		CLASSES		RAZES		CLASSES		RAZES		CLASSES		RAZES	
		1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
COMPLEMENTS.....	...	721	402	265	235	156	135	97	67	521	333	110	61	224	157	75	50								
MISCELLANEOUS																									
AWLS, Saddlers'.....No.	...	36	24	18	18	12	12	12	6	24	18	12	6	24	18	12	6								
AXES, Wood, for Field guns....."	...	6	5	5	5	4	4	3	2	5	5	4	3	5	4	3	2								
BANDS, Mast, for fishing spars.....sets	...																								
BARS, Dismounting, Howitzer.....No.	1																								
BEDS AND QUOINS, spare, each....."	$\frac{1}{10}$																								
BLOCKS, double and single, each....."	$\frac{2}{10}$																								
BOLTS, Pivot, spare, Pivot guns....."	1																								
" " " Broadside pivots....."	$\frac{2}{10}$																								
" " " Howitzers....."	1																								
" Shackle and Breeching, spare....."	$\frac{2}{10}$																								
BOOKS, Account and Return.....sets	...	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1								
" Ordnance Instructions.....No.	...																								
BORING BITS, Ship's guns....."	$1\frac{4}{10}$																								
BOXES, Division, Supply and Reserve....."	...																								
" Passing, Great guns....."	1																								
" " Field guns....."	12																								
" " Boat guns (24-pounder)....."	3																								
" for spare articles of Boat guns....."	1																								
" Packing, for Ammunition....."	...																								
" Primer, Gun Captains....."	2																								

One set for each lower mast and bowsprit.

For carriages requiring them.

2 for each vessel.

and 2 for each boat gun.

One of each to each division of guns.

As required to hold it.

TABLES OF ALLOWANCES OF ORDNANCE EQUIPMENTS AND STORES—continued.

ALLOWANCE TABLES.

NAMES OF ARTICLES	PROPORTION TO EACH GUN	SHIPS OF THE LINE	FRIGATES	SLOOPS OF WAR						BRIGS						STEAMERS					
				CLASSES						CLASSES						CLASSES					
				RAZES			CLASSES			RAZES			CLASSES			RAZES			CLASSES		
				1st	2d	3d	1st	2d	3d	1st	2d	3d	4th	1st	2d	3d	4th	1st	2d	3d	4th
COMPLEMENTS.....	...	721	402	265	235	156	135	97	67	521	333	110	61	224	187	75	50				
<i>MISCELLANEOUS -- continued.</i>																					
BRACKETS, Sponge and Rammer .....	2	On	cove	red	dec	ks.															
BRECHINGS for Truck carriages .....	2	2																			
" " Friction carriages .....	1	1																			
BUCKETS, Fire, with laniards.....	1	1																			
CAMPBOR, preserving woollens .....	...	6	4	4	3	3	2	1	1	5	4	2	1	4	3	2	1				
CARRIAGES for Great guns.....	No.	1																			
" " Boat gun .....	1	1																			
" " Field gun .....	1	1																			
" " Clamps, Traverses, Skids, &c. ....	...	...																			
" " Spare, in parts for stowage .....	...	...																			
CARTRIDGE BAGS, spare, in bales .....	10	3	2	1	1	1	1	1	1	2	1	1	1	2	1	1	1	1	1		
" " Paper, reams .....	...	...																			
CHARGERS for Shrapnel .....	1	1																			
CHOCKS, Rail, for Pivot guns.....	2	2																			
" " Shifting, for Howitzers .....	1	1																			
" " Housing, lower deck .....	2	2																			
COMPRESSORS, spare .....	...	...																			
" " spare, for Boat guns .....	1	1																			
COVERS, Lock and Sight, sets .....	1	1																			
" " Canvas, Pivot and Boat guns.....	1	1																			





TABLES OF ALLOWANCES OF ORDNANCE EQUIPMENTS AND STORES—continued.

NAMES OF ARTICLES	PROPORTION TO EACH GUN	SHIPS OF THE LINE				FRIGATES				SLOOPS OF WAR				BRIGS				STEAMERS								
		CLASSES				CLASSES				CLASSES				CLASSES				CLASSES								
		Razees				1st		2nd		3rd		1st		2nd		3rd		4th		1st		2nd		3rd		4th
COMPLEMENTS.....	...	721	402	265	235	156	135	97	67	521	333	110	61	224	187	75	50									
<b>MISCELLANEOUS—continued</b>																										
LAMP Wick, woven.....gross	...																									
" Chimneys.....No.	...																									
" Scissors....."	...																									
LANTERNS, Dark.....	$\frac{1}{10}$																									
" Battle, gun decks....."	1																									
" LASHINGS, Breast and Muzzle.....each	1																									
LEAD, Black, pulverised.....lbs.																										
LINCH-PINS, spare.....No.	$\frac{1}{10}$																									
LOOP-PINS, Howitzer....."	1																									
PRIMING-WIRES, 2 to each gun....."	2																									
LOCKS, GUN, complete....."	$1\frac{1}{4}$																									
" Howitzer, complete....."	2																									
" String, spare.....fathoms	3																									
" Screws, Nuts, and Toggles.....sets	1																									
LEATHER, BUFF.....skins	...																									
" BRIDLE.....sides	...																									
MATCH ROPE....."	...																									
" STAVES.....No.	$\frac{1}{10}$																									
MUSLIN for Targets.....yds.	...																									
MUZZLE BAGS.....No.	1																									

Half gross to each lamp requiring them.  
Six to each lamp requiring them.  
One pair to each light-box.

TABLES OF ALLOWANCES OF ORDNANCE EQUIPMENTS AND STORES—continued.

NAMES OF ARTICLES	PROPORTION TO EACH GUN	SHIPS OF THE LINE	FRIGATES	SLOOPS OF WAR						BRIGS	STEAMERS						
				CLASSES							SCREW	SIDE-WHEEL					
				Razees								Classes					
				1st	2nd	1st	2nd	3rd	4th			1st	2nd	3rd	4th		
COMPLEMENTS.....	...	721	402	265	235	156	135	97	67	521	333	110	61	224	187	75	50
MISCELLANEOUS—continued																	
OIL, SPERM, Small Arms .....	...	10	8	6	6	5	5	5	3	8	6	5	3	6	5	3	3
PADLOCKS and Keys, of brass .....	...	Two to each magazine, shell-room, and light-box scuttle.															
PINS, Breeching Shackle Keys .....	$\frac{2}{10}$																
PUNCHES for .....	$\frac{2}{10}$																
PORT PENDANTS, chain, lower deck.....	...	100	75	50	50	45	45	40	20	75	50	40	20	50	40	20	20
PUTTY, in bladders .....	...																
QUOINS, Choeking, Truck Carriages .....	$\frac{2}{10}$																
RAMMERS and Staves .....	1																
" Heads, spare.....	$\frac{1}{10}$																
" Staves, spare.....	$\frac{1}{10}$																
" and Sponge, Howitzer .....	$\frac{2}{10}$																
RATTLES, Boarding, hand.....	$\frac{2}{10}$																
" fixed.....	...																
SABOTS, one for each empty Shell .....	...																
" Straps, one set for each empty Shell .....	...																
SCRAPERS, Gun .....	$\frac{1}{10}$																
" for Sponge-heads .....	...																
SCREW PLATE AND TAP, fuze .....	...																
SELVAGEES AND HEAVERS .....	1																
SHEARS, Sheep, for Sponges .....	...																

Priming wires - Two to each gun

TABLES OF ALLOWANCES OF ORDNANCE EQUIPMENTS AND STORES—continued.

NAMES OF ARTICLES	PROPORTION TO EACH GUN	SHIPS OF THE LINE		FRIGATES		SLOOPS OF WAR				BRIGS				STEAMERS					
		CLASSES		CLASSES		CLASSES				CLASSES				CLASSES					
		RAZEEES		RAZEEES		RAZEEES		RAZEEES		RAZEEES		RAZEEES		RAZEEES		RAZEEES		RAZEEES	
		1st	2nd	1st	2nd	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th		
COMPLEMENTS.....	...	721	402	265	235	156	135	97	67	521	333	110	61	224	187	75	50		
<i>MISCELLANEOUS—continued</i>																			
SHOOTS, Canvas .....	No.																		
SHOVELS, Entrenching .....	"																		
SIGNS, for Great Guns .....	$1\frac{1}{10}$ sets																		
" Breech, Howitzer .....	No.																		
" Trunnion .....	"																		
" Thumb-screws, spare .....	"																		
SLINGS, Gun, Chain .....	"																		
SPONGES, Bristle .....	"																		
" Woollen, Pivot Guns .....	"																		
" " Broadside Guns.....	"																		
" " Heads and Staves, spare .....	"																		
SPRING-SPIKES, Howitzer .....	"																		
STRAPS, Dismounting, Howitzer .....	"																		
STICKS, Single .....	"																		
TACKS, copper, for Sponges .....	"	70	60	50	50	40	40	30	20	60	50	40	20	50	40	30	20		
" iron, for Sabot Straps .....	"	1000	500	300	300	200	200	200	100	500	300	200	100	500	300	200	100		
TACKLES, Gun, complete .....	"	2000	1000	600	600	500	500	500	300	1000	600	500	300	1000	600	500	300		
" Spare .....	"	3																	
" Port, Lower Deck .....	"	1																	
TARGET FRAME, rough .....	"	2																	
	...																		

One for each chain of Scuttles.  
Two to each field-carriage.

Long and short.  
One for each pivot-gun requiring them.

and set for each pivot-gun, as required.

One to each vessel. To be fitted on board.



TABLES OF ALLOWANCES OF ORDNANCE EQUIPMENTS AND STORES—continued.

ALLOWANCE TABLES.

NAMES OF ARTICLES	PROPORTION TO EACH GUN	SHIPS OF THE LINE			FRIGATES			SLOOPS OF WAR						BRIGS						STEAMERS					
		CLASSES			RAZES			RAZES			RAZES			RAZES			SCREW			SIDE-WHEEL					
		1st	2d	3d	1st	2d	3d	1st	2d	3d	1st	2d	3d	1st	2d	3d	1st	2d	3d	4th					
COMPLEMENTS.....	...	721	402		265	235		156	135	97	67		521	333	110	61		224	187	75	50				
<b>MISCELLANEOUS—continued.</b>																									
THUMBSTALLS.....	No.	2																							
THREAD, Shoe.....	lbs.	...																							
TOMPIONS.....	No.	1																							
TRUCKS, Spare.....	"	$\frac{1}{10}$																							
" Transporting.....	sets	...																							
TUBS, Division.....	No.	...																							
" Fire.....	"	...																							
VENT DRILLS and Braces.....	sets	$\frac{1}{10}$																							
" Punches.....	No.	$\frac{1}{10}$																							
" Guards.....	"	1																							
WADS, Selvagee.....	"	...																							
" Junk, soft.....	"	5																							
WAX, Bees'.....	lbs.	...																							
WORMS, Robinson's.....	"	$\frac{1}{10}$																							
WRENCHES, Fuze and Cap, each.....	"	$\frac{1}{2}$																							
" Patent Screw.....	"	...																							
"	"	...																							

One for each class of guns on friction carriages.  
 One for each division.  
 One for each chain of scuttles.  
 One to each shot, and one in each shell box.  
 One pound to each gun; two pounds to each shell and pivot gun.  
 One to each vessel, for tightening bolts.

NOTE.—The allowances of vessels of classes not specified in the above tables will be regulated by special orders from the Bureau of Ordnance and Hydrography.

Q. 2. 1910 X









Form 45

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Ordnance Instructions for  
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Navy

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