



# Bodleian Libraries

UNIVERSITY OF OXFORD

This book is part of the collection held by the Bodleian Libraries and scanned by Google, Inc. for the Google Books Library Project.

For more information see:

<http://www.bodleian.ox.ac.uk/dbooks>



This work is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 2.0 UK: England & Wales (CC BY-NC-SA 2.0) licence.

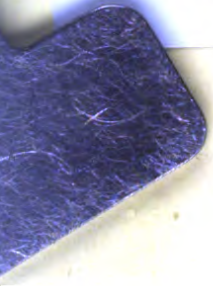
THE  
1914  
BOYS' MANUAL

SWIMMING  
AND  
RESERVE TRAINING SHIPS OF THE  
ROYAL NAVY

STAFF COMMANDER J. J. JARVEY, R.N.  
— F. R. C. S.



600018074Q

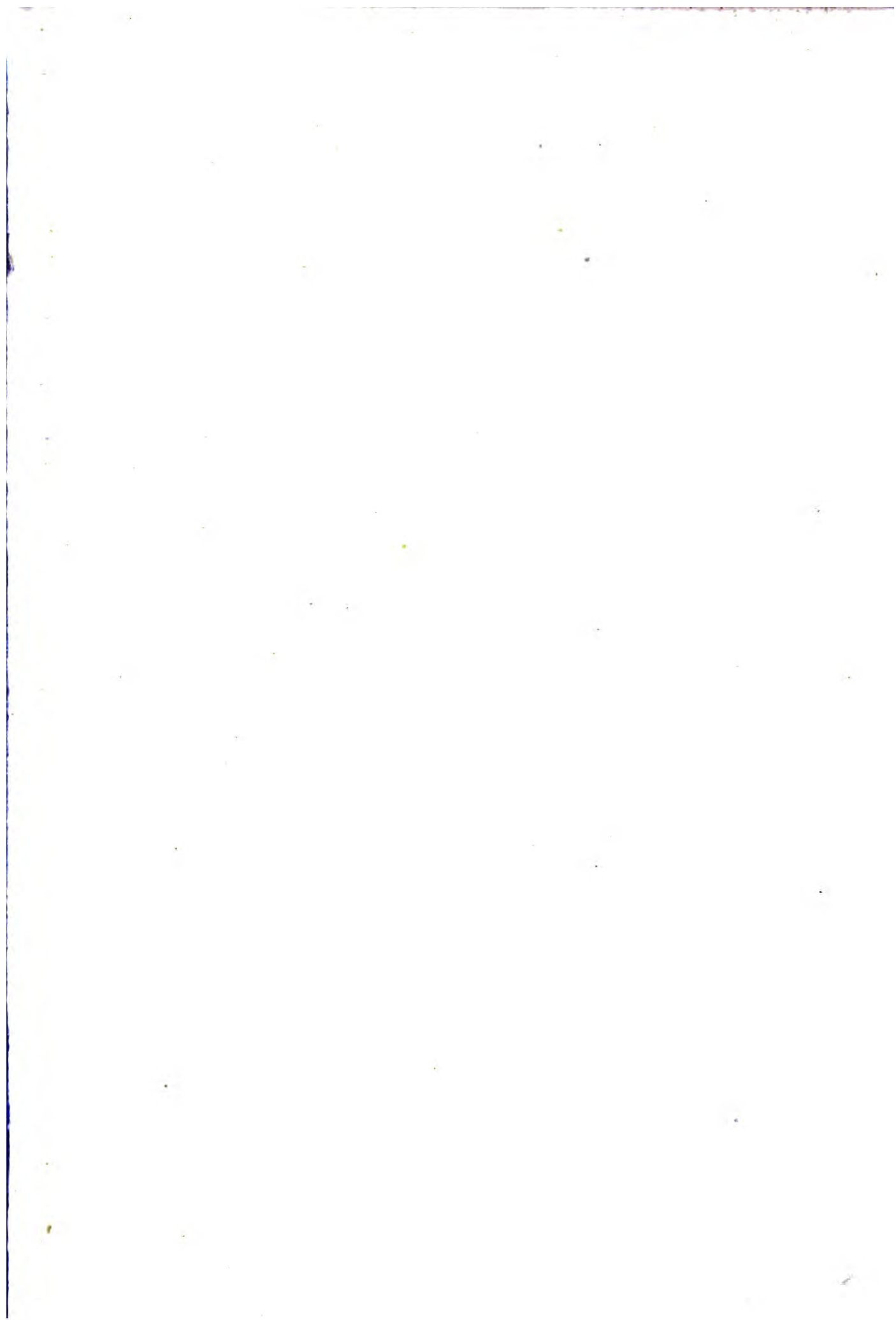




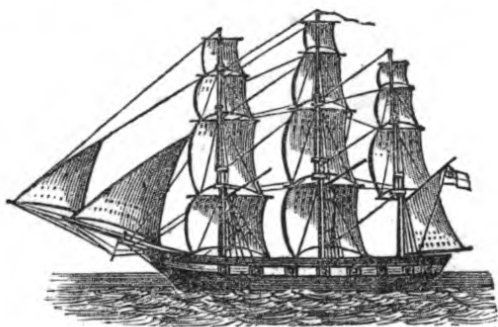


600018074Q

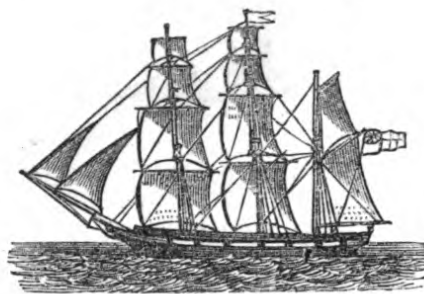




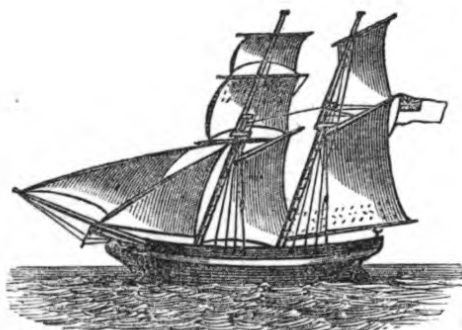
# DIFFERENT RIGS OF SHIPS USUALLY MET AT SEA.



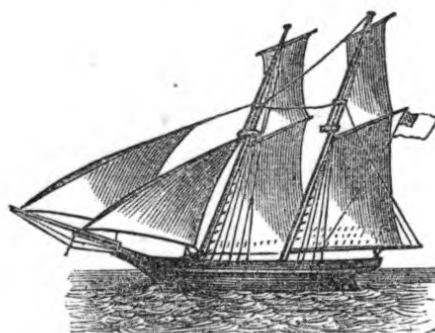
SHIP.



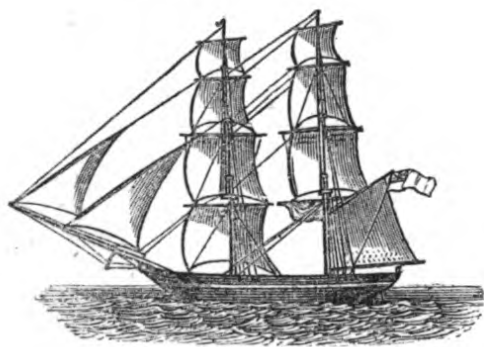
BARQUE.



TOPSAIL SCHOONER.



FORE AND AFT SCHOONER.



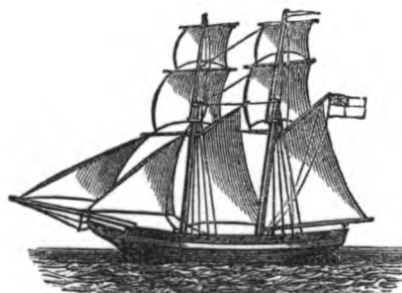
BRIG.



BRIGANTINE.



HERMAPHRODITE BRIG.



TWO TOPSAIL SCHOONER.



APPROVED BY THE LORDS COMMISSIONERS OF THE ADMIRALTY,  
*To be used in the Training Ships of the Royal Navy.*

---

THE  
**BOY'S MANUAL**  
OF  
**SEAMANSHIP AND GUNNERY**

COMPILED FOR THE USE OF  
THE TRAINING SHIPS OF THE ROYAL NAVY.

BY  
**STAFF-COMMANDER C. BURNEY, R.N.**  
SUPERINTENDENT OF GREENWICH HOSPITAL SCHOOL.



*SECOND EDITION.*

LONDON:  
**FREDERICK WARNE AND CO.**  
BEDFORD STREET, COVENT GARDEN.

[All Rights reserved.]

231. g. 10.



LONDON:  
SAVILL, EDWARDS AND CO., PRINTERS, CHANDOS STREET,  
COVENT GARDEN.

**Dedicated**

**TO**

**THE RIGHT HONOURABLE H. C. E. CHILDERS,**

**AND**

**THE LORDS OF THE ADMIRALTY,**

**BY WHOSE PERMISSION THIS MANUAL IS TO BE USED FOR THE  
INSTRUCTION OF THE BOYS IN THE TRAINING SHIPS  
OF THE ROYAL NAVY.**



## P R E F A C E.

---

THIS Manual of Seamanship and Gunnery has been written for the use of Boys under training for Her Majesty's Navy. It is arranged so as to meet the various instructions laid down in the Training Regulations, and contains full information in all matters which boys are required to learn. I trust it will prove interesting and useful to them. My principal object has been to explain everything simply and clearly, so that a boy may the more readily understand the practical teaching he receives daily in the course of his training, and so enable him to pass with greater facility from one thing to another, and prevent his becoming a "backward boy." With proper attention to his Instructors, and reading this book carefully at leisure times, he may prepare himself thoroughly for the Quarterly Examinations, on which the credit of the boys and of the ship to which they belong, must depend. I have included everything that a First Class Boy ought to learn; and I also intend it as a connecting link to another book called "*The Young Seaman's Manual*," which I have also compiled for the use of the young seamen of the Navy, and which treats more fully of a seaman's duties.

Such portions of the Training Regulations printed by Authority, considered useful for the guidance of boys, have been added, so that a boy can easily ascertain all the advantages therein held out to him by continuous good conduct; he will learn what are the qualifications for good conduct badges, and their advantages; also the qualifications for the rating of First Class Boys—in short, everything connected with the Training Regulations with which it is necessary that a boy should be acquainted.

I wish to add here a few words by way of advice to the boys:

I would impress upon a boy's mind who has selected the Navy for his future career in life, that he has chosen one of the most honourable professions, that of defender of his country, one in whose hands very often its honour and standing with other nations is entrusted. He should ever keep in mind that the Navy has always been considered the right arm of England; most highly esteemed by his countrymen, and of which every Englishman is naturally proud. This being an acknowledged fact, two things are required of every boy, and these should never be lost sight of by him—viz., honesty of character, and a determination to become master of his profession. The latter he has every opportunity of accomplishing. He is received into the Navy at an early age, and at a great expense to the country; he is trained to fill with credit to himself the highest position it is possible for him to attain; al-

ways provided his conduct will justify it, for all the training in the world will avail nothing if good conduct is not added to good qualifications.

It is to this, therefore, that I would specially call the attention of every boy joining a training ship; it will not take him long to distinguish between the good and bad boys; then let him avoid the latter in every possible way. Boys of good character are allowed to land from the ship twice a week for a walk, or to see their friends if they reside in the neighbourhood; my advice therefore is, prize this privilege without infringing upon it, as any deviation from the rules often leads a boy into loose habits, and the first step down the ladder of destruction is commenced.

A mean, or cowardly boy, will sometimes rather run the risk of incurring the displeasure of his superiors, by wilfully breaking the regulations laid down for his guidance, than stand the scorn and derision of the bad boys, who will in every way induce him to do wrong, and laugh at him for being afraid if he refuses. But the brave, honest boy, who fears nothing but the displeasure of his commanding Officer for direct disobedience of orders, his great aim is to conquer all difficulties and go forth into the service maintaining a good character, continuing in the path he has marked out for himself, which is to lead to the top of his profession. These are the boys who eventually are promoted to one of the most valuable classes of Officers in the Navy—viz., Warrant Officers.

I would therefore ask each boy on first joining a Training Ship to consider these remarks, which are offered for his future good, and to remember that rules must be strictly obeyed, and that leave is a privilege granted him for recreation, to use and not to abuse. When on shore avoid all intoxicating drinks and the use of tobacco in every shape. Never enter a publichouse. Make this, on joining the Navy, the fixed principle of your life—allow no inducement to cause you to turn aside from the path you have marked out. When on board pay strict attention to your instructions; be cleanly in your habits; careful of your kit; always ready to obey orders, remembering that implicit obedience is one of the chief ingredients required in making a good sailor. A boy that does this, will finish life as he has commenced it—a credit to himself and the Service.

If you commence life in a Training Ship with dirty habits, inattention to your drills, and a disregard to good order when on shore, you will leave it with an indifferent character; if you start badly, you may be sure you will end your course badly; perhaps be dismissed the service with disgrace, or discharged from your first ship on paying off as an objectionable character, being ever after shunned by your old shipmates as a man unworthy of being known, thus becoming a burden to yourself, and die at an early age, unregretted and uncared for.

C. B.

ROYAL HOSPITAL SCHOOLS, GREENWICH,

*April, 1871.*

# CONTENTS.

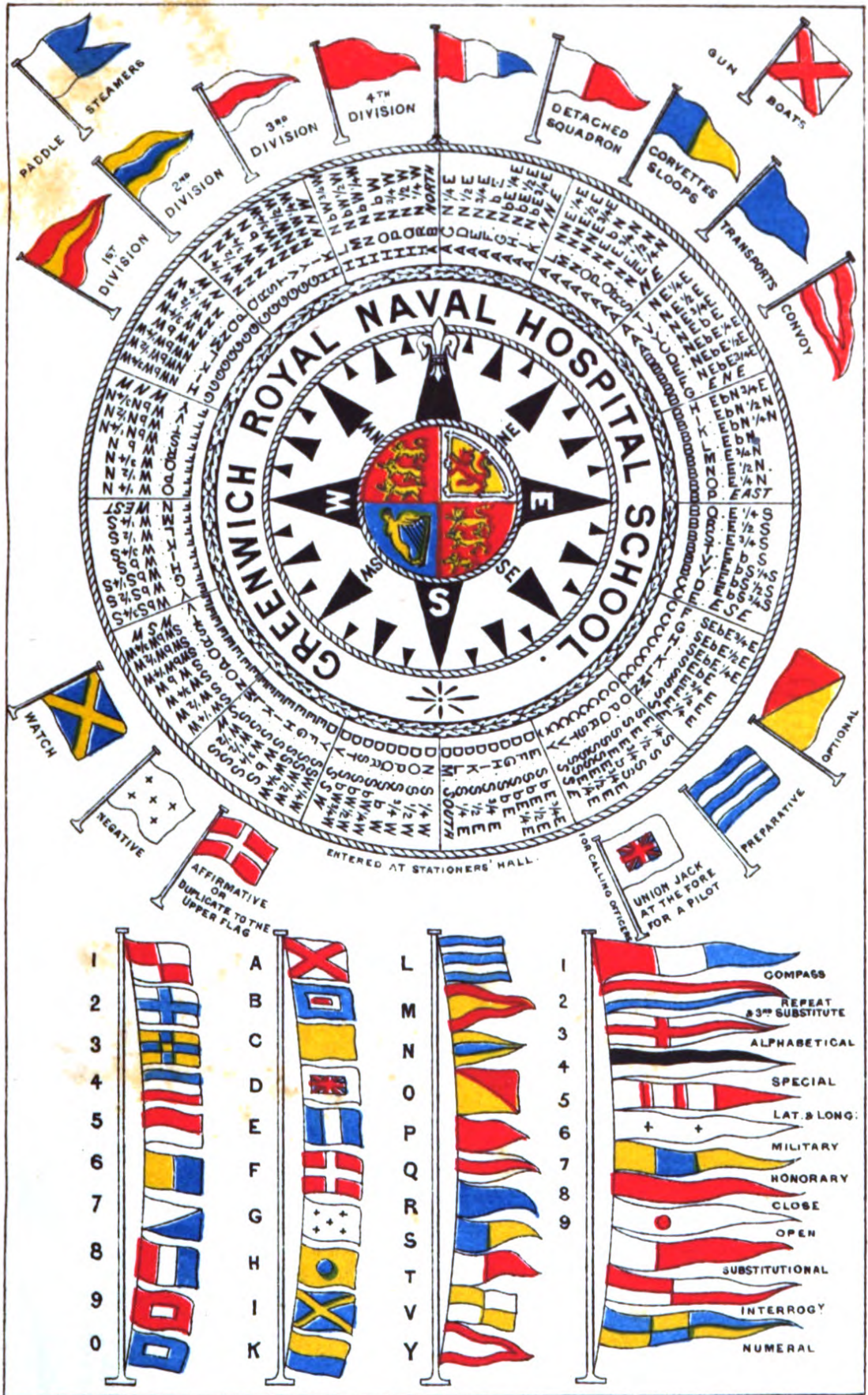
---

	PAGE
Colomb's Flashing Signals . . . . .	xi
Homograph to be used when unable to communicate by other means	xiii
Distant Signals for Boats having no reference to Colour . . . . .	xv
Seamanship, 1st Instruction . . . . .	1
Weather Table . . . . .	7
Arrangement of Crews . . . . .	9
Seamanship, 2nd Instruction . . . . .	13
Seamanship, 3rd Instruction . . . . .	21
Tables for Fitting Blocks . . . . .	29
Seamanship, 4th Instruction (Standing Rigging) . . . . .	33
Seamanship, 4th Instruction (Running Rigging) . . . . .	72
Seizings . . . . .	84
Whippings . . . . .	88
Rope Making . . . . .	89
Sailmaker's Instruction . . . . .	92
Sails, and how Fitted . . . . .	96
Sail Instruction . . . . .	109
Boat Exercise . . . . .	138
Compass Instruction . . . . .	159
Conning Ship—Technical Terms used in . . . . .	166
Lead Line Instruction . . . . .	169
Admiralty Notice respecting Lights and Fog Signals . . . . .	172
Blocks . . . . .	176
Purchases . . . . .	178
Fittings . . . . .	182
Parts of a Capstan, &c. . . . .	184
Parts of an Anchor . . . . .	186
Description of Chain Cables . . . . .	187
Technical Terms relating to Anchors and Cables . . . . .	201
Life Buoys, and their Use . . . . .	202
Log Line.—Log Ship . . . . .	204
Gunnery Exercise . . . . .	208
Heavy Rifled Gun Exercise . . . . .	215
Truck Gun Exercise . . . . .	231
Exercise with Breech-Loading Guns . . . . .	239
Exercise with Boats' Guns . . . . .	239
Musketry Instruction . . . . .	240
Snider Rifle Drill . . . . .	244
Naval Cutlass Exercise . . . . .	255
Sword Bayonet Exercise . . . . .	263
Pistol Exercise . . . . .	264
Rules and Regulations for the Instruction of Boys . . . . .	266
Rules for the Information of Newly-raised Boys . . . . .	278
Form of Monthly Return of Progress of Boys . . . . .	279

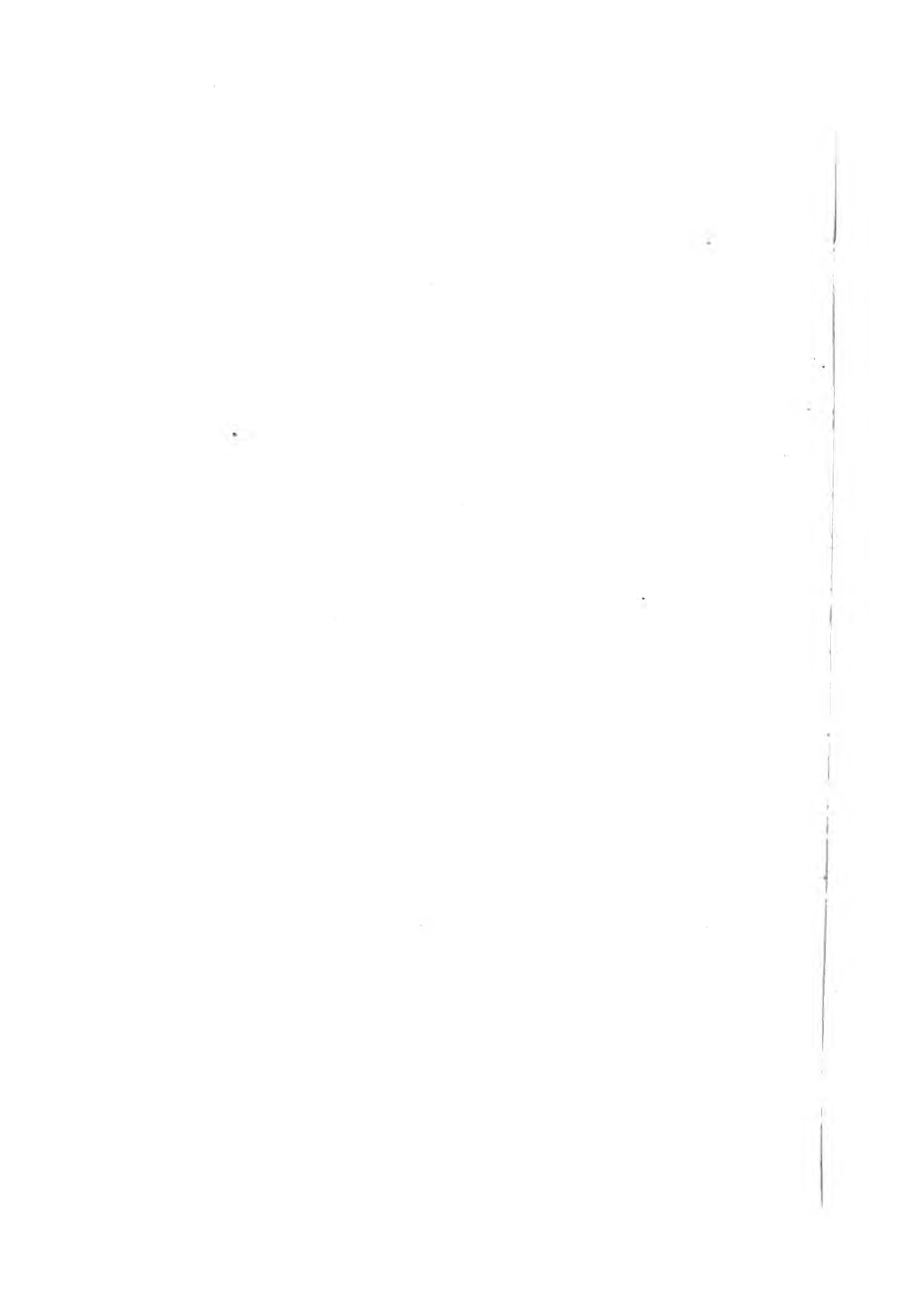
## LIST OF ENGRAVINGS.

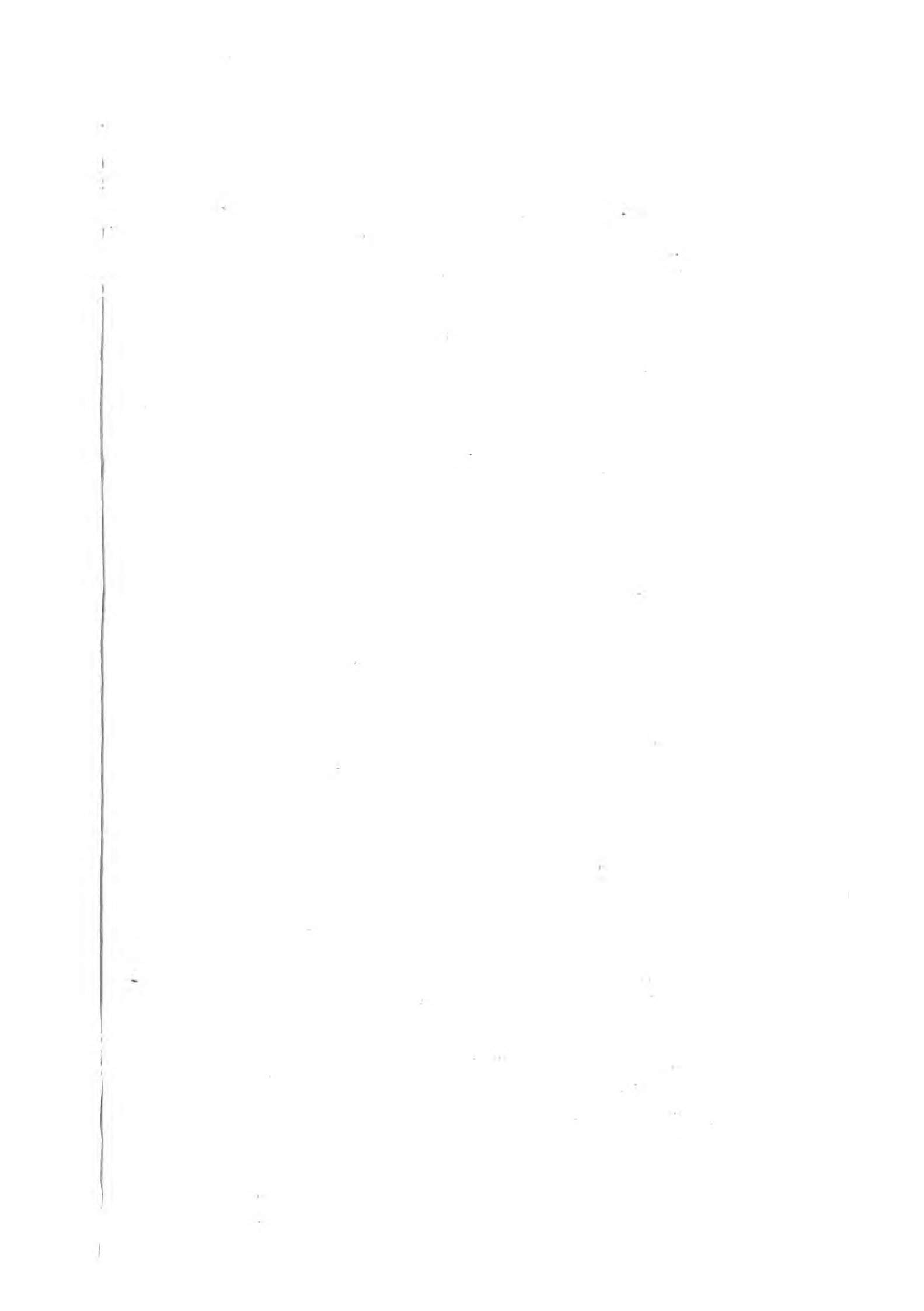
---

	PAGE
Knots, Bends, and Hitches, and Slinging a Cask ; Putting on a Jigger . . . . .	15 & 19
Block Strops, Reef Becket, Knots, &c., &c. . . . .	25
Getting Tops over, sending Lower Crosstree up . . . . .	35
Rigging a Bumpkin, Securing Lanyards of a Forestay and a Shroud that has been shot away . . . . .	38
Placing a Lower Cap and Topmast Crosstrees . . . . .	42
Sending a Lower Shroud Aloft, Setting up Lower and Topmast Rigging Ratlines, A Boatswain's Toggle . . . . .	44
Clothing a Bowsprit, Rigging a Jib-boom . . . . .	54
The Bunt of a Lower, Topsail, and Topgallant Yard . . . . .	63
A Rose Lashing and Racking Seizing . . . . .	87
Skeleton Sails, Course . . . . .	97
A Topsail . . . . .	98
Topgallant Sail . . . . .	99
A Royal . . . . .	100
Boom Mainsail, or Spanker . . . . .	101
Jib . . . . .	102
Staysail . . . . .	103
Storm Trysail . . . . .	104
Lower and Topmast Studdingsails . . . . .	105
Topgallant Studdingsails . . . . .	106
Maincourse, Topsail, Topgallant Sail, and Royal . . . . .	107
Different Modes of bending Headsails to Stays, and bending Head Sheets . . . . .	128
Passing a Head Earring and a Reef Earring . . . . .	133
A Yawl . . . . .	138
Rig of Boats used in the Navy . . . . .	141
Different Rig of Boats, and Dipping a Lug . . . . .	143 & 155
A Cutter on a Wind . . . . .	146
Laying-out a Stream Anchor, Towing a Boat, and Hauling a Boat up on a Beach . . . . .	147
A Cutter before the Wind . . . . .	148
A Topsail Schooner Yacht . . . . .	152
Compass . . . . .	159 & 161
Ships' Bow Lights . . . . .	175
A Barque . . . . .	195
A Fore and Aft Schooner on a Wind . . . . .	196
A Bollardhead, A Capstan, Belaying a Rope, Biting a Cable . . . . .	198
Securing a Bower Anchor for Sea, A Log Ship and a Deep-Sea Lead . . . . .	206









# FLAGS OF THE PRINCIPAL MARITIME NATIONS.



*Admiralty Flag.*



*Royal Standard*



*Cinque Ports*



*British Merchant*



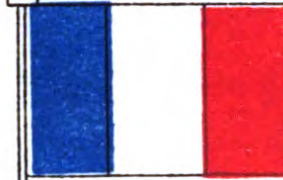
*British Man of War*



*Naval Reserve*



*America*



*France*



*Belgium*



*Italy*



*Turkey*



*Greece*



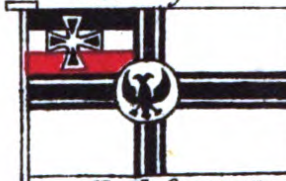
*Portugal*



*Brazil.*



*Austria.*



*North German  
Conf. Man of War*



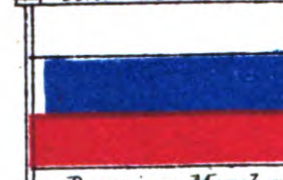
*North German  
Conf. Merchant*



*Russian Man of War*



*Spain*



*Russian Merchant*



*Holland.*



*Danish Merchant*

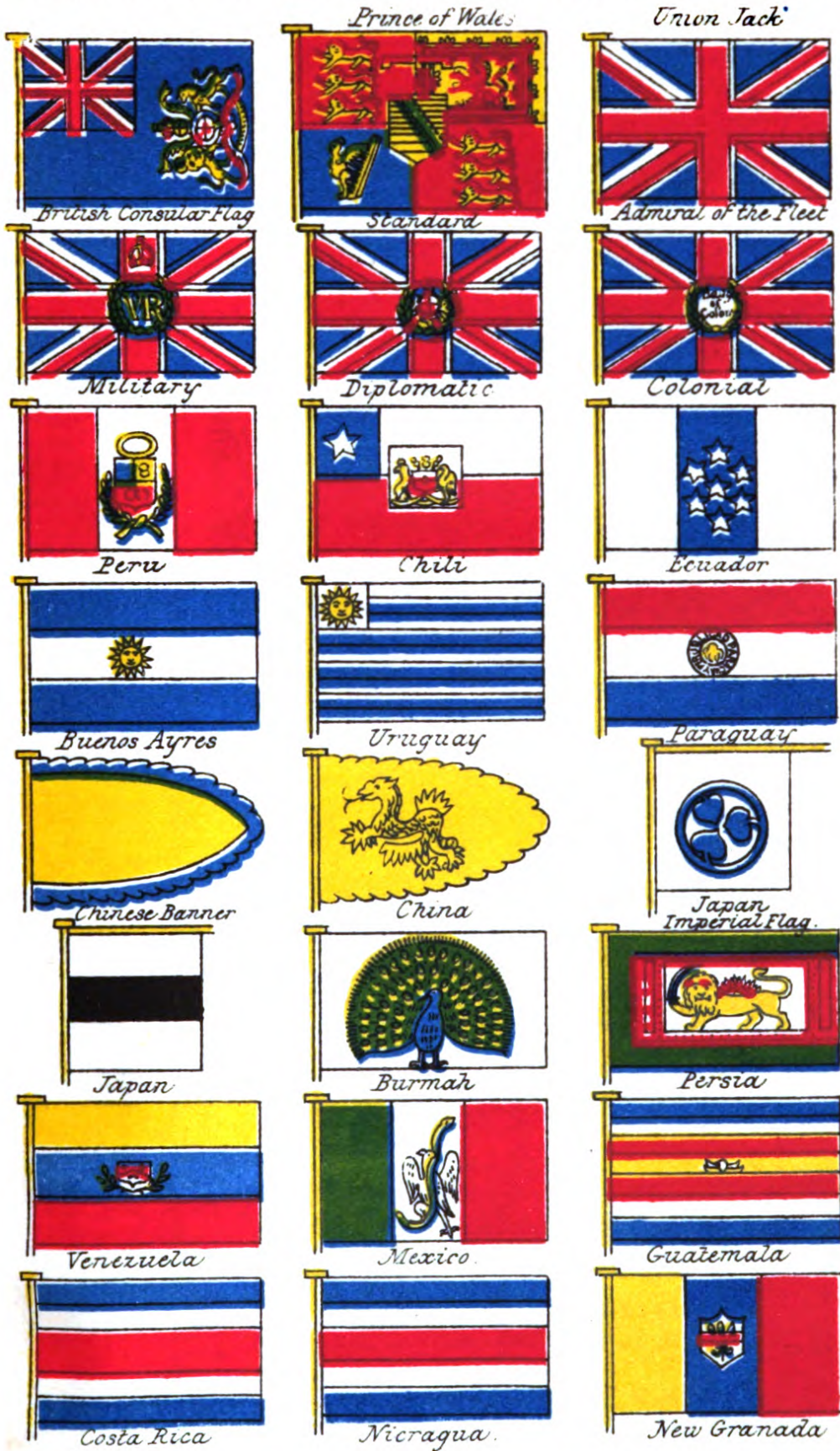


*Swedish Merchant*



*Norwegian Merc.*

**DISTINGUISHING JACKS . NATIONAL FLAGS & c**



Handwritten text, possibly a list or notes, located in the upper left quadrant of the page.

Handwritten text, possibly a list or notes, located in the upper middle quadrant of the page.

Handwritten text, possibly a list or notes, located in the upper right quadrant of the page.

Handwritten text, possibly a list or notes, located in the middle left quadrant of the page.

Handwritten text, possibly a list or notes, located in the middle middle quadrant of the page.

Handwritten text, possibly a list or notes, located in the middle right quadrant of the page.

Handwritten text, possibly a list or notes, located in the lower left quadrant of the page.

Handwritten text, possibly a list or notes, located in the lower middle quadrant of the page.

Handwritten text, possibly a list or notes, located in the lower right quadrant of the page.

## COLOMB'S FLASHING SIGNALS.

### COMPASS TABLE

When a Compass Signal is made by itself it signifies that the Admiral intends to steer that course.

11.	N. by E.	27.	S. by W.
12.	N.N.E.	28.	S.S.W.
13.	N.E. by N.	29.	S.W. by S.
14.	N.E.	30.	S.W.
15.	N.E. by E.	31.	S.W. by W.
16.	E.N.E.	32.	W.S.W.
17.	E. by N.	33.	W. by S.
18.	East.	34.	West.
19.	E. by S.	35.	W. by N.
20.	E.S.E.	36.	W.N.W.
21.	S.E. by E.	37.	N.W. by W.
22.	S.E.	38.	N.W.
23.	S.E. by S.	39.	N.W. by N.
24.	S.S.E.	40.	N.N.W.
25.	S. by E.	41.	N. by W.
26.	South.	42.	North.

Quarter points are denoted by the figures 1, 2, and 3.  
Thus "Comp." 232 = S.E. by S.  $\frac{1}{2}$  S.

### HORARY TABLE.

11.	1 P.M.	23.	1 A.M.
12.	2 "	24.	2 "
13.	3 "	25.	3 "
14.	4 "	26.	4 "
15.	5 "	27.	5 "
16.	6 "	28.	6 "
17.	7 "	29.	7 "
18.	8 "	30.	8 "
19.	9 "	31.	9 "
20.	10 "	32.	10 "
21.	11 "	33.	11 "
22.	12 Midnight.	34.	12 Noon.

Minutes are denoted by their proper figures.

Thus "Hor." 2135 = 35 minutes past 11, P.M.

Seconds must be made separately.

# COLOMB'S FLASHING SIGNALS.

TABLE OF FLASHES FOR ALL SIGNAL BOOKS.

1	----
2	--
3	----
4	----
5	----
6	-----
7	-----
8	-----
9	-----
0	-----
Preparative	----- &c.
Finish or Stop	----- &c.
General Answer	----- &c.

NOTE.—Two descriptions of flashes are used, the short and the long, the former being about half a second in duration, and the latter about a second and a half.

NAVAL SIGNAL BOOKS.	FLASHES.	ALPHABET.	
		A	5
Compass . . . . .	-----	B	C
Pendants . . . . .	-----	6	7
Numeral . . . . .	-----	G	H
Geographical . . . . .	-----	11	12
Horary . . . . .	-----	L	M
Interrogative . . . . .	-----	16	17
Negative . . . . .	-----	Q	R
List of Navy . . . . .	-----	21	22
Alphabet . . . . .	-----	V	W
		26	27
		X	Y
		28	29
		Z	30

The Boat's Signal Book to be used for all Vocabulary Signals.

All Signals from the General Signal Book to be repeated.

Vocabulary Signals to be answered with the "General Answer."

All Signals made to a single Ship, Division, or Squadron, to commence and end with their Pendants.

Care to be taken in trimming the lamps, not to spread the wicks.

When it is necessary to use a Signal from the Boat's Signal Book which consists of less than 4 figures, it must be made up to 4 figures by means of cyphers placed before it.











The "Distant Signals" of Ships to be used with the "List of the Navy" Pendant.

"Starboard Division" is denoted by "Pendants" 1.

"Port Division" by "Pendants" 2.

# HOMOGRAPH TO BE USED WHEN UNABLE TO COMMUNICATE BY OTHER MEANS.







A Sword, Tiller, Stick, or Stretcher as described below.

Position.	No.	Figure.	Position.	No.	Figure.
In right hand, perpendicular over the body.	1	* 	In right hand, perpendicular over the body, left arm extended.	6	
Elevated 45°, arm always extended.	2		Elevated in right hand 45°, left arm, extended.	7	
Horizontal in right hand.	3		In right hand horizontal, left arm extended.	8	
Depressed 45° in right hand.	4		In right hand, depressed 45°, left arm extended.	9	
In left hand extended horizontally.	5		Held horizontally over the head with both hands.	0	




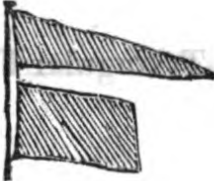
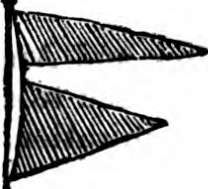

\* An Oar may be used, with the handle on the ground, and the blade in the direction of the point of the sword, &c, when convenient.



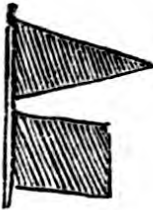

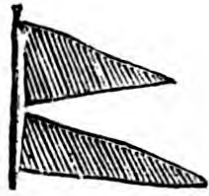


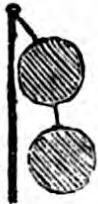
**HOMOGRAPH TO BE USED WHEN UNABLE TO COMMUNICATE BY OTHER MEANS—*continued.***

No.	Figure.	Position.
1st Substitute and Affirmative.		In each hand, extended perpendicularly over the head.
2nd Substitute and Negative.		In each hand extended horizontally.
Demand or Preparative.		Hat off, left arm extended.
Answer and Geographical.		Handkerchief, or Flag spread.
Interrogative.	Wave over the head, with right arm.	
Numeral and Horary.		In right hand extended horizontally, left arm held perpendicularly over the head.
Finish after each separate signal.	In each hand, waved over the head.	
Finish Altogether.		Hands against the hips, elbows extended.

DISTANT SIGNALS FOR BOATS HAVING NO  
REFERENCE TO COLOUR.

1		A Single Pendant.
2		One Square Flag.
3		One Triangular Flag.
4		One Pendant <i>over</i> one Square Flag.
5		One Pendant <i>over</i> one Triangular Flag.
6		One Square Flag <i>over</i> one Pendant.

DISTANT SIGNALS FOR BOATS—*continued.*

7		One Triangular <i>over</i> one Square Flag.
8		Two Square Flags.
9		One Triangular Flag <i>over</i> one Pendant.
0		One Square <i>over</i> one Triangular Flag.
		Is the Preparative, Stop, and Answer ; to be shown twice if used to denote the finish to a communication.
		Negative.

# SEAMANSHIP.

## FIRST INSTRUCTION.

*Q.* NAME the decks of a three-decked ship?

*A.* Ships termed in the Navy three-deckers, are so named from having three batteries or gun decks under the upper deck, but they actually have five decks, viz., upper, main, middle, lower, and orlop deck, such as the "Impregnable" and "St. Vincent" training ships for boys; the "Britannia," training ship for Naval Cadets; the "Excellent," gunnery ship at Portsmouth; and the "Duke of Wellington," receiving ship at Portsmouth.

*Q.* Name the decks of a two-decked ship?

*A.* So named from having two gun decks below the upper deck, but in reality, a ship termed a two-decker in the Navy has four decks, viz., upper, main, lower, and orlop decks, such as the "Boscawen," "Implacable," and "Ganges," training ships for boys.

*Q.* Name the decks of a frigate?

*A.* Upper, main, and lower decks; a frigate has only one gun deck below the upper deck, the main deck.

*Q.* Name the decks of a corvette or smaller vessel?

*A.* Upper and lower decks; the upper deck is the gun deck.

The arrangements as to decks, holds, &c., of an iron-clad are quite different to a regular built frigate.

An iron ship, iron plated, is built in compartments (water-tight).

*For example.*—The "Resistance" and "Defence" class.

The main deck is divided into three compartments, named the after, battery, and fore compartments.

All below the main deck is divided into flats, entirely separated from each other by water-tight partitions.

A separate hatchway and ladder communicates with each flat from the main deck, therefore there is no possibility of getting from one flat to another, without again going on the main deck.

There are about thirteen flats in the "Defence" class, named according to the use the flat is appropriated to.

*Q.* Name the yards, masts, and spars, in a full-rigged ship?

*A.* All spars take their names from the mast to which they belong, viz., foremast, mainmast, mizenmast, fore topmast, main topmast, mizen topmast, fore topgallant and royal mast, main topgallant and royal mast, mizen topgallant and royal mast; the topgallant and royal mast are in one. Bowsprit, jib-boom, and flying jib-boom are the spars projecting from the bows. The lower yards are named fore and main yards, and the lower yard on the mizenmast is called the cross-jack-yard, on which no sail is set. The topsails, topgallant, and royal yards are named fore, main, or mizen, according to which mast they are attached, dolphin-striker, and spritsail-gaff on bowsprit. Topmast studding-sail booms on fore-yard; topgallant studding-sail booms on fore and main topsail yards; they are seldom carried on a mizen topsail-yard. Trysail masts are small masts placed abaft the lower masts to which they are attached, for the purpose of setting the spanker and fore and main trysail on. The spanker, or main boom, is the spar projecting over the taffrail, the inner part is fitted to the mizenmast in a ship, and to the mainmast in a brig, by two cleats or chocks of wood called jaws, forming a semicircle round the masts to keep them in place.

*Q.* Name the parts of a topsail?

*A.* Head, leeches, and foot; the top is the head, the bottom is the foot, and the sides are the leeches; the clews are the two lower corners, they are formed by the foot and leeches; the head-earring cringles are in the upper corners, formed by the head and leech-ropes.

NOTE.—This applies to all square sails.

*Q.* How many bands has a topsail?

*A.* Six bands: four reef-bands, a belly-band, and a foot-band.

*Q.* What is a reef-band?

*A.* Double part of canvas across a topsail or course, for working eyelet-holes for the reef-lines.

*Q.* What is a belly-band?

*A.* An extra cloth of canvas across the belly of a topsail or course, below the fourth reef-band of a topsail, and the second reef-band of a course, to strengthen the sail midway between the lower reef and foot.

NOTE.—This applies to either sail.

*Q.* What is a foot-band?

A. An extra part of canvas along the foot of the sail.

Q. What is a mast lining?

A. An extra part of canvas on the after part of the topsail, to take the chafe of the topmast and cap, extending from the third reef-band to the belly-band, and about two cloths in width.

Q. What is a top lining?

A. Double part of canvas on the after part of a topsail, to take the chafe of the top, extending from belly-band to foot in length, and in width according to the size of the ship.

Q. What are the buntline cloths?

A. Double part of canvas on the fore part of a topsail, to take the chafe of the buntlines, extending in an angular direction, from foot to belly-band.

Q. What is a reef-tackle patch?

A. Extra part of canvas, to take the strain of the reef-tackle of a topsail.

Q. What is a goring cloth?

A. A side cloth of a topsail cut obliquely, or lining of a topsail, called by sailmakers the leech-lining.

Q. What is the tabling of a topsail, or any other square sail?

A. Double part of the sail to which the bolt rope is secured.

Q. What are eyelet-holes?

A. Holes, with small grummetts sewn in them, formed in the tabling and reef-bands, for the cringles, robands, reef-lines, and buntline toggles.

Q. What are cringles?

A. A strand of rope worked through two eyelet holes in the leech of the sail round the bolt rope, for reef earrings, bowline bridles, and reef-tackle pendants.

NOTE.—Head earring cringles are spliced in the leech rope.

Q. Are all the cringles fitted alike?

A. No, the reef-earring and reef-tackle cringles have thimbles in them, to take the chafe of the reef-earrings and reef-tackle pendant, also to prevent the earrings jamming, and insure their rendering easily.

Q. What are robands?

A. Pieces of sennit plaited round the head rope of a topsail, or any other square sail, for securing it to the jackstay.

Q. Are all robands alike?

A. No; the midship roband is round rope, so that in shifting topsails, the captain of a top will readily distinguish

it from the other robands, and as soon as he ascertains the topsail is clear of turns, and on the right slew, he at once secures the midship roband as near the centre of the yard as possible, so as to prevent the men at the yard-arm from hauling the sail more out to one yard-arm than to the other ; mid-ship robands are secured round the tye-block, or blocks ; if fitted with a double tye, your sail should be fitted with two midship robands.

*Q.* What is a bolt rope ?

*A.* The rope secured round the sides of a topsail to the tabling, or any other square sail.

*Q.* Is a foot rope secured to a topsail, or course in a similar way to the leech and head rope ?

*A.* No, the foot rope being wormed, parcelled, and served, it would be impossible to get a needle through it ; it is therefore marled to the topsail or course.

*Q.* What are head-earrings ?

*A.* Pieces of rope spliced into the head-earring cringles, for the purpose of hauling the head of the topsail, or any other square sail, out to the head-earring strops, and taut along the yard. They are fitted with a long eye ; it forms a double part when rove through the head-earring cringle.

*Q.* What is a reef-earring ?

*A.* Reef-earrings are pieces of rope, in size according to the size of the leech-rope, as when a topsail is reefed the reef-earring, when passed is supposed to bear the same amount of strain as the leech-rope.

The first and second reef-earrings are fitted with a running eye round the yard-arm, outside the lifts ; they are in length twice and a half the depths of the reefs, *i.e.*, the first reef-earring is twice and a half the depth of the first reef, and the second reef-earring twice and a half the depth of both first and second reefs.

The third and fourth reef-earrings are spliced into the eyelet-hole in the lower part of the third and fourth reef cringles, forming a long eye sufficient to admit of both parts of the eye going round the yard and through the thimble of the reef-crinkle again. The two parts of the earrings forming the long-eye are marled together, the bight being seized to the eyelet-hole. The other end of the earrings are hitched as follows :—The end of the third reef-earring is rove through the second reef earring-crinkle, and bowline knotted to its own part, and the end of the fourth reef-earring in a similar way through the third reef-crinkle.

*Q.* What is a gasket ?

*A.* All gaskets on lower and topsail yards are made of sword matting, cut to the required length, and fitted with an eye in each end. The upper eye is fitted with a lanyard, it is secured to the head rope of the sail. The proper length to cut a gasket is half the round of the part of the yard the gasket is to go on.

For topgallant and royal yards the harbour-gaskets are made, the upper part of French and the lower part of English sennit, an eye is formed in the upper part in making the gasket and seized to the jackstay of the yard.

Sea-gaskets, are made all through of English sennit: an eye is formed in the outer end, which is seized to the yard-arm, the gaskets being long enough to pass round-about-turns round the sail and yard, from yard-arm to quarter, the inner end being secured to the jackstay.

*Q.* What is the difference between a bunt and yard-arm gasket ?

*A.* All bunt-gaskets are of sword matting, and the lanyards are spliced in the lower instead of the upper eyes. The upper eyes, for a course or topsail, are seized to the head ropes of the sail. For topgallant or royal yards they are seized to the jackstays. Bunt-gaskets always cross in the middle, and are secured to opposite quarters.

*Q.* What is a bowline bridle ?

*A.* Pieces of rope spliced into the bowline cringle, as follows:—For a fore and mizen-topsail, the upper bridle is spliced, the upper end to the upper bowline cringle, and the lower end in the middle bowline cringle. The lower bridle the upper end, is spliced round the upper bridle, and the lower end in the lower bowline cringle.

The bridles are in length (when fitted) once and one-third the drift of the cringles.

The upper one is served two-thirds up, and the lower one two-thirds down.

For a main topsail, the upper end of the upper bowline bridle is spliced in the upper bowline cringle, the lower end to the second cringle. The lower bridle the upper end is spliced into the third, and the lower end into the fourth cringles. The middle bridle the upper end is spliced round the lower part of the upper bridle, and the lower end round the upper part of the lower bridle.



The upper and middle bridles are served two-thirds up ; and the lower two-thirds down.

The length to cut a bowline bridle is one and two-thirds the drift from cringle to cringle.

*Q.* What is a clew-hanger ?

*A.* A piece of  $1\frac{1}{2}$  or 2 in. rope, according to the size of the topsail, about two fathoms in length; they are generally spliced round the upper part of the parrel ; when the sail is furled, they are passed round the clew, and hauled taut back to the parrel again, where they are secured.

The clew-hangers on a lower yard are fitted in a similar way, only spliced into the truss strop instead of the parrel ; sometimes they are spliced in the jackstay in the bunt of the lower yard.

*Q.* How do you know a main from a fore or mizen topsail?

*A.* The main has four bowline bridle cringles, and a fore or mizen has only three.

*Q.* How do you know the fore from the after part of a topsail ?

*A.* The roping is sewed on the after part of all square sails.

*Q.* What would be the consequence if a topsail or any other square sail was bent, with the roping part forward ?

*A.* The stitches would chafe through, and the sail would blow out of the bolt ropes.

*Q.* How is the head-earring secured ?

*A.* The end is rove through the thimble of the head-earring strop, from up down, and through the head-earring cringle from down up ; these are called the two outer turns, it is then passed four times round the yard and through the head-earring cringle each time ; these are called the four inner turns ; the end is then clove hitched round all parts of the outer turns, and expended round them or the jackstay ; thus, the number of turns taken with the head-earring are two outer and four inner.

*Q.* How do you secure a roband ?

*A.* A roband is passed round the jackstay, over, and under, and through the eyelet-hole in the head of the topsail, or any other square sail, and secured with a clove-hitch.

*Q.* What are reef-lines ?

*A.* Lines running across each reef-band on fore part of a topsail, from leech to leech, secured to the upper eyelet-hole of the reef-crinkle.

*Q.* What are naval lines ?

A. Lines running across the after part of a topsail, from leech to leech, for the purpose of securing the reef-lines, the ends of the naval lines are also secured to the upper eyelet-holes of the reef-cringles.

Q. What is a spilling line ?

A. A line up and down the fore part of a topsail, for spilling the sail when reefing.

Q. How is a reef-line secured by a naval line ?

A. Trice the sail up by the first reef-cringles, and haul it well taut, pass your naval line the aft side of the sail, making it fast to the cringles, and heaving well taut.

Well stretch your reef-line, measure the length of your reef-bands and allow a foot extra for every three holes, the length to cut your reef-line.

Commence reeving your reef-line in the centre, and work both ways ; the man that works to the right will pass the line through the hole under the naval line, and receive it back over, the man that works to the left will pass it over and under, and so on to the end, securing it to the upper hole in the cringle, and splicing it to its own part ; the other reefs in the same manner.

Q. What is the use of a reef-tackle ?

A. To light the sail out to the yard-arms in reefing and shifting topsails.

Q. What are slab-points ?

A. Slab-points are reef-points, rove through the eyelet-hole, and the reef line and naval line rove through them on their respective sides.

In recording the force of the wind, and the state of the weather, the following scheme is to be adopted :—

*Figures to denote the Force of the Wind.*

0. denotes Calm.

1. Light Air . . just sufficient to give steerage way.

2. Light Breeze . { with which a well-  
conditioned man-

3. Gentle Breeze . { of-war, under all  
sail and clean full,

4. Moderate Breeze { would go in smooth  
water from . . . } 5 to 6 knots.

*Figures to denote the Force of the Wind—continued.*

5. Fresh Breeze . . .	) in which the same ship could just carry close hauled	Royals, &c.
6. Strong Breeze . . .		Single reefs and topgallant sails.
7. Moderate Gale . . .		Double reefs, jib, &c.
8. Fresh Gale . . .		Triple-reefs, courses, &c.
9. Strong Gale . . .		Close - reefs and courses.
10. Whole Gale . . .	{ with which she could only bear . . . }	{ Close-reefed main topsail and reefed foresail.
11. Storm . . . . .	{ with which she would be reduced to . . . . . }	{ Storm staysails.
12. Hurricane . . . . .	to which she could show no canvas.	

*Letters to denote the State of the Weather.*

- b** denotes Blue Sky—whether with clear or hazy atmosphere.  
**c** Cloudy—*i.e.* Detached opening clouds.  
**d** Drizzling Rain.  
**f** Fog—**f** Thick Fog.  
**g** Gloomy Dark Weather.  
**h** Hail.  
**l** Lightning.  
**m** Misty or Hazy—so as to interrupt the View.  
**o** Overcast—*i.e.* the whole sky covered with one impervious cloud.  
**p** Passing Showers.  
**q** Squally.  
**r** rain—*i.e.* Continuous Rain.  
**s** Snow.  
**t** Thunder.  
**u** Ugly threatening appearance in the weather.  
**v** Visibility of Distant Objects—whether the sky be cloudy or not.  
**w** Wet Dew.  
 . Under any letter denotes an Extraordinary Degree.  
 By the combination of these letters all the ordinary phe-

nomena of the weather may be recorded with certainty and brevity.

*Examples.*

**b c m** *Blue* sky, with detached opening *clouds*, but *hazy* round the horizon.

**g v** *Gloomy*, dark weather, but distant objects remarkably *visible*.

**q p d l t** Very hard *squalls*, and *showers* of *drizzle*, accompanied by *lightning*, with very heavy *thunder*.

ARRANGEMENT OF THE CREW OF A  
SHIP OF WAR

AS TO WATCHES, STATIONS, SLEEPING, AND MESSING.

*Division of the Crew.*

*Q.* How is a crew divided for performing the different duties of the ship?

*A.* Into two parts, or watches, called the starboard and port watch—odd numbers, starboard watch; even numbers, port watch. They stand on the watch bill as follows:—

Chief Petty Officers and Instructors.

Boatswain's Mates.

Quartermasters. Signal Men.

Forecastle Men.

Fore-top Men. Main-top Men. Mizen-top Men.

Quarter Deck Men.

Carpenters.

Working Idlers.

Excused Idlers.

Stokers. Marines.

*N.B.*—The terms after guard and gunners are abolished, and those bodies incorporated under the designation of quarter deck men, captains of the after guard becoming captains of the quarter deck men, gunners' mates retaining the name. The first part of quarter deck men will, where requisite, perform the duties that have hitherto been allotted to gunners' crews, the second part, those allotted to after guard. The gunners' mates will be at the head of the first part, and the captains of quarter deck men the second.

*Distinctions.*

*Q.* How are the two watches distinguished from each other?

A. By a piece of bright red tape, sewn on the sleeve of the blue serge and a piece of blue dungaree on the sleeve of the white frock worn on the right arm by the starboard watch, and on the left arm by the port watch.

Q. Are there any other marks of distinction?

A. Yes; all above the rating of A.B. wear a badge of distinction on their left arm—viz.:

A chief petty officer: anchor and crown and wreath of oak leaf.

First-class petty officer: cross anchors and crown.

Second-class petty officer: anchor and crown.

Leading seamen: anchors.

*Mark of Distinction worn by Seamen Gunners.*

Gunnery instructors: a crown over cross-gun, rifle, and sword.

First-class seamen gunners: a crown over a gun.

Second-class seamen gunners: a gun.

These distinctive badges are now worn on the right arm.

All seamen of good character are now entitled to good conduct badges, of the following colours:—

On cloth . . . . . in gold.

On blue serge . . . . in red (bright).

On white duck or drill . . . in blue.

The distance between badges is to be three eighths of an inch.

Each watch is divided into two parts, and in large ships' companies, where there are a great number of men, it is found necessary to again divide the parts into sub-divisions.

Q. In working ship, with the hands on deck, how are the watches divided?

A. The starboard watch work the starboard side of the deck, and the port watch the port side of the deck.

Q. Working ship with the watch only, how is the watch divided?

A. The first part, the starboard side of the deck, and the second part, the port side of the deck.

Q. How is the day and night divided into watches?

A. The twenty-four hours is divided into seven watches—viz., afternoon watch, from noon to 4 o'clock; first dog watch, from 4 p.m. to 6 p.m.; second dog watch, from 6 p.m. to 8 p.m.; first watch, from 8 p.m. to midnight; middle watch, from midnight to 4 a.m.; morning watch,

from 4 a.m. to 8 a.m. ; forenoon watch, from 8 a.m. to noon.

The dog watches, being of only two hours each, and all the other watches four hours each, is the cause of the watches changing every twenty-four hours : thus the watch that had the first watch last night, would have the middle watch to-night ; by this plan, each watch has in turns eight hours on deck every other night at sea, and eight hours in their hammocks likewise, every other night.

*Q.* How is the time denoted on board ship ?

*A.* By striking a bell in the following way :—

Noon or midnight, eight o'clock and four o'clock, 8 strokes of the bell.

Half-past twelve, four, or eight o'clock . . .	1 bell.
Half-past six in the last dog watch . . . . .	1 bell.
One, five, and nine o'clock . . . . .	2 bells.
Half-past one, five, and nine o'clock . . . . .	3 bells.
Half-past seven in the last dog watch . . . . .	3 bells.
Two, six, and ten o'clock . . . . .	4 bells.
Half-past two, six, and ten o'clock . . . . .	5 bells.
Three, seven, and eleven o'clock . . . . .	6 bells.
Half-past three, seven, and eleven o'clock . . . . .	7 bells.

Thus it will be found, that the number of bells denoting the time from six to eight o'clock in the last dog watch, differs from the number of bells denoting the same hours in the morning watch, on account of commencing them again with the last dog watch.

### *Messing.*

*Q.* How is the crew divided into messes ?

*A.* Master at arms, seaman-schoolmaster, and ship's steward have a mess place amidships.

The chief petty officers mess alone ; 1st class petty officers mess alone.

The remainder of the crew are divided into messes, with an equal number of each watch forming the mess, so as to insure half of each mess below at a time for cleaning the mess deck, &c.—two petty officers generally in a mess.

*Q.* Where do the crew mess ?

*A.* In a line-of-battle ship, on the lower deck, one mess in each space, between the guns.

In an iron-clad, in the battery compartment, two messes in each space, between the guns.

In a frigate, or smaller vessel, on the lower deck, an equal number of messes each side of the deck.

The marines always occupy the after messes on each side of the deck in all ships.

The boys are equally distributed among the messes.

#### *Sleeping Arrangements for the Crew.*

*Q.* How are the hammocks berthed ?

*A.* The numbers are arranged in rotation, commencing forward, and working aft, the numbers running athwart ships ; by which plan, with a watch on deck, every other hammock is empty.

The boatswain's mates sleep close to the hatchways, ready for a call at the shortest notice.

Boys are berthed in the fore part, or one side of the main deck, under the charge of a sentry and a ship's corporal.

#### *Hammocks.*

Every one of the ship's company (and officers not provided with cabins) have two hammocks supplied to them ; they are numbered for the crew with the number corresponding to their number on the watch bill ; in the case of an officer, they are distinguished by a letter and number also.

One set is marked with a white figure on a black patch, and the other with a black figure on a white patch.

Marines, with red figures, one on a white, and the other on a black patch.

*Q.* Where are the hammocks stowed ?

*A.* In the hammock nettings, which are fitted all round the upper deck, on top of the bulwarks.

#### *Bags.*

A bag is also supplied to each man and boy, for keeping their kit in, bearing their number on the watch bill ; thus it is easily ascertained (by referring to the watch bill), when a hammock or bag is found knocking about the decks, to whom it belongs.

*Q.* Where are the bags stowed ?

*A.* In the bag-racks, which are erected in a line-of-battle ship in the fore cockpit.

In a frigate, forward on the lower deck, or round the deck, under the mess tables.

In an iron-clad, in the bag rack flat.

## SECOND INSTRUCTION.

## PART I.

Describe the use of the following knots, bends, and hitches, and the mode of making them :—

To knot yarns.	Bending studdingsail hal-
Reef-knot.	yards.
Bowline knot.	Cat's-paw.
Bowline on a bight.	Sheep shank.
Running bowline.	Carrick bend.
Clove-hitch.	Bend hawsers.
Timber-hitch.	Sling a cask.
Blackwall-hitch.	Inside clench.
Two half-hitches.	Outside clench.
Rolling-hitch.	Clap on jiggers and stoppers.
Sheet bend.	To use a parbuckle.

*Q.* How do you knot yarns ?

*A.* Take the ends of two yarns, split them in halves about 2 ins. down, marry them together and form a reef-knot, with the opposite ends as nearly as you can ; yarns are knotted for the use of the rope-maker, for making spunyarn, nettle-stuff, or any small rope.

*Q.* How do you make a reef-knot, and what is its use ?

*A.* It is used for reefing sails, fitted with reef points, such as trysails, spankers, and boat sails. First make an overhanded knot round the foot of the sail, then bring the end which is next to you over the left hand and through the bight ; haul both ends taut, and it is made.

*Q.* What use is a bowline knot, and how is it made ?

*A.* A bowline knot is used for sending a man aloft, or one down from aloft, for riding down stays, backstays, making a pair of slings, and many other purposes. Take the end of your rope in your right hand, and the standing part in your left, lay the end over the standing part, then with your left hand turn the bight of the standing part over the end part, so as to form a cuckold's neck on the standing part ; then lead the end through the standing part above, and stick it down through the cuckold's neck, and so the knot is completed.

*Q.* What use is a bowline on the bight, and how is it made ?

*A.* A bowline on the bight is used when both ends are



occupied, or to send a man down from aloft when he is hurt, as it is much easier to sit in.

*To make the Knot.*

With the bight of a rope in your right hand, and the standing part in your left, throw a cuckold's neck over the bight with the standing parts, then haul enough of the bight up through the cuckold's neck to go under and over all parts, haul all taut, and the knot is completed.

*Q.* What is a running bowline used for, and how is it made?

*A.* It is used for throwing over anything out of reach, or anything under water.

*How to make the Knot.*

You take the end of the rope round the standing part, through the bight, and make a single bowline upon the running part.

*Q.* What is a clove-hitch used for, and how is it made?

*A.* It is used for rattling down the rigging. It is made by passing the end of a rope round another rope or spar, over, and bringing it under and round behind its standing part, over the rope or spar again, and up through its own part. It can be stopped or hitched to its own part as required, the only difference between two half-hitches and a clove-hitch is, one is hitched round its own standing part, and the other is hitched round a spar or another rope.

*Q.* What is a timber-hitch used for, and how is it made?

*A.* For securing the end of a rope to a spar: in towing a spar, always use a half-hitch in addition to a timber-hitch.

*To make the Knot.*

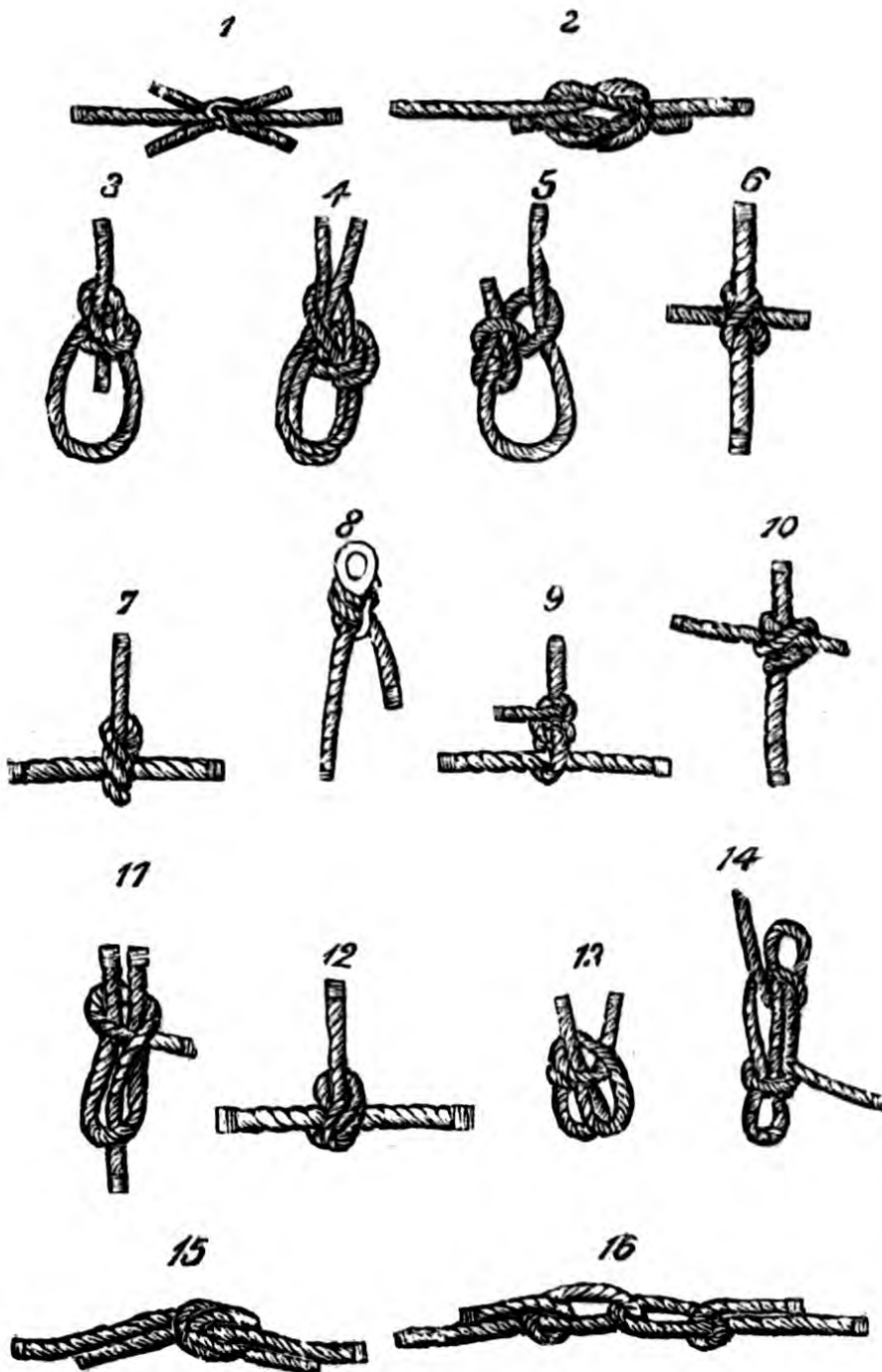
Take the end of a rope round a spar, pass it under and over the standing part, then pass three turns round its own part, and haul it taut.

*Q.* What is a Blackwall hitch used for, and how is it made?

*A.* For hooking a tackle to a rope, such as setting up lower rigging instead of a cat's-paw, where the end of the lanyard is not long enough to form a cat's-paw, but a strop and toggle is preferable.

*To make the Hitch.*

You form a bight or a kink, with the end of the lanyard,



1 Knot Yarns. 2 Reef Knot. 3 Bowline Knot. 4 Bowline on a Bight. 5 Running Bowline. 6 Clove Hitch. 7 Timber Hitch. 8 Black-wall Hitch. 9 Two Half-Hitches. 10 Rolling Hitch. 11 Sheet Bend. 12 Bending Studdingsail Halyards. 13 Cat's-Paw. 14 Sheep-Shank. 15 Carrick Bend. 16 Bend Hawsers.

keeping the end part underneath, and the standing part on the top, put the hook through the bight, taking care to keep the bight well up on the back of the hook, until there is a strain on the tackle.

*Q.* What are two half-hitches used for, and how are they made?

*A.* Making the end of a rope fast, such as a boat's painter. You make the knot by passing the end of your rope round the standing part, and bringing it up through the bight, which is one half-hitch; repeat it, and the knot is completed.

*Q.* What is a rolling-hitch used for, and how is it made?

*A.* Bending a small rope to a large one, putting a tail jigger on a backstay. Make the hitch by taking a half-hitch round the standing part with the end of a rope, and another through the same bight, hauling it well taut in place above the first hitch and the upper part of the bight, and dog the end above the hitch round the standing part, and stop it back with spunyarn or a ropeyarn.

*Q.* What is the use of a sheet bend, and how is it made?

*A.* Making a rope's-end fast to anything, such as a becket of a swab or block.

#### *How to make the Bend.*

Pass the end of a rope through the bight of another rope, or through the becket of a block, or a clew of a sail; then round both parts of the bight or becket, and take the end under its own part; it is sometimes put under twice, and the end stopped back to the standing part; also for bending topgallant and royal clewlines, jib and staysail down-hauls.

*Q.* What is the use of a studdingsail halyard-bend, and how is it made?

*A.* It is used in bending studdingsail, topgallant, and royal halyards; it allows the yards to go closer to the blocks or sheaves than any other bend.

#### *To make the Bend.*

Take two round turns round the yard, pass the end from right to left under both turns, then from left to right over one, and under the other turn.

*Q.* What is a cat's-paw used for, and how is it made?

*A.* It is used for setting up lower rigging. To form it, you first lay the end part of the lanyard across the standing part, which will form a bight; then lay hold of the bight with one hand on each side of it, breaking it down and turning it

over from you two or three times ; clap both bights together and hook on to both parts. A boatswain's toggle and strop should always be used in preference to a cat's-paw, as it is almost certain to burst the outer yarns of the lanyard.

*Q.* What is the use of a sheep-shank, and how is it made ?

*A.* For shortening in a rope, which requires to be lengthened again, such as topgallant and royal backstays, the rope is doubled in three parts, and a hitch taken over each bight with the standing part of the backstays, and hauled taut.

#### A CARRICK BEND.

##### *To Bend two Hawzers with a Carrick Bend.*

Take the end of a hawser and lay it across the top of standing part forming a bight, reeve the end of the second hawser down through the bight thus formed, up and over the cross, and down through the bight again on the opposite side, from the other end ; one end will then be on top, and the other underneath, one each side of the standing part ; if both ends come out on top, it will form a granny's knot.

##### *To Bend two Hawzers with Two Bowline Knots.*

Form a bowline knot in the end of the first hawser, dip the end of the second hawser through the bight of the first bowline knot, haul sufficient end through, and form a bowline knot with the second hawser, leaving a bight to each bowline at least a fathom long.

##### *To Bend two Hawzers with two Half-Hitches and seizing the ends back.*

Make a half-hitch in the end of the first hawser, leaving a bight at least a fathom long, reeve the end of the second hawser through the bight of the first hawser, haul end enough through on both hawsers to have at least four feet end, put a seizing on about two feet from the half-hitch, on each hawser, and stop the ends to the standing part.

*Q.* How do you sling a cask ?

*A.* There are several methods of slinging a cask, either with a pair of butt slings, bale slings, or a bowline knot. A cask should always be slung, bung up, or on its head ; should one of the heads be defective or out, a bowline knot is used for this ; it is very useful, for the instruction of boys, to have small miniature casks slung in the different ways, and hung up in a conspicuous part of the ship, set apart for seamanship instruction.

*Q.* What is the use of an inside clinch, and how is it made ?

*A.* For securing the standing part of a reef-tackle round the goose-neck or any other rope that you wish to jamb.

*To make the Clinch.*

Take the end over and under its own part, and inside, put two seizings on opposite each other, they are called the throat and quarter seizings ; exactly the same as is used for turning-in lower rigging.

*Q.* What is the use of an outside clinch, and how is it made ?

*A.* For securing the standing part of a rope topsail sheet, or any rope you wish to let go smartly.

*To make the Clinch.*

Take the end over and under its own part and outside, put the two seizings on exactly the same as for inside clinch.

*Q.* How do you put a jigger on a backstay ?

*A.* With a rolling hitch.

*Q.* How do you pass a stopper ?

*A.* By taking a half-hitch round and against the lay of the rope, and lashing the end of the stopper in the lay.

## SECOND INSTRUCTION—PART II.

### OVER-HAND KNOT.

*To make the Knot.*—Pass the end of a rope over the standing part and through the bight. It is used for the end of running rigging, or any rope rove through a block or sheave to prevent it unreeving.

### FIGURE OF EIGHT KNOT.

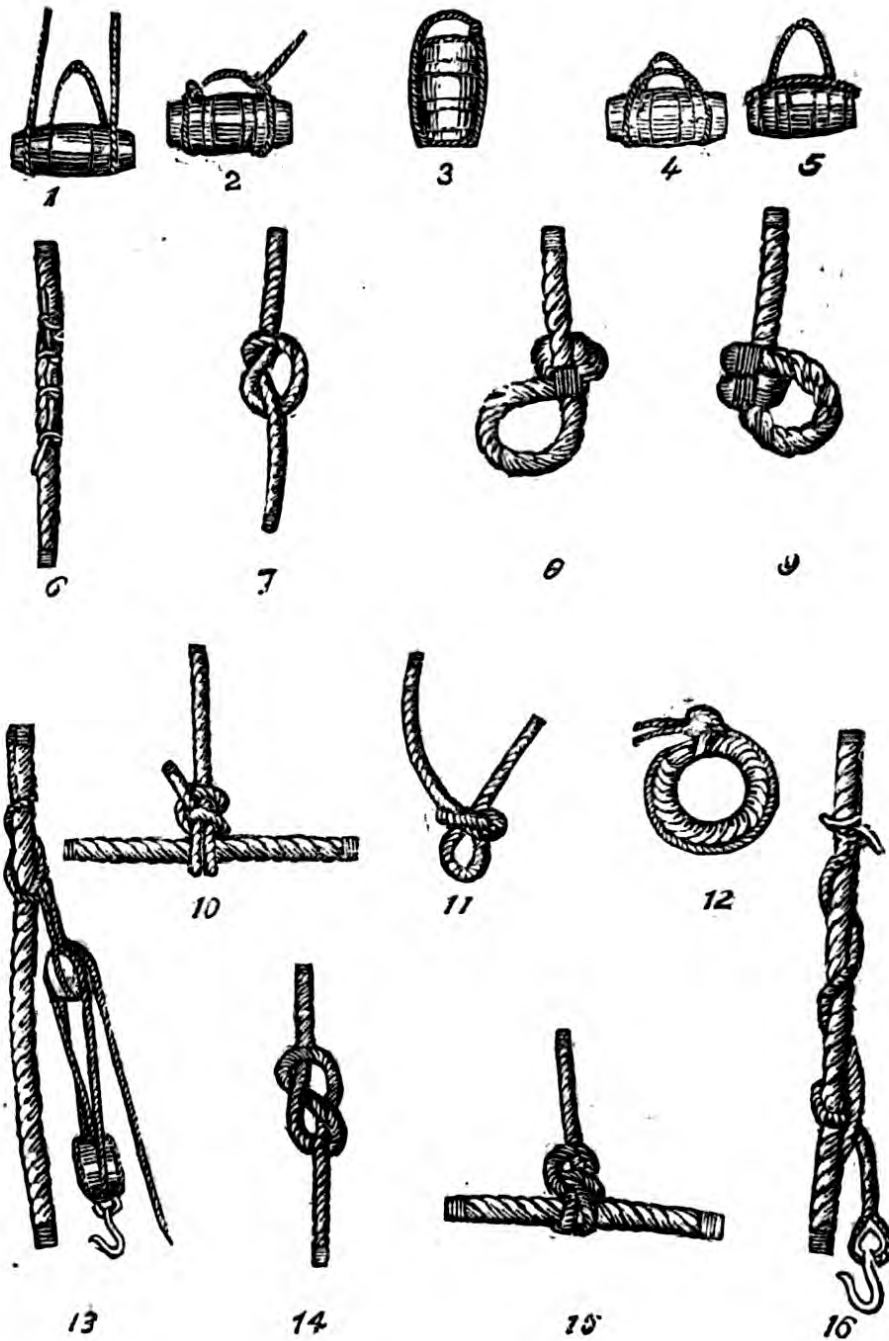
*To make the Knot.*—Pass the end of a rope over and round the standing part, up over its own part, and down through the bight. It is used for the end of running rigging, or any rope rove through a block or sheave to prevent it unreeving.

### A BEND,

So called, by many persons, is simply a rolling-hitch, made by two round turns round a spar, and two half-hitches round the standing part.

#### *A Fisherman's Bend.*

Take two round turns with the end of a rope round a spar, or through the ring of an anchor, take one half-hitch round



1 Parbuckle. 2 Bull Slings. 3 Slings a Cask, Head up. 4 Bale Slings. 5 Can Hooks. 6 Marline Hitch. 7 Overhand Knot. 8 Outside Clench. 9 Inside Clench. 10 Fisherman's Bend. 11 Admiralty Hitch. 12 Hitching Ringbolts. 13 Putting on a Jigger. 14 Figure Eight Knot. 15 Two Round Turns and Two Half Hitches. 16 Passing a Stopper.

the standing parts, and under all parts of the turns, then one half-hitch round the standing parts above all, stop the end to the standing part, instead of taking the last half-hitch, tuck the end under one of the round turns, and it becomes a studding-sail halyard bend.

*A Common Marline Hitch, used for Lashing Hammocks up.*

An eye is spliced in one end, the other end is passed round the head of the hammocks, and rove through the eye, and hauled taut, this forms the standing part of the lashing which is brought along the hammock, the other part being passed over and under at regular intervals, hauling each turn well taut, after passing the last turn the end is tucked under it, and the bight of the remaining part expended up the standing part of the lashing and under the two last turns. Seven turns are the correct number to take in lashing a hammock up, leaving an equal distance between each turn.

A marline hitch is used for many other purposes, such as seizing the double part of the strop together of the fish-block that goes over the fish davit head, also for securing the foot of a course or a topsail to the foot rope, and for marling down the strands of a splice before serving over it.

*Hitching over a Ring-Bolt.*

All the ring-bolts for breechings, in fact, all ring-bolts not used for hooking tackles to, are generally hitched over for neatness. It can be done with one, two, or three ends.

*A Marline-Spike Hitch (also called a Midshipman's or Admiralty Hitch).\**

Is made by placing the marline-spike upon top of the end of the seizing you are going to heave taut, the end part is then brought over the marline-spike, forming a round turn; the marline-spike is then brought back under the standing part of the seizing, and up between it, and the other part of the round turn thus formed; the greater strain you bring on the seizing, the more the end jams and prevents it from slipping.

If used for the hook of a tackle, the hook is passed down between the round turns.

\* Used for heaving the turns of a seizing taut with a marline-spike or hooking the hook of a tackle to any rope where a smart pull is required: it is preferable to a cat's-paw, as it never jams.

### THIRD INSTRUCTION.

#### PART I.

*Q.* Describe the use of the following splices :—Long-splice, short-splice, and eye-splice, and the mode of making them ?

*A.* A splice is considered to weaken a rope one-eighth. A long splice is used in joining any running gear together that has been carried away, such as braces, clew-lines, &c., or any gear required to reeve through a block ; when well done, it does not enlarge the rope.

#### *To make a Long-Splice.*

Unlay the ends of the two ropes to the length of five and a half times the circumference of the rope, crutch them together in a similar manner to a short-splice, unlay one strand, and fill up the vacant space which it leaves with the opposite strand next to it, then turn the rope round and lay hold of the two next strands that will come opposite their respective lays, unlay one, filling up the vacant space, as before with the other. Take one-third out of each strand, and knot the opposite strands together, and heave them well in place, stick all six ends once under one strand ; having stretched the splice well, cut the ends off.

#### A SHORT-SPLICE.

A short-splice is used for joining standing rigging, or any gear not required to travel through a block, strops of blocks, &c.

#### *To form a Short-Splice.*

Unlay the rope to the required length, which is twice the circumference of the rope for the long ends, and once and a half the circumference of the rope for the short ends ; when this is done, whip all the ends with a yarn, then crutch them together, put a stop round the crutch, the long ends are put in twice, and the short ends once, pass the left hand strand over the first strand next to it, stick it underneath the second strand, and haul it taut in the lay of the rope, then enter the right hand strand, and lastly the middle strand, in a similar manner to the first or left-hand strand, haul them taut along the lay of the rope, being the long ends, put them in again as before, cut the stop off the crutch, and put the short ends in



once in a similar way, stretch the splice, whip the ends, and cut them off. If it is intended to serve over the splice, put the strands in once and a half each way, take a few of the underneath yarns from each strand to fill up the lay of the rope for worming, scrape the ends, and marl them down ready for serving.

#### AN EYE-SPLICE.

An eye-splice is used in forming an eye for any common purpose, lower lifts, &c., and made by opening the end of a rope, and laying the strands, at any distance upon the standing part of the rope, according to the length of the eye it is intended to make. Divide the strand by putting one strand on the top, and one underneath the standing part, enter the middle strand, having opened the lay with a marline-spike, and stick it under its respective strand, take the next end over the first strand and under the second; the third and last end is taken through the third strand on the other side. With a four-stranded rope, put the left-hand strand under two strands or two lays of the rope, and cover it with the next strand.

*Q.* How do you make a grommet?

*A.* Cut a strand three times the length of the grommet required, allowing end enough also in addition for finishing it off. Middle the strand, lay the right-hand end over the left, and lay the strand up again until the rope is re-formed, then tuck the ends and finish off, as in a long-splice.

*Q.* How do you make the following knots, and what are their use:—Matthew Walker, Stopper-knot, English shroud-knot, French shroud-knot?

*A.* Matthew Walker knot is used for the standing part of the lanyards of lower rigging, and many other purposes.

#### *To make a Matthew Walker Knot.*

Unlay the ends of a rope, and take the first strand round the rope and through its own bight, and the second end round the rope underneath through the bight of the first, and through its own bight, take the third end round the same way underneath, and through the bight of all three, haul the ends well taut.

#### *Stopper-Knot.*

Stopper-knot is used in the end of stoppers, it is usually formed by double walling, in some cases crowned; there is

however, no necessity for this ; heave the ends together, seize and cut them off to within three ins. of the knot. But the best method of making a stopper-knot is to wall and half-wall it, put a good whipping on about two or three inches from the knot, and cut the ends off. A stopper-knot made this way will never capsize. A stopper-knot made with a double wall, will capsize when a great strain is brought on it.

• *English Shroud-Knot.*

Shroud-knots are used when a shroud is shot, or carried away.

*To make an English Shroud-Knot.*

Unlay the ends of the shroud you are going to splice, and commence in a similar way to a short-spiice, then single-wall the ends of one rope round the standing part of the other, and wall the other three ends in the same manner ; open the ends of the strands and take out a few yarns from each, and lay them in for worming ; taper the remainder down, and serve over them with spunyarn.

*French Shroud-Knot.*

You place the ends of the two parts of the shroud, in a similar way to forming an English shroud-knot, drawing them close together, then lay the first three ends upon their own part, and single-wall the other three ends round the bights of the first three ends and the standing part, taper the ends, marl them down, and serve over them. This knot is much neater than the English shroud-knot.

*Q.* How do you make a Turk's head, and what is it used for ?

*A.* It is used for the foot ropes of jib and flying jib-booms and spanker-booms, being much neater than overhand knots, also for man ropes and Jacob's ladders ; it is generally made of white line or nettle-stuff.

*To make it.*

Take a round turn round the rope you intend to make the Turk's head on, cross the bights on each side of the round turn, and put one end under the cross on one side, and the other end under the cross on the other side, after which follow the lead until it shows three parts all round, and finish it off.

*A Point, its Use, and how it is Made.*

For reefing sails : make the point by taking five foxes and

middling them, working them down sufficiently to form the eye, viz., 3 ins., place the two parts together, which will give the eye  $1\frac{1}{2}$  ins. ; after having formed the eye, work down 6 ins., then leave out the short end, and work the point to the length required.

*Q.* How do you make a sea-gasket, or English sennit ?

*A.* Take three or four foxes (if intended for tyers it is made of yarns) according to the size you intend to make the gasket, middle them over a belaying-pin and plait three or four of them together, the length you intend to make the eye, then work both parts together to form an eye, and plait them by bringing the outside foxes on each side alternately over to the middle ; the outside one is laid with the right hand, and the remainder held firmly with the left hand ; work the whole together, adding a fox when necessary ; after the eye is properly formed, and you have worked three or four inches down, drop a fox or yarn, and continue to the end with an odd number. When it is a sufficient length, lessen it by dropping a fox at regular intervals. To finish it, lay one end up, leaving its bight down, plait the others through this bight, until they are all worked through it, then haul on the end, till the bight is taut ; to secure all parts, cut the ends off, and whip it.

*Q.* How do you make a harbour-gasket, or French sennit ?

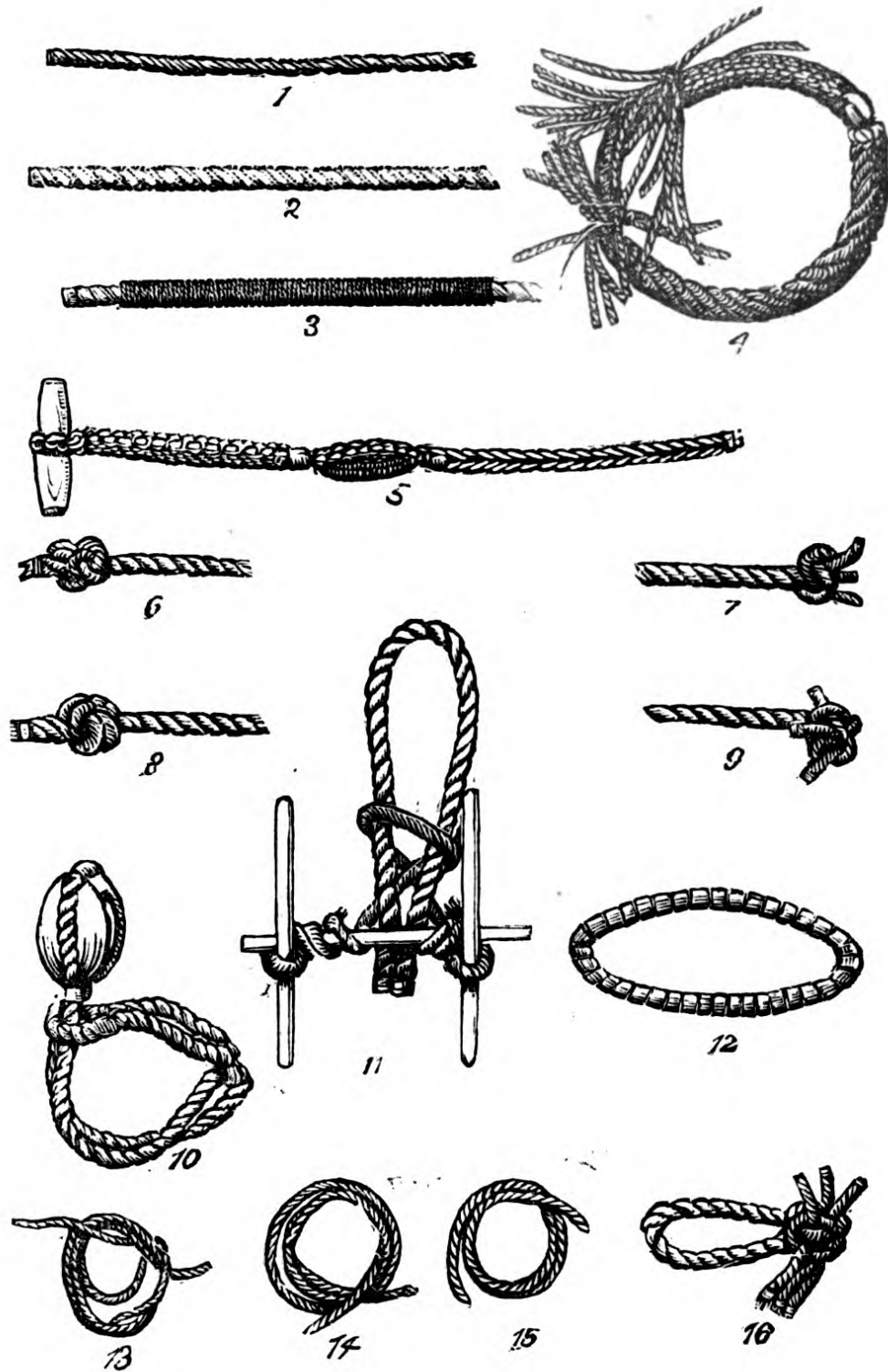
*A.* With foxes somethingsimilar to the common sea-gasket, but instead of taking the outside fox over all the rest and bringing it into the middle, you interweave it between them, by taking the outside fox of both sides, and taking it over one and under the other, working it towards the middle, the same as common sennit.

Harbour-gaskets, for lower and topsail-yards, are made of sword matting, and cut off to the required length, leaving enough end to form a Flemish eye each end of the gaskets. Gaskets made of French sennit are only used for topgallant and royal yards, and are always finished off the same as a sea-gasket, by working the ends with English sennit.

Worm and parcel with the lay,  
And serve the rope the other way.

*Q.* What do you mean by worming a rope, and what use is it ?

*A.* To fill up the vacant space between the strands of the rope with spunyarn or small rope to render the surface smooth and round for parcelling and serving, to give it a neat appearance. The strops of gun-tackle blocks are wormed.



1 Worming. 2 Parcelling. 3 Serving. 4 Jumpsurgee Strop. 5 Reef Becket. 6 Single Diamond. 7 Single Wall. 8 Double Diamond. 9 Single Wall and Crown. 10 Jew Strop. 11 Spanish Windlass. 12 Salvagee Strop. 13 Spanish Fox. 14 Fox. 15 Knittle. 16 Spritsail Sheet Knot.

Q. What do you mean by parcelling a rope ?

A. Parcelling a rope is laying round it with the lay of the rope strips of old canvas dipped in tar, from two to three inches wide, according to the size of the rope, before serving it ; each turn of the parcelling should overtop the other, in fact, like tiles on the roof of a house.

Q. What do you mean by serving a rope ?

A. The service is of spunyarn, put or hove on by an instrument called a serving mallet, it has a score in the under part, according to the size of the rope, so as to lay on the rope, and a handle about fifteen inches long. Service is always laid on against the lay of the rope ; a man passes the ball of spunyarn, taking the turns well out of it, at some distance from the man that is serving the rope. When the required length of service is put on, the end is put under the last two turns, hauled taut and cut off. All standing rigging, or any other rope likely to be chafed, is always served.

Q. How do you strop a block ?

A. There are various ways of stropping a block, depending upon what they are required for.—*First*. There is the common strop, used for all general purposes, which is formed by short-splicing the two ends of a rope together, forming a ring, in which the block and thimble, or hook and thimble is seized.

For this purpose the rope is got on a stretch. All above  $3\frac{1}{2}$  ins. is wormed, parcelled, and served ; below that size is only served with two or three yarns, spunyarn : cut the rope for the strop off, the length depending on what the strop is required for. If it is intended to put the ends in twice one end, and once the other, put a chalk mark, or a stop, on the piece of rope already cut to length, at twice the round of the rope from one end, and once and a half the round of the rope from the other end ; then unlay the strands to the chalk marks or stops, heave the service back, crutch them together, close up to the chalk marks or stops, and enter your strands, as if making a short-splice, only taking great care to marry your splice slack, so as when you come to stretch the strop the strands will draw down in place and form a neat strop. If it is not intended to serve the strop over, put the chalk mark or stop at twice the round of the rope each end, and put the strands in twice each way. By putting the strands in once and a half each way, you make a neater strop, especially if it is intended to serve over it. After your strands are tucked, and the strop has been well stretched,

cut the ends off, work the service up to the splice, and finish it off; the strop is then ready for placing the block and thimble in place. When the block and thimble are in place, put a temporary seizing on, and with a couple of small wedges made for the purpose, set the block well in place, until the splice of the strop takes well in the score of the ass of the block; take the temporary seizing off, and heave the strop between the block and thimble well together with a Spanish windlass, then pass the seizing for a full due.

*To Strop a Single Block with a lashing Eye.*

You proceed exactly the same as if stropping a block with a thimble. The length to cut the strop depends upon what it is required for, the size of the eye is generally once or once and a half the round of the rope.

To strop a block with two lashing eyes is merely putting an eye-splice in each end of the strop after it is cut to length and before the block is seized in place; the length of the eyes are from once to once and a half the round of the rope.

*To Strop a Double or Single Block with a Tail.*

The strop is sometimes cut long enough to admit of the strop and tail being in one; and it is also fitted separately, the tail being spliced in a thimble seized in the crown of the strop; the latter is by far the better plan, as it can be replaced at pleasure, which is at times most convenient, as the tail invariably fags out before the strop is half worn.

*To make a Grommet Strop.*

After the rope is cut to length, unlay the strands; each strand will form a strop; thus, one length of rope will make three strops; lay each strand up, as if making a common grommet and worm them, the block and thimble is then seized in place, as in any other strop.

These strops are always used for gun-tackles.

*To fit a Salvagee or Warped Strop.*

Lash two hooks, or seize two bolts at the length the strop is required apart, then pass roundabout-turns sufficient with whatever you intend making your strop, until you have it to the required thickness, then pass marling-turns all round, taking care each part of the strop has equal strain, it is either grafted over or covered with leather, the block and thimble

are then seized in place. These strops are frequently used for boom-sheet and reef-tackle blocks for boom-mainsails.

*To form a Double-Strop for a Double-Scored Block.*

According to the size of the rope, it is got on a stretch and wormed, parcelled, and served, or only served ; it is then cut to length, and the two ends short-spliced together, the block is placed, and the four parts of the strop seized together, the two bights forming two lashing eyes. These strops are used for quarter-blocks on lower yards for topsail sheets, lower yard brace-block, upper or masthead jeer-blocks.

*To fit two Single Strops.*

These strops are also used for double-scored blocks, such as lower jeer-blocks, or topsail brace-blocks. After the strops are cut to length, the ends are short-spliced together, each strop is placed on the block separately, and the four parts of the strop seized together. In the case of lower jeer-blocks, one strop is fitted longer than the other.

*To make a Jumpsurgee Strop.*

After the strop is cut to length, which will be three times the round of the block and once the round of the thimble and rope, put a mark on each end at once the round of the block, unlay the strands on each end to the mark, marry them together, and put a temporary seizing on to keep them in place, then unlay each strand and make them into nettles, divide the nettles when made equally, picking up every alternate nettle and graft both ways from where the strands are married, finishing off on the quarter, then seize the block, or block and thimble, in place. A strop thus made is considered to be three times the strength of a common strop.

*To make a Jew Strop.*

A jew strop is used when a single-scored block is required to be given a particular stand in the absence of a double-scored block ; for instance, it can be used with efficiency in the event of a lower jeer-block being carried away, and having no double-scored block to replace it. It is merely fitting a single block with a long lashing eye, working a grommet round the eye which rests round the strop between the lower yard and the crown of the block, the eye goes round the yard in a similar way to the long eye of a lower jeer-block, up before all, and is lashed to the grommet.

TABLES FOR FITTING BLOCKS.

DESCRIPTION OF STROP.	How to Measure for		Remarks.
	Cutting the Strop.	Marrying the Strop.	
Seizing Strop.	Twice the round of block and rope.	Once the round of block and four times the round of rope.	Leech-lines, slab-lines, &c.
Long Seizing Strop.	Twice the round of block and four times the round of rope.	Once the round of block and six times the round of rope.	Jib-stay, purchase, top-gallant royal haliards, &c.
Hook and Thimble Strop.	Once the round of block, hook, and thimble, and six times the round of rope.	Once the round of block, hook, thimble, and rope.	Leading blocks, &c.
Do. with two Seizings, or double Seizing Strop.	Twice the round of block and six times the round of rope.	Twice the round of block and once the round of rope.	Lower blocks of yards and stay-tackles.
Do.	Three times the round of block and once the round of rope.	Twice the round of block and three times the round of rope.	Lower blocks of burton's.
Quarter Blocks.	Once the round of block and yard, and six times the round of rope.	Once the round of block, yard, and rope.	Quarter blocks for topsail, topgallant, and royal yards.



## TABLES FOR FITTING BLOCKS.

DESCRIPTION OF STROP.	How to Measure for		What it is used for.	Remarks.
	Cutting the Strop.	Marrying the Strop.		
Quarter-Blocks.	Twice the round of yard and rope and three times the round of block.	Twice the round of yard and block and four times the round of rope.	Topsail sheet blocks on lower yards.	As a rule, allow in cutting five times the round of rope for splicing, in addition to the measure for marrying.
Hanging Jeer-Blocks.	Four times the round of masthead, twice the round of block, and seven times the round of rope.	Four times the round of masthead, twice the round of yard and block.	Upper jeer-blocks.	
Jeer Blocks on the Yard.	<i>Long leg</i> , the same as for marrying, but six times the round of rope. <i>Short leg</i> as above.	<i>Long leg</i> , once and a third the round of yards, once the round of block and rope. <i>Short leg</i> , two-thirds the round of yard, once the round of block and rope.	Jeer-blocks on the yard.	
Brace-Block.	Allow in cutting five times the round of rope, in addition to the length given for marrying.	Twice the round of block and thimble, and three times the round of rope. <i>Dog Strop</i> , once the round of yard-arm and thimble, and three times the round of rope.	Brace-block on lower yards.	

*Q.* How do you turn a dead-eye in, and mark the shroud for cutter stay fashion?

*A.* After all the shrouds are over the masthead, and steadied taut alike by means of strands round the shrouds, and rove through the lower dead-eyes with as much strain as they will bear, mark the rigging off for turning in as follows:—Put a mark on the foremost and after shroud about 6 ft. from the channels, fasten a line to the mark on the foremost shroud haul it taut aft, and secure it to the mark on the after shroud, then mark each shroud where the line cuts, which will be for the lower part of the dead-eye, then put another mark below it, at the distance of half the round of the dead-eye, and once the round of the rope, which will be the mark for the nip or crown of the dead-eye; then bring the end round the standing part of the shroud so as to have the marks in their proper places, the ends of the shrouds in and aft, and heave the two parts together, as close as the standing part of the shroud will allow, by means of a Spanish windlass, put a rope-yarn strop to keep them in place, and then put the seizings on, place the dead-eye, and beat the nip of the shroud well down, this is done by putting a good strand over the nip and beating it down with a commander, until the shroud takes the score of the dead-eye in all parts.

*N.B.*—In Portsmouth Yard a racking-seizing is now used, instead of a throat and quarter-seizing, as formerly.

*Q.* What should be most attended to in turning rigging in?

*A.* To keep the lay in the rope, to prevent the wet getting in.

*Q.* How do you reeve a lanyard for setting up lower or topmast rigging?

*A.* For lower rigging, the standing part is either secured by a single wall-crowned or a new stopper-knot, or by being spliced round a thimble in an eye-bolt in the chains. A Matthew Walker is liable to capsizes.

The standing part of a lanyard for the topmast rigging is secured by either a Matthew Walker knot in the end, or a running-eye round the lower dead-eye,

*To reeve the Lanyard.*

The end is first rove through the after hole in the upper dead-eye from in out, then through the after hole in the lower dead-eye from out in, and so on until it is rove in full.

When the rigging is hemp, the lanyard is half the size of

the shroud, when wire, the lanyard is the same size as the shroud.

*Q.* Describe the mode of rattling-down the rigging.

*A.* The rope to be used for the ratlines should be well stretched. Before commencing to rattle-down, put two swifters on each side, and slightly frap the shrouds together in a fore and aft line, mark the foremost shroud all the way up 15 ins. apart for the foremost eye of each rattling, then place spars about 5 ft. apart, parallel with the sheer pole, all the spare ends of spars should be aft, otherwise they will interfere with lower yards and sails going up ; the two lower ratlines are of larger rope than the others, and sufficiently strong to bear the weight of the number of men who crowd there at the order "man the rigging," waiting for orders to go aloft ; great care should be taken that the marline-spikes in use for rattling-down should be fitted with lanyards, and either worn round the neck of the man at work, or hitched round the shroud. In sparring and rattling the rigging, commence from below, thus insuring both being placed horizontally ; ratlines are clove-hitched on the intervening shrouds, and seized to the foremost and after one but one. Every fifth ratline is taken to the after-shroud, which is called a catch ratline.

#### *To Rattle-Down.*

Splice a small eye in one end, hitch your rattling stuff round the third shroud from aft, then round each shroud in succession, taking care the hitches are all formed the same way ; lower part of hitch aft, seize the eye to the foremost shroud with two-yarn nettle-stuff, with about 3 in. drift, after the hitches are all hove taut round the shrouds, splice an eye in the other end, and seize it, in a similar way to the fore, to the after shroud but one ; if a catch ratline, to the after shroud ; every man should be furnished with a thin batten,  $14\frac{1}{2}$  ins. long, to measure between the ratlines, that they may be all square with the sheer pole ; the batten should be held perpendicularly between the ratlines, and not with a rake, the same as the after shroud, which are four or five feet longer than the foremost shrouds ; when all the ratlines are in place, ease up the frapping.

*Q.* How do you point or graft a rope ?

*A.* Put a stop on at once the circumference of the rope from the end or eye, which will leave about the length for pointing or grafting, unlay the rope to the stop, then unlay

the strands, split a number of the outside yarns and make a nettle out of each yarn; when the nettles are made, stop them back on the standing part of the rope; then form the point with the rest of the yarns, by scraping them down to a proper size with a knife, and marl them down together with twine; divide the nettles, taking every other one up, and every other one down; pass three turns with a piece of twine which is called the warp very taut round the part where the nettles separate, taking a hitch with the last turn, continue to repeat this process by placing every alternate nettle up and down, passing the warp, or filling, taking a hitch each time until the point is to its required length; you can either form a bight with the last lay by passing the warp through the bights, haul them taut, and cut them off, or work a becket in the end, by taking a small piece of rope one-fourth the size of the rope, form a bight, unlay the ends, and twist the six strands up again by twos, take some of the inside yarns and lay them up as rope, then short-splice that and the becket together and marl it down.

---

## FOURTH INSTRUCTION.—STANDING RIGGING.

### PART I.

#### *Standing Rigging*

Is composed of pendants, shrouds, stays, and backstays; each mast is supported forwards by stays, aft by backstays, and sideways by shrouds; the pendants are for applying extra purchases for additional support, staying the mast, or setting up the shrouds; the foremast is supported forward by the bowsprit, therefore the latter has an additional number of shrouds, bobstays, &c., to meet the strain thus brought on it.

Iron masts are rigged similar to wooden; iron yards occasionally have bands with eyes for lifts, braces, clew-garnets, &c.

Iron bowsprits are seldom or never used in the Service, those ships that are supplied with iron masts, such as Rams, have wooden bowsprits for running in, which are fitted as follows:—

Bobstay-chain—set up with slip and screw.

Bowsprit } do. do. do.  
Shrouds }

Heel-pendants—do do. do.—Blocks ron 2 No.

Do. Tackles 2 No.

*To Rig a Lower Mast.*

The masts are supposed to be placed in their proper positions by means of wedges driven in at the partners. A measuring batten is placed against the mast to indicate the stand, also to guard against bellying the mast in setting up the stays and shrouds.

Gantlines are always placed on the mastheads before the masts are stepped.

Q. How do you get the lower crosstrees in place?

A. Supposing the foremost crosstree to be on the starboard side of the deck, the starboard gantline is bent to it amidships, on its upper side, and stopped to the port-arm three parts out.

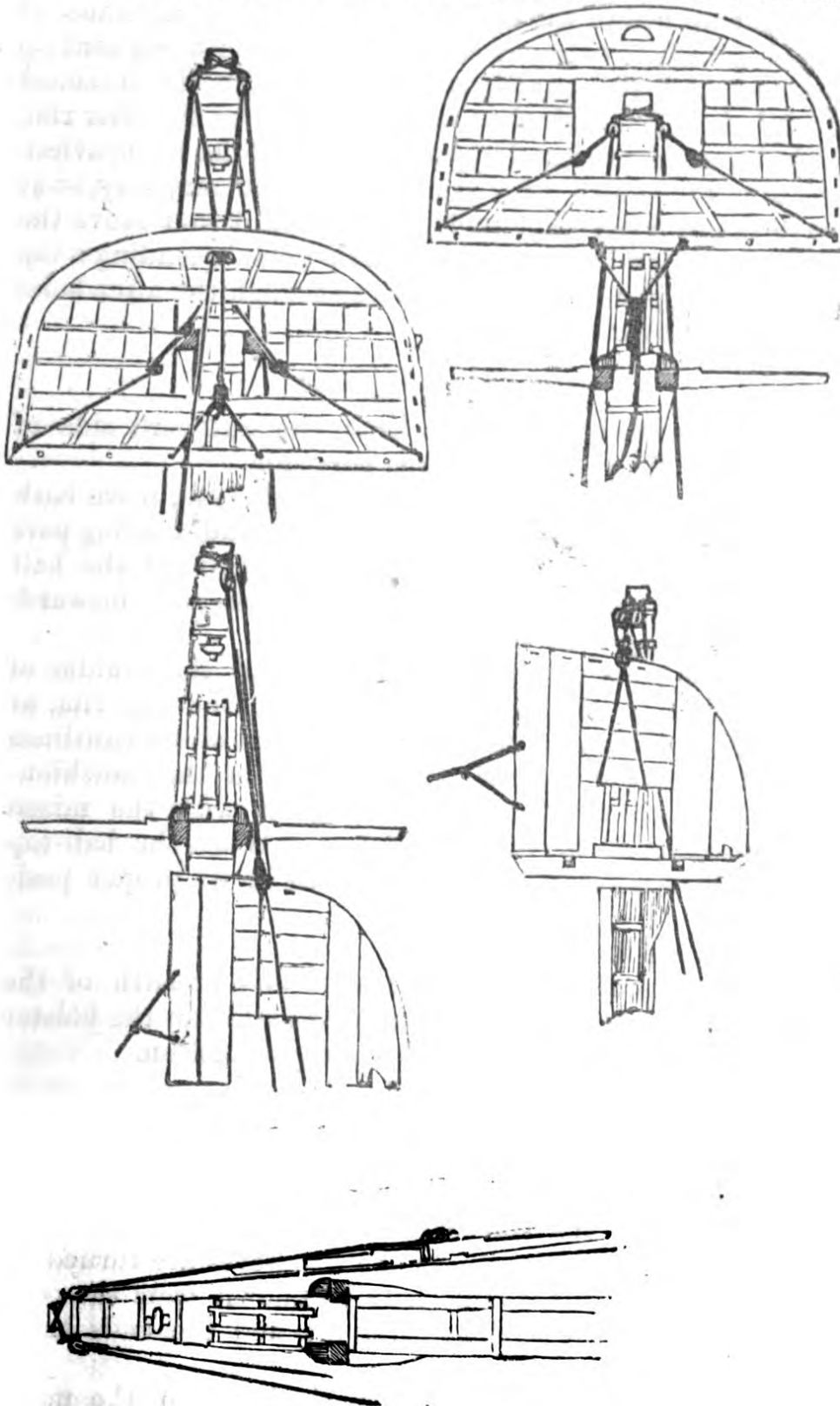
When the arm is well over the trestle-tree, cut the stop and sway across. The after one is crossed in a similar way.

Q. How do you get a top over?

A. There is no rule for getting a top over either before or after the lower rigging, but it is much better to do it before, as it gives the men placing the eyes of the rigging a sure footing, more room to work, and less chance in letting things fall on deck.

Tops of large ships are in halves, and small ships in one. To send a whole top over the masthead, say the main, stand it abaft the mainmast on its after edge, lower side facing forward, overhaul the gantlines down abaft the crosstrees, the hauling part being between the crosstrees; bend the gantlines on their own sides by passing them under the top, up through lubber's-hole, through the after futtock plate-hole,—thus having the heaviest part uppermost and forward; hitch the ends to their own parts, stop the gantlines to the fore parts of the tops, through holes made for that purpose. Bend the mizen-gantline to the after part through the stanchion-holes, guy aft and sway away, when the stops which confine the gantlines to the foremost rim of the top are up to the gantline-blocks, the foremost edge of the top will be pointing over the masthead; by keeping a strain on the mizen-gantlines it will keep the top from tilting aft when the stops are cut. When stops are cut, pull up on the gantlines, and the top will fall

**SENDING UP A CROSSTREE AND PLACING TOPS.**



over in its place. A foretop is got over in a similar way, the main gantlines being used instead of the mizen. A mizen-top is sent up before the mast, so as to have the assistance of the main-gantlines to guy it clear, the after rim being sent up uppermost, and the gantlines passed through the foremost futtock-hole underneath the top, and stopped to the after rim, so as to have the after and uppermost part of the top heaviest. In sending tops down, they are slung the contrary way, so as to have the heaviest part under; therefore if you reeve the gantlines through the foremost futtock-holes in sending a top up before all, you must reeve them through the after-holes in sending it down before all.

*Getting Half-Tops over.*

Suppose the starboard-half to be on the starboard side of the deck, and the port-half on the port side.

To send the starboard-half over the masthead, place both gantlines the starboard side of the masthead, hauling part between the crosstrees, and bending parts abaft it; the half tops are placed on their own sides, foremost ends forward, bottom of the top next the deck.

Hitch the ends of the gantlines round the middle of lubber's-hole trap, then stop them down to the top rim, at the futtock-hole abreast the hitch; bend the mizen gantlines to the after part of the top through one of the stanchion-holes. Sway away, taking care to guy aft with the mizen gantlines clear of the after crosstree. When the half-top is above the crosstrees, it is easily placed in its proper position.

Q. What are bolster cloths?

A. Six parts of canvas, the length and breadth of the bolster, dipped in Stockholm tar and nailed on the bolster for the eyes of the pendants and rigging to rest on.

Q. How are shrouds numbered?

A. By knots in a rope-yarn made fast to the crown of the eye, the first pair the starboard side has one knot; the first pair the port side has two knots, and so on, thus, all the odd numbers will be the starboard shrouds, and all the even numbers the port shrouds. If the dead-eyes are turned in, the starboard shrouds would easily be known from the port, and *vice versa* by the seizings being aft, and the ends being inside and aft on both sides.

Q. How do you send the lower rigging over the mast-head

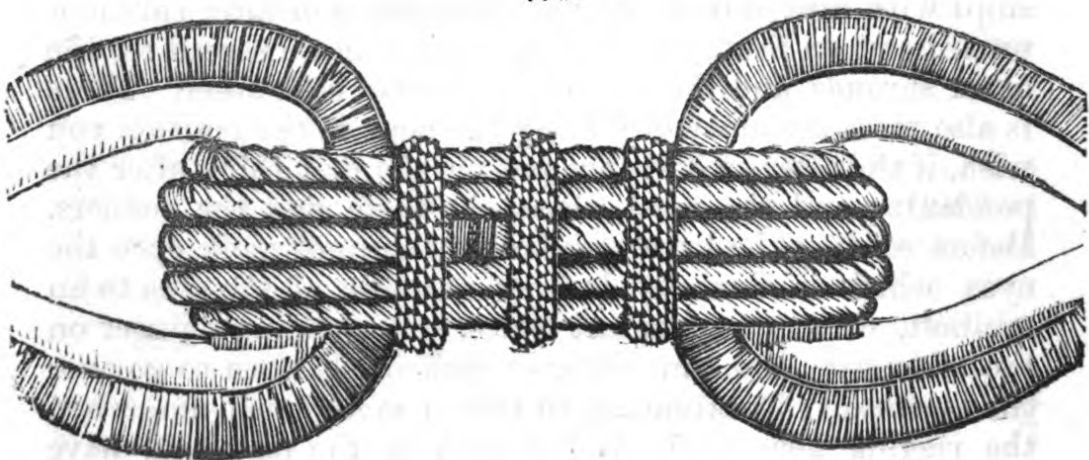
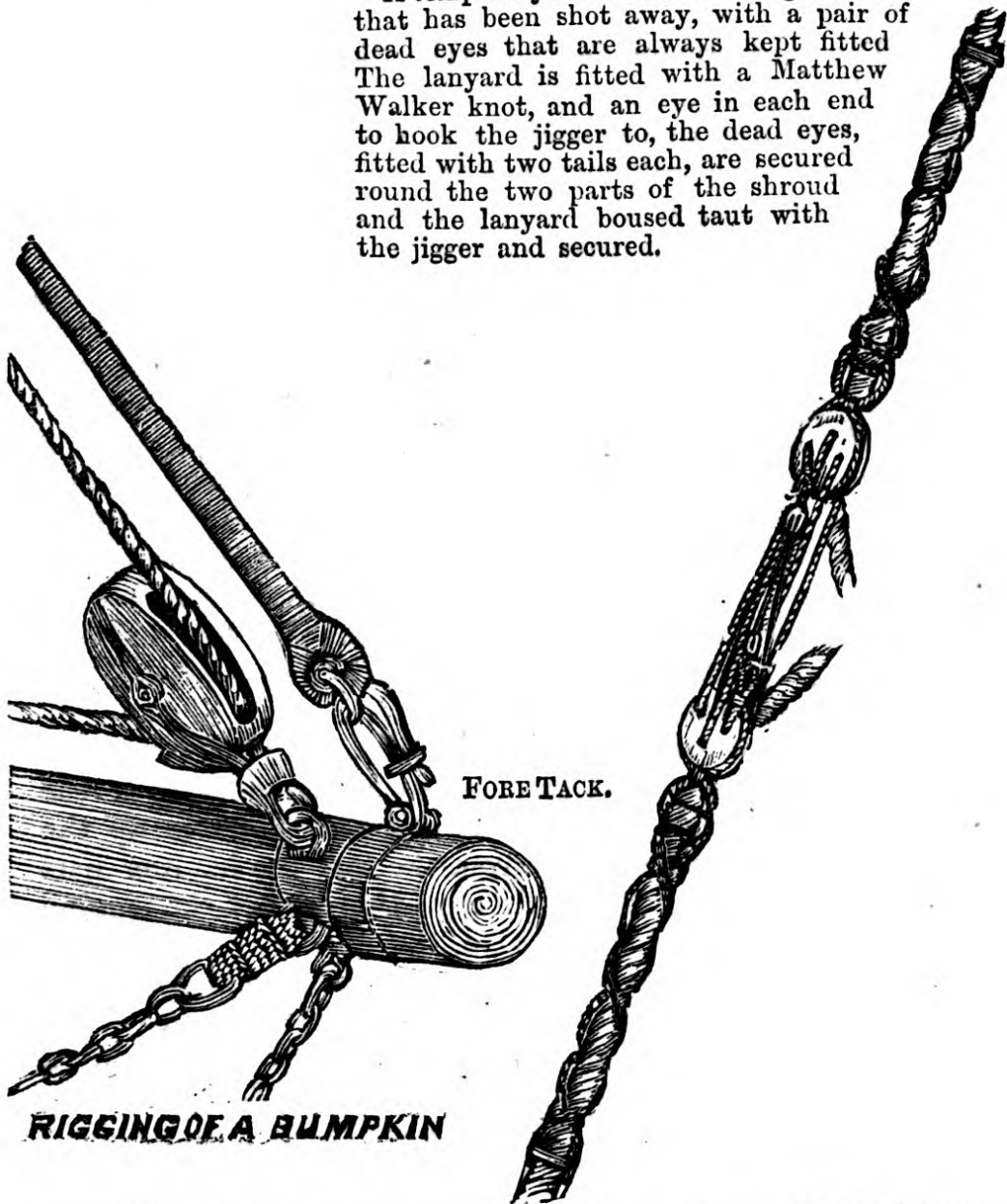
A. The gantlines are shifted to the after part of the trestle-trees. A large toggle is seized on the end of each gantline to which a rounding line is bent. The starboard lower pendant is first sent up, a good temporary seizing is put on about three feet down the long or after leg, and instead of bending the gantline, the toggle is inserted under the seizing, and the upper part of the eye is stopped to the gantline. When the eye of the pendant is triced up to the gantline-block, the stop is cut, and the pendant is placed over the masthead, the seizing is cast off, and the gantline is rounded down by the rounding line, the port pendant is then sent up, then the first or foremost pair of shrouds the starboard side, then the first or foremost pair the port side, and so on, until all the rigging is over the masthead ; in sending the shrouds up, the temporary seizing under which the toggle of the gantline is inserted, is placed about one-third down the shroud, and the gantline is stopped to the crown of the eye in a similar way to the lower pendants.

In large ships where the mastheads are very long, it is necessary to have a short gantline to assist the eye of the rigging over ; which is lashed as high as possible up the lower masthead, and worked from the top, the hauling part of the gantline being dipped through the eyes of the rigging as soon as it is over the masthead.

When the lower pendants are in place, the runners should be triced up and lashed to the long or after legs, and the up and down tackles to the short or foremost legs, so as to get a good up and down pull to settle the pendants down in place, and make a foundation for the lower rigging : each pair of shrouds should be set up when placed over the masthead ; in ships with nine shrouds of a side the single or after shroud is usually put on first ; by so doing it gives more spread for the other shrouds, and the seizings lie clear of each other. There is also more certainty of placing the mast in the position you wish, if the after-swifters are put on the first thing after the pendants ; and the mast placed by them and the runners. Before sending the lower pendants or shrouds aloft, open the eyes, which is done by lashing one side of the eyes to an eye-bolt, or any convenient place, and clapping a jigger on the other side, and haul the eyes sufficiently open to go over the masthead ; by attending to this, it saves much time when the rigging goes aloft, as the men at the masthead have neither the means nor space to do it. After having got an up and down pull of the runners, pass a lashing across abaft the



A temporary method of securing a Shroud that has been shot away, with a pair of dead eyes that are always kept fitted. The lanyard is fitted with a Matthew Walker knot, and an eye in each end to hook the jigger to, the dead eyes, fitted with two tails each, are secured round the two parts of the shroud and the lanyard boused taut with the jigger and secured.



SECURING THE LANYARD OF A FORE STAY.

mast, from the after leg of one pendant, to the after leg of the other, carry the runners forward, and steady them hand taut.

*Q.* How do you send lower stays up?

*A.* If for a foremast or mainmast, which have always two stays, send them up together by placing the upper one, which is always the starboard stay, upon top of the lower one, bend your gantlines to the fork of the stays, having first placed them fair with each other, and seize the two forks of the stays together, also put a good seizing on each side of the collars, about half way up (this applies to topmast stays also: for large ships, two seizings are put on each side of the collars), then put two seizings to the gantlines on each half-collar; when high enough, cut the seizings on the collar, lash the stays abaft the mast; they sometimes go over the foremast crosstree, so as to give more room for the lower yards to brace up. A mizenstay is sent up in a similar way.

*Q.* For what reason are the lower and topmast stays put over the mastheads after the shrouds?

*A.* The lower the shrouds are placed, the sharper the yards will brace up. If the stays were placed over the masthead first, the eyes of the rigging would chafe the lashing of the eyes of the stays through, and the rigging would not lay snug.

*Q.* How are the lower stays turned in?

*A.* Either cutter-stay fashion, or on end. When turned in cutter-stay fashion, hearts are used instead of dead-eyes; when on end, thimbles; sometimes the mainstays are passed round the cross-piece of the fore bitts, and secured to their own parts. Hearts are turned in and secured in a similar way that dead-eyes are in shrouds—the starboard stay the same as a starboard shroud, and the port stay the same as a port shroud.

*To mark a Fore or Mainstay, for turning in.*

Measure with a line from the after-part of the masthead to the heart in the collar on the bowsprit for a forestay, and to the heart at the knight-heads or fore bitts whichever place the mainstays are going to be set up to for the mainstays. Four or five feet less than the measure will be the length of the stay from the eyes to the lower part of the heart, then allow once the round of the stay and half the round of the heart for going half-round the heart and the nip.

In ships of the "Warrior" class, the mainstays are set up

to hearts, secured by bolts through chocks on the upper deck, and clenched underneath on the main deck, to one of the beams about 30 ft. or 40 ft. abaft the foremast.

*Q.* What size is a lanyard of lower stays in proportion to the stay?

*A.* Half an inch less than half the size of the stay.

*Q.* How many turns are there rove through a heart for securing lower stays?

*A.* Four lower turns, and three riding turns; should there be any end left after these turns are rove, it is expended in riding turns, if there is sufficient room left in the heart; the four lower and three riding turns generally fill the heart up.

*Q.* How are lanyards of lower stays rove?

*A.* Generally on the bight, and set up on both ends; sometimes they are only set up on one end, in which case the standing part of the lanyard is secured with a running eye round the underneath part of the lower heart.

When the hearts for the forestays are turned in on the bowsprit, with what is termed a long collar, the standing part of the lanyard of the stay is spliced in the lower heart. It is then rove in a similar way that a lanyard for lower rigging is, the hauling part of the lanyard on the standing part of the stay, each turn being placed in the notch or score in the heart. In large hearts there are four scores, and in small ones three, every turn is hauled well taut and is racked. After the riding turns are passed, the end is seized to its own part; three good spunyarn seizings are passed round the lanyard, at equal distances, to keep all parts in place.

*Q.* What purchases are used for setting up lower stays, and how are they applied?

*A.* When setting up with lanyards rove on the end, the same purchase is used as for setting up lower rigging, viz., up and down and luff; a boatswain's toggle is also used. Both stays should be set up at the same time, the luff being applied to a stay in a similar way that it is to a shroud, the single block well up the stay, hooked to a salvagee-strop, and the double block to the strop of the boatswain's toggle—the up and down to the fall of the luff.

The mast having been placed in the required position by the runners and tackles, the stays are set up until they have the strain of the mast.

When the lanyard is rove on the bight, top-Burton's, on luffs, are sufficient purchase. Great care must be taken to

keep the eyes and lashing clear of each other at the mast-head ; and the fork of the stays exactly middled. Men are stationed each side of the lubber's-hole with a strand, to keep the stays close to the crosstrees while setting up. If the seizings are well secured that are put on the forks of the stays before they are sent aloft, there is little fear of the stays getting out of place at the masthead when setting up ; seizings thus put on, have been known to last an entire commission, and not taken off until stripping the mast again.

*Q.* How do you send a lower cap up ?

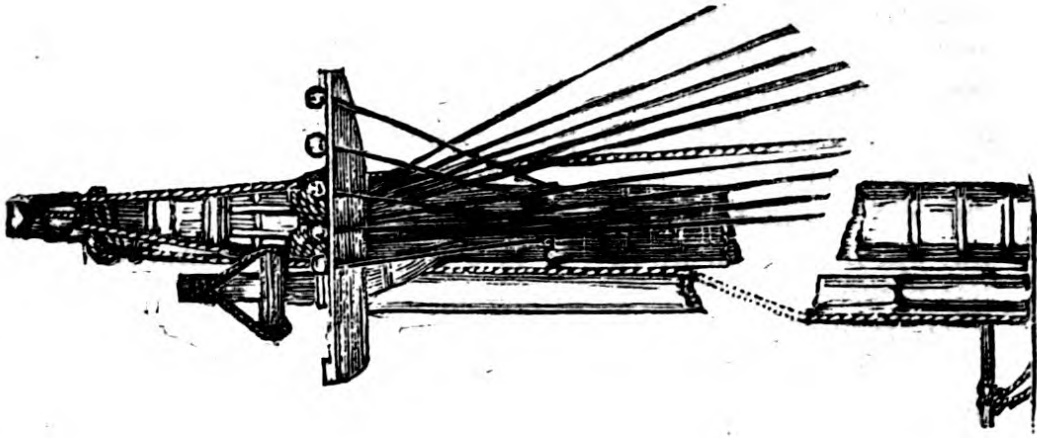
*A.* It is sometimes sent up before the lower rigging is put over the masthead, if after the lower mast is rigged, before the rigging is set up, so as to allow ample room for it to go through the lubber's-hole ; when one gantline only is used for sending the lower cap up, it is doubled by being rove through another block, the standing part being made fast to the masthead ; or both gantlines are shifted to the side of the mast you intend sending it up ; there is sufficient room for it to lay in the fore part of the top, without in any way interfering with the rigging of the lower mast.

#### TO PUT A LOWER CAP ON.

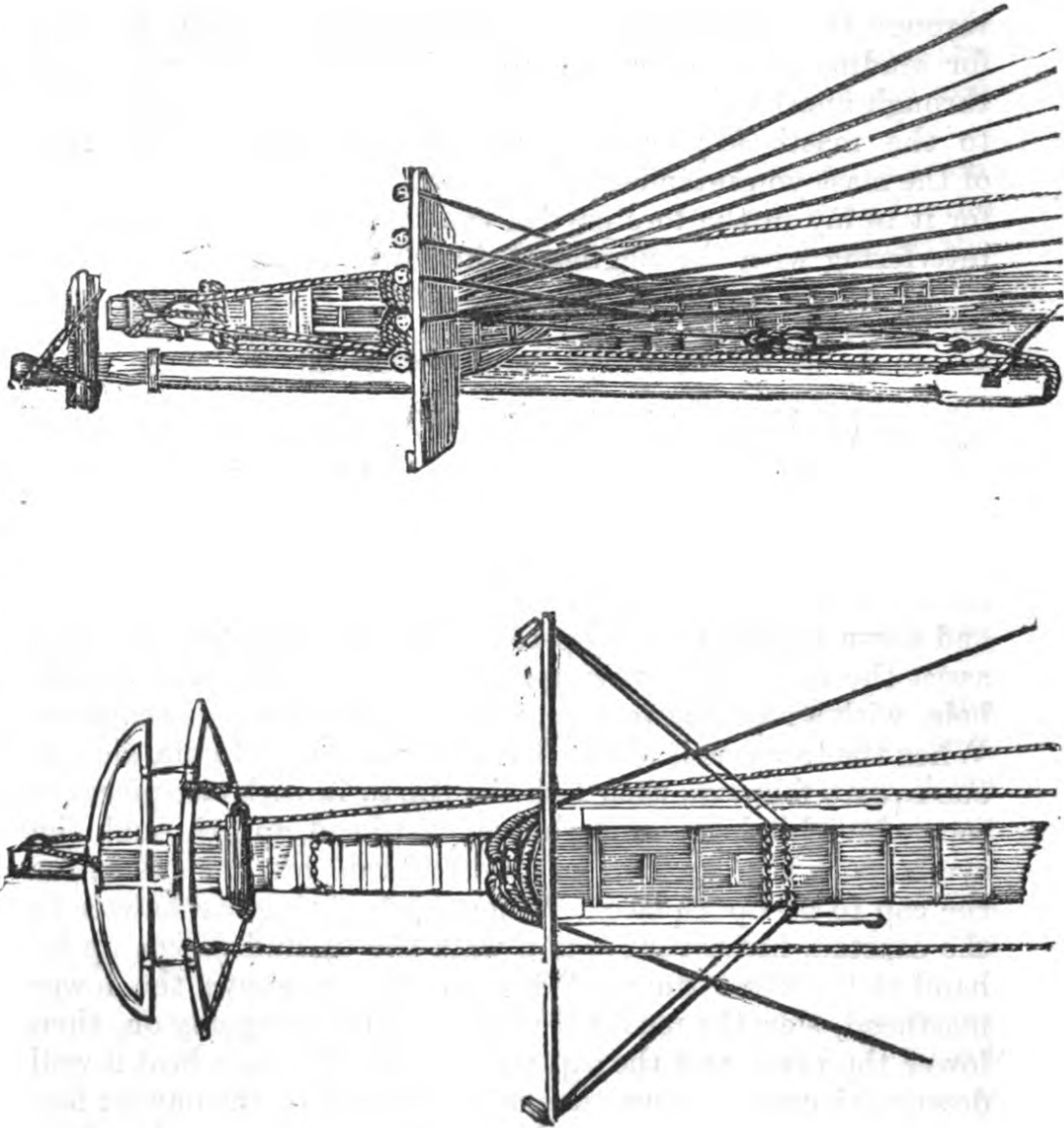
*(A Topmast is always used for this purpose.)*

The cap is swayed out of the top, and hung above the eyes of the lower rigging with the top-Burton tackles fair for the topmast to enter, taking care the after part of the topmast is the same side as the top block is lashed ; hook the two up and down tackles to a strop round the heel of the topmast, to assist the hawser in swaying it up, put a small spar in the fid-hole, with a rope fast to it, so as to slew the mast as required. When the topmast is about 3 ft. through the fid-hole, slew it one square forward, then lash the cap to it with two pieces of rope, clove-hitched round the topmast-head, and through the eye-bolts in the cap, one forward and one aft each side, for the cap to go up square. When ready, bring the hawser to the capstan, heave round, and walk the up and downs up by hand at the same time. When the cap is above the lower masthead, slew the mast till the cap is fair for going on, then lower the mast, and the cap will go into its place, beat it well down with commanders, then make the end of the hawser fast to the foremost eye-bolt in the cap, keeping the weight of the mast in the tackles, unlash the top-block, and hook it to the

PLACING A LOWER CAP.



PLACING TOPMAST CROSSSTREES.



after eye-bolt, in the cap on the opposite side to which the hawser is secured, take the lashing off the topmast-head and lower cap, and the up and down tackles off the heel, and the racking off the two parts of the hawser, put a gantline on the after-part of the topmast-head, ready for sending the topmast crosstrees up; sway the topmast for this purpose, one-fourth up.

NOTE.—It is customary to fid the spare topmast first.

Q. How do you set up lower rigging?

A. With an up and down and luff. The double block of the up and down is lashed to the short or foremost leg of the lower pendants, the single block is overhauled down ready to hook to the fall of the luff. The single block of the luff is hooked to a salvagee-strop, which is put on the shroud that is to be set up, about 10 ft. above the netting, a strip of canvas having previously been placed round the shroud to take the chafe of the salvagee-strop.

If setting up with what is termed a boatswain's toggle, the double block of the luff is hooked to a strop which goes round both parts of the lanyard under the toggle.

A boatswain's toggle is simply a piece of hard round wood; it is used by taking a round turn round it with the lanyard; and then by taking two round turns round both the parts of the lanyard, under the toggle, with a salvagee-strop, taking care to have both parts of the strop on the same side of the toggle.

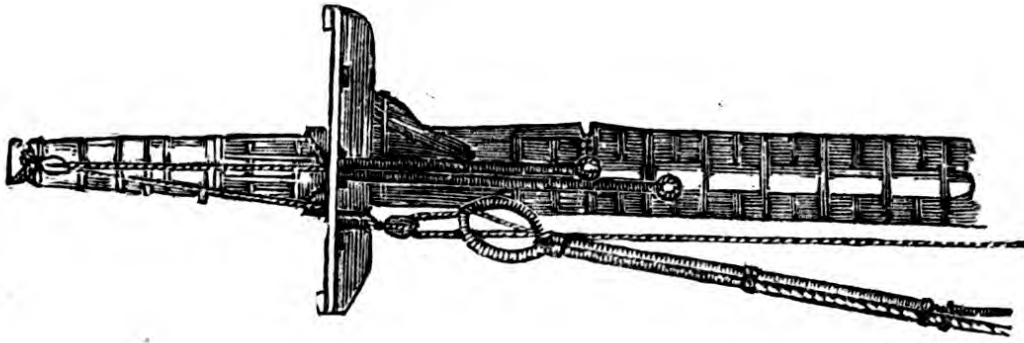
This plan is much approved of by riggers, as the lanyard never jams, nor do you run a chance of bursting the yarns of the lanyard.

Another plan, for setting lower rigging up, is by making a cat's-paw in the end of the lanyard, and hooking the double block of the luff to it, this plan is most objectionable, as the lanyard invariably jams, and in many cases you burst the outside yarns of the lanyards; therefore, in all cases, a boatswain's toggle should be used.

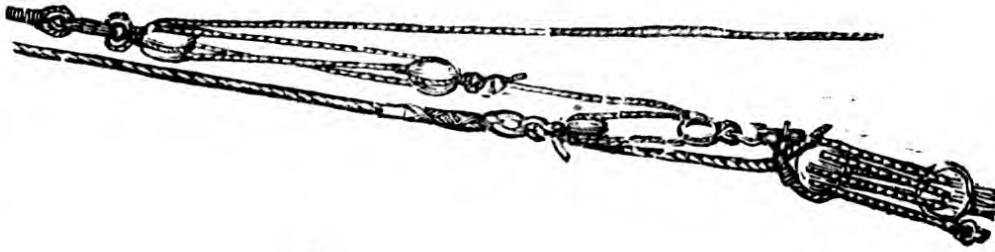
### *Futtock Rigging*

Is composed of iron rod and chain, the foremost shroud only being of chain, the remainder iron rods. The upper ends of the shrouds are fitted with legs to bolt to the futtock-plates, the lower ends are shackled to the necklace round the lower masthead, they are parcelled and served over with spunyarn; an iron Scotchman is seized to the shrouds of the lower

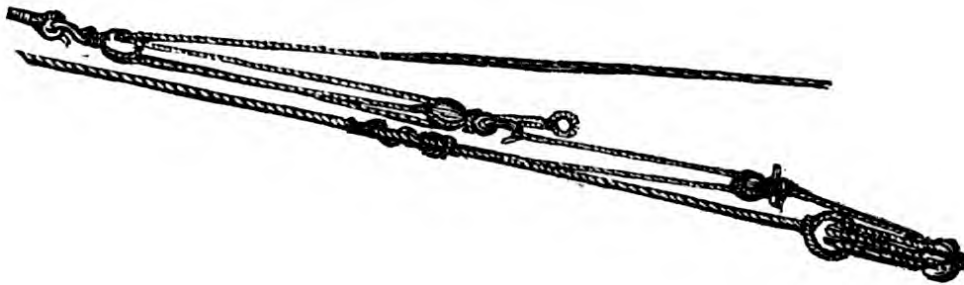
SETTING UP RIGGING, &c.



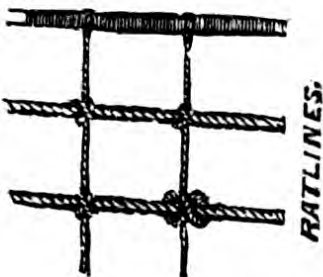
Sending a Shroud aloft.



Setting up Lower Rigging.



Setting up Topmast Rigging.



RATLINES.



Boatswain's Toggle.

rigging, in the wake of the futtock-rigging, to prevent it chafing.

When the futtock-plates are sent up, and rove down through their respective holes in the top rim, send the futtock-shrouds up one at a time and shackle them on in place.

*Q.* How do you send topmast crosstrees in place ?

*A.* Gantlines are placed on the topmast-head for this purpose.

Send the end of the gantline down abaft the top, make it fast to the centre forepart of the crosstrees, bend an after-gantline to keep it clear of the top and lower cap, sway the crosstrees above the cap, slack the after-gantline, let the fore part rest against the mast, and the after part on the cap, make a rope fast to the after part of the crosstrees, and reeve it through the eye-bolt in the cap each side, and a man in the top to attend them to prevent them slipping off, lower the topmast, take the gantlines off the topmast-head. As the topmast goes down, the crosstrees will gradually come down on the lower cap in the right position to go over the topmast-head when the mast is again swayed up. The spare topmast is generally used for this purpose, and after the crosstrees are in place, the mast is swayed up, and fidded, to ascertain all is right ; they are then sent down, and stowed in the booms or chains. The heel of the fore-topmast being taken aft, and the main and mizen forward.

*Q.* How do you rig a topmast ?

*A.* Sway the mast up, so as to have the crosstrees about 4 ft. above the lower cap, and put the gantline or gantlines on for sending the topmast rigging up. There are two plans for sending topmast rigging over the topmast-head, either by putting a gantline and two man-ropes on the after part of the topmast-head, or by placing two gantlines on the after part of the tressletrees, and the man-ropes on opposite sides of the topmast-head.

Shackle the tye-blocks to the foremost legs of both the necklaces, and the jib halyard-block to the after-leg the starboard side, and topmast-staysail halyard or jibstay-block to the after-leg the port side of the fore-topmast necklace.

The jib and staysail halyard blocks are sometimes shackled to eye-bolts, driven up through the fore-part of the topmast tressletrees and crosstrees, and clenched above, which forms a much better lead ; it saves time to get the hanging-blocks in place, before sending or setting the topmast rigging up.

The iron binding of the blocks should be smoothed down



at the edges, and the ends of the pins covered with leather, to prevent them cutting into the masts.

Nail the bolster cloths in place, the same as for the lower rigging, put the sail-tackle pendant round the topmast below the cross-trees.

*For Staying the Masts.*

Hook the lower block of the fore to the bowsprit cap the main to an eye-bolt in the foremast-head, or a strop round the foremast-head, and the mizen to an eye-bolt in the mainmast-head, or a strop round the mainmast-head.

The topmast rigging is fitted in the eyes, and the dead-eyes turned in the same as the lower rigging, the top-Burton pendant has only one leg of a side to hook the top-Burton to.

The topmast rigging is placed over the masthead the same as the lower rigging, after the Burton pendant is placed, the first pair of shrouds the starboard side, then the first pair the port side, so on until all the shrouds are in place; then the first pair of backstays the starboard side, then the first pair of backstays the port side. Then the third and last pair of backstays, which is fitted with a single leg of a side and a horseshoe-eye, so the backstays shall lay fair on the quarter of the mast.

NOTE.—Single backstays, fitted with a horseshoe splice, are always put over the masthead first, after the shrouds, in Portsmouth Dock-yard, therefore they become the quarter backstays.

All backstays are now turned in alike, and set up with dead-eyes the same as the rigging, as quarter backstays.

There are always three of a side down to second class frigates, below that, only one pair of a side.

Breast or shifting backstays are done away with in the Navy, but if they should ever be used, after the topmast shrouds are placed, send the breast backstays up, which are one on each side; they are spliced together to form the eye.

Bend the gantline, on 3 ft. below the eye, the port side, and stop it along the starboard-leg, sway it up, and cut the stops as they come to the block, sending the starboard breast backstays down its own side; they are set up with a runner and tackle, instead of being set up, like the others, with dead-eyes.

In French ships of war the topmast breast-backstays are used instead of yard-tackle pendants and whips, having fiddle blocks seized in them for reeving the falls.

When required for hoisting boats in or out they are run out to the yard-arms, to the required distance, by a single whip, and secured round the yard-arm by a strop and toggle, thus doing away with the lumber on the main and foreyards of yard-tackle pendants and whips, leaving them much clearer for working studdingsails.

NOTE.—The “London,” and “Princess Royal,” when commanded by Captain (now Admiral) Sir Lewis Tobias Jones, in the Black Sea, had their topmast breast backstays fitted in this way.

When not in use as yard-tackle pendants and whips, the single blocks are hooked in the chains, the hauling part of the falls are hitched round the ass of the lower block, and coiled down, the standing part of the fall, which is secured by being hitched round the backstay above the fiddle-block, is cast off, rove through the pipe in the ship-side inboard, and used as a temporary hauling-part to set the backstay up, thus doing away with the necessity of having the whole length of the fall on the upper deck.

All backstays are usually served with sennit in the wake of the braces, so as to do away with the use of mats.

*To send the Topmast-Shrouds over the Topmast-Head.*

Bend the gantline 3 ft. below the eye-seizing, and stop it to the eye, pull up on the gantlines when the first seizing is up to the gantline-block, cut it, pull up again on the gantlines, and place the shrouds over the masthead.

The quarter backstays are then set up in the usual way, one pair of a side and set up with dead-eyes.

If you are sending the topmast rigging up by a single gantline on the after-part of the topmast-head, you must hang the shroud by the man-ropes, cast off the gantlines, unreeve it, dip it clear of the eye of the shroud, reeve it the reverse way, and pay it down for the next pair.

If you are sending the shrouds up by gantlines placed on the after tressletree, as soon as the second seizing is up to the gantline block, reeve, if the starboard shroud, the port man-rope, which is placed on the topmast-head through the eye, and bouse it down in place; this latter plan, for small vessels, is much to be preferred, and in ships where the topmast-heads are not too long, much time is saved in working the two gantlines.

In large ships, where the topmast rigging is very heavy, the single gantline on the after-part of the topmast-head is the best and easiest plan.

Funnels are used in small ships for the topmast rigging, the same as for topgallant rigging, only they are square instead of round.

*Q.* How are the lower dead-eyes for the topmast rigging fitted?

*A.* The lower dead-eyes of the topmast rigging are iron stropt, and, like the lower ones, swivel; they are connected to the necklace of the lower mast by the futtock shrouds.

It requires great care in placing the lower rigging, so the futtock rigging will lead clear between the lower shrouds without chafing them; but if the lower shrouds ride, there will be great difficulty in reeving them, and constant chafing afterwards.

Iron Scotchmen are placed on the lower rigging, so as to prevent chafing the lower shrouds.

*Q.* What is the difference in the fitting of the topmast shrouds?

*A.* The first or foremost pair of shrouds each side, has a sister-block seized in them for the topsail lifts and reef-tackles, and the foremost shroud on each side is wormed, parcelled, and served all the way down.

*Q.* How do you send up and place the topmast stays, fore, main, and mizen over the topmast-head, and how are they set up?

*A. For the Fore or Main.*—The stays are placed one on top of the other, seized together in the crutch, and two seizings are put on each side of the collar; if the jib-stay is fitted to secure at the masthead and set up on the forecastle, all three stays can be sent up together, the jib-stay uppermost; the gantlines are sent down before all, and bent to the crutch of the stays and stopped to the collars, swayed up, and when the seizing on the collars are up to the gantline-blocks they are cut, and the eyes are lashed abaft the topmast rigging with a rose-seizing.

The legs of the collar of the jib-stay are passed down through the collars of the fore-topmast stays, and lashed in a similar way to the topmast stay abaft all, and below them. It takes it more clear of the foot of the fore top-gallant sail, and brings less strain on the topmast-head.

In large ships, where the stays are heavy, it is the best plan to send them up by a top-Burton, which is hooked to a strop round the fork of the stays.

The starboard stay is always the upper stay.

The fore-topmast stays are rove through the sheaves in the

bees of the bowsprit, through holes in the spritsail gaff, and set up in the head, the port or inner stay having previously been rove through hanks for the topmast-staysail.

*Main Topmast-stays.*

In all screw ships they both lead through iron-bound clump blocks, shackled to the hooks at the foremast-head above the rigging, high enough to clear the peak of the gaff-foresail, and are set up to iron-bound hearts in the deck. Paddlewheel steamers have but one stay that reeves through the fore cap, and sets up to a collar under the third pair of shrouds.

The mizen topmast stays set up to a thimble, stropped round the eyes of the main shrouds; in screw ships there is an iron-bound clump-block above the rigging, similar to the main topmast-stays.

In sailing ships, the upper main topmast-stay leads over a chock between the fore tressletrees; the lower one leads through a clump-block bolted through the foremast, under the top; both are set up to iron-bound hearts in the deck.

*Q.* How do you set up topmast rigging?

*A.* A top-Burton and runner are used for this purpose. The double block of the Burton is hooked to the Burton-pendant, and the single block to a thimble in the end of the runner; the other end of the runner is secured round the shroud that is to be set up, about 10 ft. above the top, or as high up as the length of the runner will allow with two round turns, and the end is dogged round with the lay of the rope and stopped.

The end of the lanyard is rove through the thimble, in the crown of the runner-block.

A sheet-bend is formed round the neck of the strop, in which a belaying pin, or any round piece of wood is inserted, to prevent it from jamming.

The end of the Burton fall is led on deck, where it is worked.

If a hook were substituted in the crown of the runner-block, instead of the thimble, a boatswain's toggle could be used for setting up topmast rigging, the same as lower rigging, by which much time would be saved.

*Q.* How are topmast-stays turned in?

*A.* On end, with the end parts in amidships. Hearts are generally used by the dockyard riggers in large ships, and in

small vessels, thimbles. For neatness in large ships, dead-eyes are frequently substituted for hearts.

*Q.* How are the lanyards for topmast-stays rove ?

*A.* If dead-eyes are used in a similar way to lower or topmast rigging, the end is secured by a Matthew Walker knot in the upper dead-eyes. If hearts are used, the standing part of the lanyard is spliced in the bolt in the deck, to which the lower heart is secured. If thimbles, the standing-part of the lanyard is spliced in the thimble in the stay.

*Q.* What purchases are used for setting topmast-stays up, and how are they applied ?

*A.* Luff upon luff.

*For a Fore Topmast-stay.*

The single block of the first luff or fore-castle-jigger is hooked to the lanyard of the stay, and the double block to a salvagee-strop on the stay, or the tail of the double block of the jigger dogged round the stay ; the fall is led in through one of the pipes on the fore-castle, cat's-pawed, and the double block of another luff or fore-castle-jigger is hooked to it, the single block being hooked to a convenient place to form a fair lead, it is then steadily walked up until the topmast-stays have the strain of the mast, or the sail tackle by which the mast has been placed in the position required is slack.

*To Set a Main Topmast-stay up.*

Hook the single block of a luff to a salvagee-strop well up the stay, and the double block to the lanyard, then hook the double block of the second luff with another salvagee-strop well above the single block of the first luff, and below the clump-block through which the main topmast-stays are rove, and the single block to a cat's-paw in the hauling part of the first or lower luff ; reeve the fall through a leading block on deck, and steadily walk it up until the stays have the strain ; both stays should be walked up together.

The mizen topmast-stays are set up with top-jiggers, the double block of the jigger is hooked about 10 ft. or 15 ft. up the stay, and the single block to the lanyard ; it is generally set up by hands in the top.

*Q.* What is the difference in the rigging of a fore, main, and mizen topmast ?

*A.* The fore topmast has an extra stay to the main—viz., the jib-stay. The mizen has only one topmast-stay.

Q. How do you get a topmast cap in place?

A. In small vessels it is swayed up by gantlines, and put on by hand.

In large ships a topgallant-mast is used in a similar way that a topmast is for a lower cap.

Lash the fore and mizen topgallant-mast rope blocks the starboard side, and the main the port side.

To reeve the mast-rope for this purpose, take the end up through lubber's-hole, on the starboard-side, for the fore or mizen, and the port side for the main, reeve it through the block at the topmast-head from aft forward, down through the mast-hole in the crosstrees, then through the thimble of the lizard, through the sheave-hole in the heel of the topgallant-mast, and through the thimble of the topgallant lizard; haul enough through to reach the royal-mast-head, and rack the two parts together; reeve the lizard that is on the hauling part through the royal sheave-hole, and hitch it to its own part; the lizard on the standing part is rove through the topgallant sheave-hole, and hitched to its own part.

Sway the mast up, and point it through the topmast crosstrees.

Two gantlines are secured to the topmast-head for this purpose; overhaul one of them down before all, bend it to the cap, and sway it up to the topmast-head.

Make the other gantlines fast, so that the cap will hang square above the eyes of the rigging, for the topgallant-mast to enter the round hole, then sway the topgallant-mast 2 ft. or 3 ft. through the cap, and lash it fair for going on the topmast-head, sway up until the cap is above the topmast-head, then slew the topgallant-mast until the cap is fair for going on, then lower away until the cap is in place; beat it well down with a commander, when it bears fairly all round in place, make the standing part of the topgallant-mast rope fast to the foremost eyebolt in the topmast cap; lower the mast, and let the weight come on the standing part with the same racking on; then unlash the block, and hook it to the after eyebolt in the cap on the port or starboard side, according which mast it is. Haul taut the mast-rope, take a turn with it and cast the racking off.

Q. How is a topmast necklace secured, and what is it made of?

A. A topmast necklace is merely a chain-strop, the fore having two open links or legs on each side for the hanging

or topsail tye-blocks, jib and fore topmast staysail halyard-blocks and the main and mizen, one open link or leg each side for the topsail-tye, or hanging-blocks.

The necklace is placed over the topmast-head, above the crosstrees, and under the bolsters.

NOTE.—In Portsmouth Dockyard the chain strop is done away with, the necklace is now formed out of an iron plate, with lugs for long links for the hanging blocks.

Q. How are the bolsters on the topmast secured ?

A. The topmast bolsters, like the bolsters on the lower mast, are chocks of wood, half-rounded, so as to form a smooth surface for the eyes of the topmast rigging to lay on ; and are scored out underneath to fit snugly down on the necklace.

The necklace and bolsters are secured to the crosstrees, before the crosstrees are sent aloft.

Q. How do you rig a topgallant and royalmast ?

A. Topgallant rigging is placed over a funnel, which is made of copper to fit above the hounds of the topgallant-mast ; being of a smooth surface, it does not chafe the eyes of the rigging.

#### *To rig a Fore Topgallant Funnel.*

Send the gantlines down before all, and make it fast to the stays, about 6 ft. below the funnel, stop it to the funnel ; pull up on the gantline, and place the funnel over the hole in the topmast cap, in readiness to receive the topgallant-mast, stop the stays to the crosstrees ; send the gantlines down abaft the top for the starboard pair of shrouds, place them over the funnel, then send the port pair of shrouds up and place them ; then the starboard pair of backstays, then the port pair of backstays and place them.

The main and mizen topgallant-masts are rigged in a similar way, with the omission of a flying jibstay.

Main and mizen royalstays are now rove through sheaves in the after-part of the fore and main topmast crosstrees. Iron jacks, or arms, are also fitted to the lower rim of topgallant funnels. The fore has six, the main five, and the mizen two. On the fore the blocks for the flying-jib halyards, fore topgallant-buntlines, and the topgallant studdingsail-halyard, are shackled to the four foremost ones, Jacob's ladder being shackled to the two after ones. On the three foremost lugs of the main, the main topgallant buntlines, and topgallant studdingsail halyard-blocks, are shackled, Jacob's ladder to

the two after ones. The mizen Jacob's ladder is shackled to the two lugs which are on the after part of the funnel.

*Royal Funnels.*

A royal funnel is made of copper, and similar in shape to a topgallant funnel.

A false royal masthead is fitted to go far enough down the funnel to be secured by screws; it is in every way the shape of the royal masthead, fitted with the lightning conductor, and a hole for the spindle.

Place the royalstays and backstays on the funnel, reeve the signal halyards and put the truck on. Send it up, and place it over the topgallant funnel, ready to ship on the head of the mast.

Sway on the mast-rope, when the head of the mast is through the topgallant funnel, place the royal funnel and truck, and reeve the royal halyards; when the mast is high enough, settle the topgallant funnel down in its place, and when the sheave is above the cap, reeve the topgallant yard-rope: shackle the span-blocks for topgallant studding-sail halyards and Jacob's ladder, abaft, all to the jacks attached to the funnel. The spindle goes with a screw into the false masthead.

N.B.—In most cases the flying-jib halyards block-strop is worked round the chafing grommet when the funnel is not fitted with jacks.

A fore topgallant stay is rove through the dumb-sheave in the jib-boom end, through the dolphin-striker, and set up to one of the knight-heads.

The main and mizen are led through a hole in the lower caps, and set up, the mizen in the main, and the main in the fore-top

The fore royalstay is rove through the dumb-sheave in the flying jib-boom end, through the lower part of the dolphin-striker, and like the topgallant stay, is set up to one of the knight-heads.

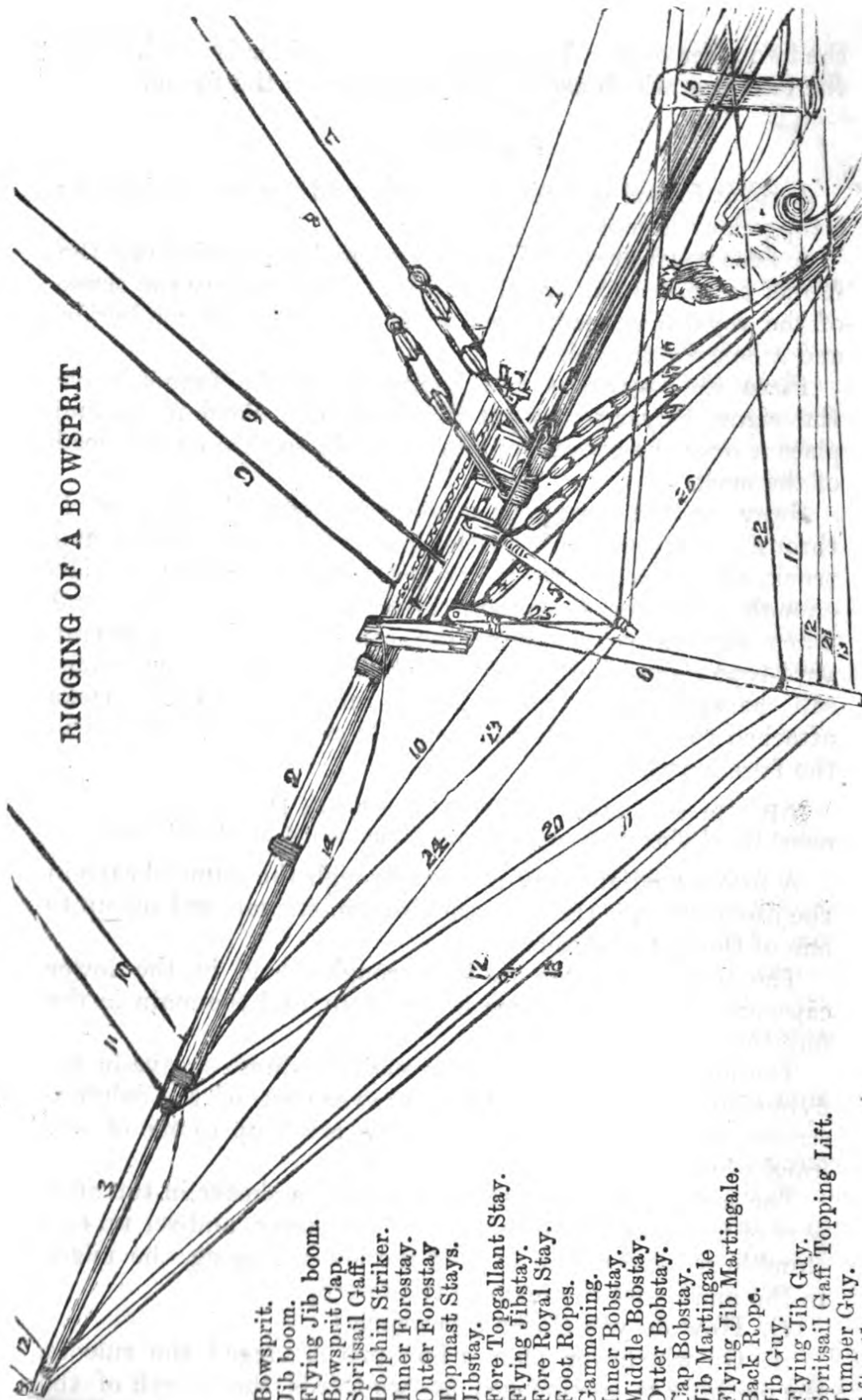
The main and mizen are rove through a sheave in the after part of the main and fore-topmast crosstrees, and set up to a thimble secured to the eyes of the lower rigging, the mizen in the main, and the main in the foretop.

Q. How do you clothe a bowsprit?

A. On whichever plan a bowsprit is rigged, the rule is, the clothing is commenced at two-thirds the length of the bowsprit from the knight-heads, but owing to the long bows



# RIGGING OF A BOWSPRIT



- 1 Bowsprit.
- 2 Jib boom.
- 3 Flying Jib boom.
- 4 Bowsprit Cap.
- 5 Spritsail Gaff.
- 6 Dolphin Striker.
- 7 Inner Forestay.
- 8 Outer Forestay.
- 9 Topmast Stays.
- 10 Jibstay.
- 11 Fore Topgallant Stay.
- 12 Flying Jibstay.
- 13 Fore Royal Stay.
- 14 Foot Ropes.
- 15 Gammoning.
- 16 Inner Bobstay.
- 17 Middle Bobstay.
- 18 Outer Bobstay.
- 19 Cap Bobstay.
- 20 Jib Martingale.
- 21 Flying Jib Martingale.
- 22 Back Rope.
- 23 Jib Guy.
- 24 Flying Jib Guy.
- 25 Spritsail Gaff Topping Lift.
- 26 Jumper Guy.
- 27 After Guys.

ships now have, this must depend on the length of the cut-water.

There are two plans for clothing a bowsprit—viz., heart plan, or the strop or bale-sling plan.

#### HEART PLAN.

*This plan is generally adopted in Portsmouth Dockyard.*

Inner bobstay collar	Outer bowsprit shroud
Inner bowsprit shroud collar.	collar.
Inner forestay collar.	Outer forestay collar.
Middle bobstay collar.	Outer bobstay collar.

N.B.—The bobstay collars are placed, the diameter of the bowsprit apart.

#### *Strop or Bale-sling Plan.*

Inner forestay collar.	Outer bowsprit shroud
Inner bowsprit shroud collar.	collar.
Inner bobstay collar.	Middle bobstay.
Outer forestay collar.	Outer bobstay collar.

In this way the forestay is placed inside, for convenience in removing the collar if necessary.

An extra bobstay is fitted, reaching from the lower stem-hole to the bowsprit, just inside the cap called the cap-bobstay.

In rigging a bowsprit, the first thing to be done is to rig a stage for the men to work on, as follows :—Take two topmast studdingsail-booms, or any other spars of that description, rig them out of the head-port over the rail, hook the double block of a luff to the cap of the bowsprit, and the single block, to a lashing on the end of the spars : haul them out, and secure their heels on the headrails ; lash a third spar across the outer ends, to keep them open, and secure them to the end of the bowsprit by a lashing. Lash two planks athwart them, one near the inner, the other near the outer end of the spar ; then slay as many planks as required to form a platform, nailing them for security to the two athwart-ship planks.

The bowsprit is supported at the hole in the bows, which it passes through by wedges, the same as the lower masts are at the partners ; it is also secured by chain or rope gammonings, two in number, inner and outer gammonings, which are passed over the gammoning-fish, on the bowsprit, and through holes in the stem.

The gammoning-fish, or saddle is well-tarred, the ends of the chain are passed over the bowsprit, from the starboard side, through the holes in the stem, and over the bowsprit, and shackled to their own parts underneath ; the turns are then passed with the other ends, so that the foremost ones on the bowsprit are the after ones in the stem ; each turn is hove taut, as it is passed, by reeving the gammoning through snatch-blocks made fast to the bobstay-holes on the cutwater, bringing the bight through the hawse-hole, and toggling on to tackles led from the capstan.

Before coming up the tackles, the chain is secured, by nails driven through it, into the fish or gammoning pieces, also by the wedges driven into the gammoning-hole in the stem.

The last turns are frapping turns, passed over some well-greased hide, and set up by a tackle or a runner led through a block on the bumpkin.

In rope-gammoning, racking turns with spunyarn would be used, instead of nails. Chain-gammoning stretches after much use, and should therefore be attended to, when about to set up rigging.

The man-ropes are spliced round a thimble, through an eye-bolt each side of the bowsprit-cap, and a thimble spliced in the other ends, to set up to the knight-heads with a lanyard, and attached to the forestay by stirrups.

The bowsprit is secured outside downwards by the bobstays, and sideways by the shrouds.

The forestays pull upwards, and are always placed between two bobstays, so as not to strain or distress the bowsprit.

The inner bobstay or inner forestay collar, according to the plan the bowsprit is to be rigged, is lashed on two-thirds the length of the bowsprit from the knight-heads.

All collars, before being placed, are well fidded out. The bobstay-collars are lashed on top.

The forestay-collars below, and the bowsprit shroud-collars on the quarter of the bowsprit, the lashings are hove taut by means of a Spanish windlass ; when all the collars are in place, cleats are nailed to keep them from shifting in or out.

In some cases they are fitted without being lashed, the thimble reeving through its own part.

Bowsprit-shrouds are usually of chain, secured to the collar by a rope lanyard, and to the eye-bolt in the bow by a slip ;

all bobstay collars are placed the diameter of the bowsprit apart, which leaves a proper distance for the other collars.

Bobstays are rove through the hole in the cutwater, middled, and spliced, and the hearts seized in, ready for setting up, the drift for the lanyards between the heart in the bobstay, and the heart in the collar is, for the inner bobstay, the diameter of the bowsprit, the middle one 3 ins. less, and the outer one, 6 ins. less.

The lanyard is half the size of the bobstay ; if wire, the lanyard of the bobstay is the same size as the bobstay, and the standing part is made fast with a running-eye, either round the bowsprit close to the collar, or round the heart in the collar ; reeve as many turns as you can without riding, well tar and grease them, hook the double block of a luff to a strop round both parts of the bobstay near the cutwater, and the single block to the lanyard, bring the end of the fall through a block hooked to a strop round the bowsprit, haul through the slack, and make a cat's-paw in it, hook the double block of another luff to it, and single block to the knight-heads, and haul every turn taut.

The standing parts of the lanyards should be made fast on opposite sides alternately, so as to endeavour to keep the blocks of the luff clear of each other in setting up.

After each bobstay has been drawn into place, shorten up for a final pull, and walk all three down together ; rack the turns, and pass the riders, rack these again, and when the last turn is taut, rack the end to the other part.

Sometimes the bobstays are set up on both ends of the lanyards, this is done by reeving one end through a leading block made fast round the bowsprit.

#### *Bumpkins.*

The bumpkins are stepped, one each side of the bows, to a beam fitted for the purpose, they are secured downwards, and sideways by chain guys, shackled to the bows, and set up to the bumpkin-end, to eye-bolts attached to an iron band that is on the bumpkin-end, and clamped to one of the cross-beams of the head-rail ; it is tapered off at the end, to prevent the foretack blocks from slipping in.

*Q.* How do you get a bowsprit cap on ?

*A.* Bowsprit caps are put on and taken off with the jib-boom, in a similar way that a lower cap is with a topmast.

*Q.* How do you rig a jib-boom ?

*A.* First point it over the knight-heads, lightning conductors downwards, get a whip on the forestay, and hook the single block to a strop round the jib-boom, about 10 ft. or 12 ft. from the jib-boom end, which will take it into its place on the bowsprit, with the end far enough through the bowsprit cap to admit of placing the funnel to receive the rigging.

The funnel is fitted with an iron band round it with two legs to it ; the one on top is for the slip of the jibstay, and the one underneath is to shackle the martingale stay ; before placing the funnel on, put the jib-traveller on, if it is intended to use one.

*How to place the Rigging over the Funnel.*

1st. A good chafing grommet, close to the iron band, driven well down to protect the eyes of the rigging from being cut.

2nd. Foot ropes.

3rd. The starboard-jib or spritsail guy.

4th. The port one, seize the foot-ropes on to the guys, about 18 ins. from the eye.

5th. The jackstay, which is fitted in most cases with an eye over the funnel, and a small eye in the other end to set up to the bowsprit cap ; it is also fitted with stops for stowing the jib.

6th. Shackle the martingale stay on, one end to the eye-bolt under the iron round the funnel, and the other end to the dolphin-striker.

When the martingale stay is made of wire rope, there is an eye spliced at each end, one of which goes over the funnel and the other over, and close up to the shoulder, on the point of the dolphin-striker.

After the rigging is placed over the funnel, the flying jib-boom iron is put on the end of the jib-boom, with the hole for the flying jib-boom on the starboard side.

To rig the jib-boom out, reeve the heel rope, bend the jib-halyards, or hook the foretop sail tackle to the jib-boom end ; pull on the heel rope, and rig the jib-boom out, keep as much strain on the jib-halyards, or sail tackle, as will keep the heel from rising off the saddle.

When out, the heel is secured by two chains, the heel and crupper chain, both fitted with slips.

The heel chain is in two pieces, and shackled to eye-bolts

on either side of the bowsprit cap. The starboard piece having a slip in the other end, the port piece is brought round the heel of the jib-boom, there being a score there to receive it, and extends about 2 ft. up the starboard side, when it is secured by the slip in the starboard piece.

The crupper chain is passed round the bowsprit, and over the notch in the jib-boom made to receive it, and secured to one of its own links by a slip.

*To set up the Rigging.*

Steady taut the jumper-guys, so as to allow the gaffs to come into their required position, pull up on the spritsail-lifts and guys, the gaffs will come nearly horizontal, then steady taut the back-ropes, and remove the jib-halyards or sail-tackle from the jib-boom end.

The jibstays are generally set up in the head, and seldom shackled to the jib-boom funnel.

The jibstay is either rove through the sheave hole in the jib-boom end, through another in the dolphin-striker, and its end (which is pointed and fitted with a becket for bending a reeving-line) set up in the head, or it is secured by a slip to the eye-bolt in the upper part of the iron band that goes round the jib-boom funnel.

Another plan is the jib-traveller, worked the same as in a cutter, only with a jib-stay, the standing part of the stay is secured by a slip, or seized to the traveller, the other end is rove through a block at the masthead, and set up by a tackle, or sometimes, in small vessels, by a runner and tackle on deck.

The traveller is worked by an outhaul, through the sheave-hole in the jib-boom end, and an inhaul.

The object of this plan is to be able to ease the jib in when blowing fresh.

Small ships have an iron martingale or dolphin-striker, and iron whiskers or outriggers, projecting from the catheads, instead of spritsail-gaffs, through the ends of which the jib-guys are rove, and set up in the fore chains clear of the anchors.

It is found convenient, when a jib-boom is fitted with a funnel, to fix two iron projections on the fore part of the bowsprit cap, so as to be able to secure the funnel in a direct line with the jib-boom hole in the bowsprit-cap, in shifting jib-booms.

Q. How do you rig a flying jib-boom out ?

A. By a heel-rope, fitted with a tail-block and made fast to the boom-iron, then make the end fast to the flying-boom end, and stop it to the head ; haul on the heel-rope, and point the boom through the iron.

*How do you Rig a Flying Jib-boom ?*

- 1st. Put on a chafing grommet close to the hounds.
- 2nd. The foot-ropes.
- 3rd. Flying-jib-guys.
- 4th. Flying martingale-stay.
- 5th. Reeve the flying jib-stay through the sheave-hole ; the royal stay leads over a notch, or half-sheave in the flying jib-boom end.

Splice an eye in the ends of the foot-ropes, then take a half-hitch, and seize it round the jib or spritsail-guys, and put another seizing on before the hitch.

Q. Where is the flying jibstay set up ?

A. It is rove through the sheave-hole in the end of the flying jib-boom, through the dolphin-striker, and set up with a purchase to the port knight-heads.

*To Ship the Spritsail Gaffs.*

Put the jaws through the bow ports, clap a tackle on the topmast stays, hook the single block to a strop put inside the jaws of the gaff, and whip them out in place near the bees of the bowsprit, and just outside the outer bobstay collar ; there is a score cut in the jaws, for the topmast stays to lead through.

*To Rig a Spritsail Gaff.*

- 1st. Put the brace on.
- 2nd. The lift.
- 3rd. The guys.
- 4th. The after-guys, and spritsail-martingale, it is sometimes called a jumper-guy.

Put a clump-block on the gaff outside, and close to the guys, for the foremost guy of the swinging boom.

A double strop is fitted round the gaff, half-way out from the jaws, with a thimble seized in it, for the flying jib-sheets to lead through.

*To Ship a Dolphin-Striker in Place.*

Hook the double block of a tackle to the bowsprit cap, and the single block to a strop below the jaws of the dolphin-

striker ; and trice it up close to the bowsprit, where it is secured by jaw-ropes round the bowsprit, just inside the cap.

*Q.* How are spanker, or trysail-gaffs fitted, and what gear is attached to them ?

*A.* In most cases the gaff is fitted with two iron bands round them, with eye-bolts on top, the inner one is half-way and the outer one five-sevenths out from the jaws, for hooking the peak halyards-blocks to, which are two single iron-bound blocks ; on the gaff end is an iron spindle or outrigger, with a sheave in it, for reeving signal-halyards through, for hoisting the ensign.

The throat halyard-block is a double iron-bound block, and is hooked to an eye-bolt just abaft the jaws, which is clenched underneath.

In the gaff end, there is a sheave-hole for the outhaul, and in most cases a small iron band with an eye-bolt on each side for the vang.

The jaws is the fork or foremost part of the gaff, that fits round the mast, and is formed by two chocks, secured to the gaff by iron hoops, or bands ; when the spanker-boom is near the binnacle, the hoops, or bands, for securing the chocks, or jaws, are always metal ; the jaws are covered in the wake of the mast with liquored leather.

*Q.* What rigging is attached to a gaff ?

*A.* Peak and throat halyards, vang, downhaul and tack-tricing line ; inhaul, outhaul, and jaw-rope.

*Q.* How is the boom of a boom-mainsail, or spanker-boom fitted, and what rigging is attached to it ?

*A.* It is fitted with jaws, the same as the gaff, which rests on a saddle, and is secured to the mizen trysail-mast or main-mast of a brig, with cleats and a clasp hoop.

If the sail is fitted with an outhaul, there is a sheave in the boom end.

There is an iron band, with an eye-bolt on each quarter of it, for the topping lift-blocks, the boom is coppered over the part that rests in the crutch, there are cleats, and eye-bolts fitted alternately each side of the boom-end for the reef-pendants, four in number.

There are two double blocks, or two single blocks, according how the boom or spanker-boom is fitted, on the after-part of the boom, for the boom-sheets, placed so as to make a fair lead with those placed in the stern of the ship on each quarter.

The standing rigging of a boom is, jackstays, foot-ropes, jaw-rope.



*Main or Spanker-Boom Foot-Ropes.*

It is becoming very general to fit a foot-rope to spanker-booms.

*To fit them.*

Form a cut splice in the centre of a piece of rope to go over the boom-end, splice an eye in the two ends, and seize them round the boom about 3 ft. or 4 ft. inside the taffrail.

*Main or Spanker-Boom Jackstay.*

It is a very convenient thing to have a jackstay on the after part of a spanker-boom, for all it is not usual. It is merely a piece of rope with an eye spliced in each end, the outer one being sufficiently large to go over the boom-end, the inner one is set up to the strop of the boom-sheet block.

Another plan of fitting a spanker or main-boom jackstay, is to form a Matthew Walker's knot in the outer end, reeve it through an eye-bolt on top of the boom, splice an eye in the inner end, and set it up to another eye-bolt placed for the purpose.

*How do you Rig a Main Yard ?*

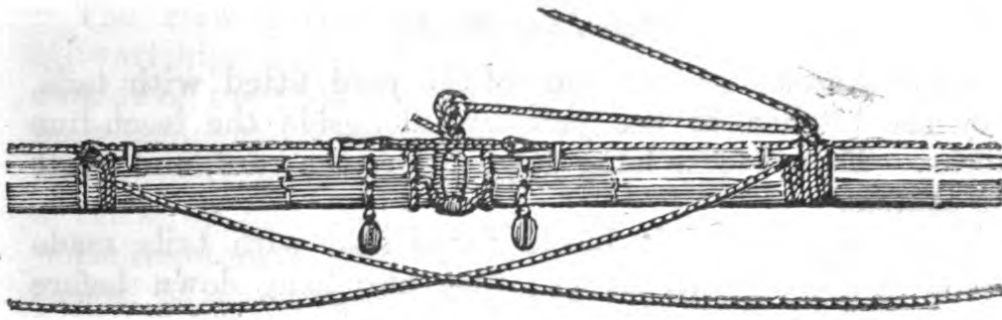
- 1st. Next the slings, on either side, jeer-blocks.
- 2nd. Topsail-sheets blocks.
- 3rd. Truss-strops.
- 4th. Clew-garnet blocks.
- 5th. Rolling tackle-strop.

*At the Yard-Arm ?*

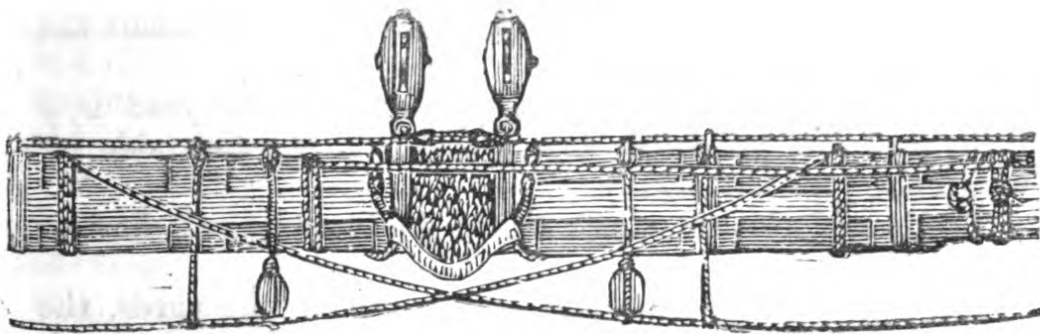
- 1st. Chafing-grommet.
- 2nd. Foot-ropes.
- 3rd. Head-earring strop.
- 4th. Jackstay.
- 5th. Yard tackle-pendants.
- 6th. Brace-blocks.
- 7th. Lift-blocks.

*Leech-Line Blocks.*

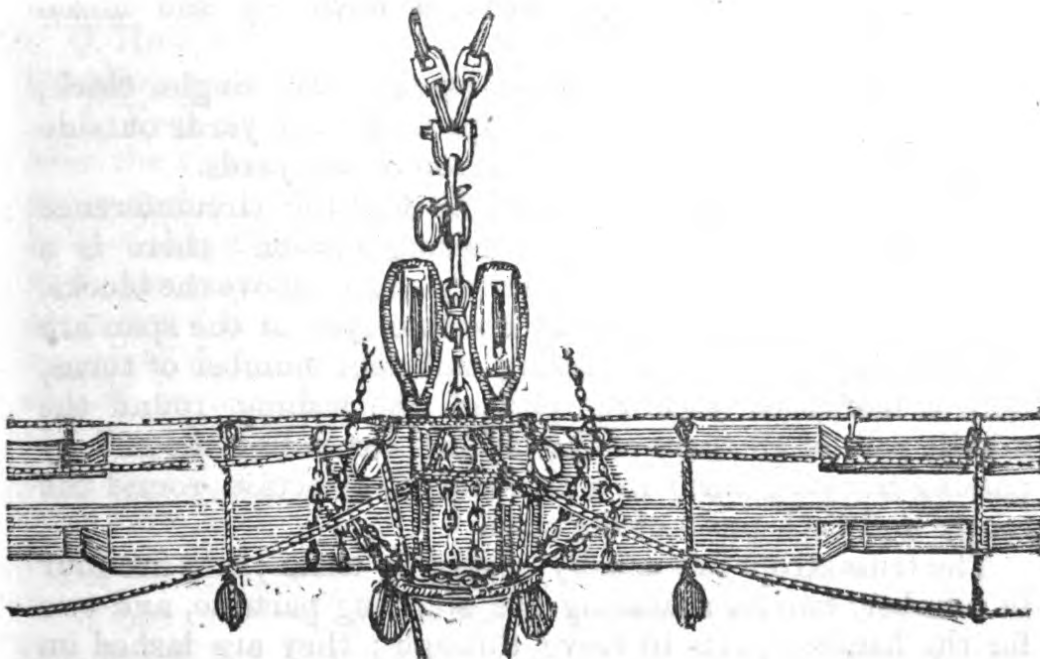
There are two on each side of the yard, and the general rule for placing them is, the outer one is seized on the jackstay, about 6 ft. inside the quarter iron ; the inner one about the same distance outside the clew garnet-block ; but before seizing them on for a full due, their proper position should be determined on when the sail is bent.



BUNT OF A TOPGALLANT YARD.



BUNT OF A TOPSAIL YARD.



BUNT OF A LOWER YARD.

*Slab-Line Blocks.*

There are two on each side of the yard, fitted with tails, they are hitched to the jackstay, alongside the leech-line blocks. These blocks hang down before the yard, and abaft the courses.

There are two double blocks fitted also with tails, made fast to the jeer-block strops; they also hang down before the yard, and abaft the courses, to lead the slab-lines on deck.

*Bunt Slab-Line Block*

Is a single block fitted with a tail, made fast to the slings of the yard, and hangs down before the yard and abaft the course.

The only difference in rigging a main or fore yard is, a main yard has preventer brace-blocks on the fore side by which the yard is worked.

The jeer blocks are single thick, double-stropped, having long and short legs.

The blocks stand fore and aft on top of the yards, the two eyes of the strops are lashed the fore side of the yard, leaving sufficient room between the blocks for the slings, the lashing is passed rose-seizing fashion, and should be half the size in circumference of the stropping of the block. There are two such blocks on both the fore and main yards. The crossjack yard is sent up and down by the mizen Burtons.

The topsail-sheet, or quarter-blocks, are single thick, double-stropped, stand athwartships under the yards outside the jeer-strops, and are lashed on top of the yards.

The size of the lashing should be half the circumference of the strop, and is passed rose-seizing fashion; there is a span put round the strops, under the yards, above the blocks, to keep them in their place; the two eyes of the span are lashed together. After passing sufficient number of turns, take a half-hitch with the end of the lashing, round the middle part of all turns of the lashing, expending the end by passing frapping turns in a fore and aft direction round the centre and both parts of the span.

The truss strops are usually of rigging chain; they are four in number, two for shackling the standing parts to, and two for the hauling parts to reeve through; they are lashed on the same as rope strops, the starboard truss standing part up and inside, the port truss standing part down and outside.

The clew garnet-blocks are single stropped, standing athwartships, and are lashed at twice the length of the block outside of the truss-strop, the blocks underneath the yard a little before the centre, so as to be clear of the topsail-sheets. The size of the lashing should be one-third the circumference of the strop, and passed rose-seizing fashion.

Rolling-tackle strop is generally a grommet; an eye is formed in it and parcelled over on top of the yard, abaft the jackstay, and then it is driven taut up on the quarter, at two-thirds out from the slings, to the quarter iron.

Lower-yard slings are two pieces of chain, the length of each piece is about 2 ft. more than once the round of the yard, more or less, according to the size of the yard; there is a ring welded in one end of each piece, and a long link at the other end, to receive the bolt of a shackle that connects the slip; in reeving them round the centre of the yard the ends with the rings come up the aft side, and the two ends with the long links come up the fore side, and reeve through the ring; the slings are hauled well taut, and seized to the ring, taking care to keep the ring well forward; a shackle with its bolt through the two end links, is connected to the slings, the slip goes through the shackle; the other end of the slip is shackled to the two ends of a piece of chain called the masthead slings.

A chafing-grommet is a common grommet put on the yard-arm, and beat well down for the rigging to lay on.

*Q.* How are foot-ropes fitted?—if to go over yard-arm with standing eye—if over goose-neck with a welded thimble.

*A.* Foot-ropes are rove through the stirrups, the eyes are put over the yard-arms, and beat well home, or a thimble over the goose-neck; the eyes of the stirrups are placed over the eye-bolts of the jackstay, which are previously well served or hitched with spunyarn; the thimbles in the other end of the foot-ropes are secured abaft the yard, in the bunt, to the slings. The length of the foot-rope, from the fork of the eye to the thimble, should be one foot less than the yard is from the centre to the shoulder of the yard-arm. It has been found convenient in large ships to put quarter foot-ropes, which, crossing the bunt from each quarter, enables the men to get a footing on that part of the yard.

#### *Head-Earring Strop*

Is a strop with a thimble seized in it, placed over the yard-arm, and beat well home to the foot-rope.

*Jackstays.*

The ends are rove through the eyebolt over the eyes of the stirrups, a thimble is then spliced in each end, the eyes over the yard-arm are beat well home to the head-earring strop, a lanyard half the size of the jackstay is placed in one thimble, and rove through the other, by which it is set taut up in the bunt of the yard ; a space of at least 6 ins. is left between the two thimbles for this purpose.

N.B.—All jackstays on lower and topsail yards are now of wire rope, and the thimbles are seized, not spliced in.

*Yard-Tackle Pendant.*

In large ships they are fitted to remain on the yards, the eye is put over the yard-arm, and beat close home to the jackstay ; in small ships they are fitted with a hook and thimble, and put on when required for use.

N.B.—Now the yard-tackle pendant is made of wire-rope it is fitted to a strop that goes over the yard-arm with union thimbles.

*Brace Blocks.*

Put the strop over the yard-arm, and beat it close home to the yard-tackle pendants, with the head of the pin of the block upwards. The yard-arm strops are single ; those on the blocks are double, so that the blocks may lie horizontally. For greater ease in bracing up, the preventer blocks on the main yard are placed on the fore side.

*Lift Blocks*

Are single, and single-stropped. Put the strop over the yard-arm, and beat it close to the brace block.

*Q.* How do you rig a crossjack yard ?

*A.* 1st. Topsail-sheet blocks.

2nd. Truss strops.

There is an iron band round the centre of the yard, with an eye in it, and a shackle to receive the slip, that is shackled to the masthead.

*At the Yard-Arm.*

1st. Foot-ropes.

2nd. Jackstays.

3rd. Brace-blocks.

4th. Standing part of lifts, which are always single.

Sometimes the topsail-sheets are rove through one double block in the bunt of the yard underneath, reaching the deck on opposite sides, which enables the yard to brace up easier and sharper.

Q. How do you rig a main topsail-yard ?

A. 1st. Tye-blocks are iron-bound, with swivel and lugs, and are connected by a bolt and forelock to an iron band round the yard, the ends of the bolts are covered with leather, and the edges of the iron stopping smoothed down, to prevent them cutting into the masts. Tye-blocks and boom-irons should always be fitted to spare yards.

2nd. Parrel.

3rd. Quarter-blocks. These are double blocks, for the topsail-clew-line and topgallant-sheet to lead through, single-strop lashed outside parrel, and on top of the yard, lashing half the size of strop.

4th. Rolling tackle strop, is a grommet-strop made round the yard, with a thimble seized in it, and is placed half way out from the centre of the yard to the shoulder or cleat.

A pendant, for sending the topsail-yard up and down, is fitted with a running-eyeround the quarter of the topsail-yard, the other end has an eye spliced in it; it is well parcelled for hooking the sail tackle to, and is lashed close outside the quarter-strop, on the opposite side of the yard.

*At the Yard Arms.*

1st. Chafing grommet, fitted the same as lower yard.

2nd. Foot-ropes, fitted with an eye to go over the yard-arms, and beat close home to the chafing-grommet; an eye spliced in the other end, and seized to the opposite quarter of the yard; sometimes the outer eye goes over the goose-neck instead of the yard-arm; when fitted this way an additional stirrup is required on the shoulder of the yard-arm.

3rd. Head-earring strop, fitted the same as a lower yard.

4th. Jackstay, fitted the same as lower yard.

5th. Brace-blocks. The strop is put over the yard-arm and beat close home to the jack stay.

6th. Lift-blocks, if double lifts; if single lifts, the standing part of lift; in the case of single lifts, the eye goes over the yard-arm close to the brace-block; in the case of double lifts, the strop of the block goes over the yard-arm, and is beat close home to the strop of the brace-block.

7th. Second reef-tackle block. The blocks on the topsail-yards for the second reef-tackle are attached to the strop with union thimbles, the strop going with lashing eyes round the yard-arm outside all rigging.

8th. Flemish horse. A thimble is spliced in the outer end which goes over the goose-neck, an eye is spliced in the

inner end and is seized inside the shoulder, at the distance of once and a half the length of the yard-arm from the shoulder. Not required when foot ropes go to goose-neck.

Topsail-yards (now that reef-beckets have come into general use) are fitted with two jackstays, so that by having two rows of toggles, the reef-beckets may be more clear of each other, when there are two or more reefs in.

The only difference in the rigging of a fore and main topsail-yard is, there are no jewel-blocks to a main topsail-yard, now that main-topmast studdingsails are done away with in the Navy.

The difference in rigging a mizen topsail-yard from a main or fore is, the Flemish horse is fitted with clip-hooks to the eyebolt at the yard-arm, and the brace-blocks face forward.

A parrel to a topsail yard is what a truss is to a lower yard, or a traveller on a boat's mast is to the yard of the sail it is hooked to. It consists of two pieces of rope which are wormed, parcelled, and served, and an eye spliced in each end; one piece is shorter than the other, and is placed, the centre of the short leg on top of the centre of the long leg, seize them together with two short flat seizings, fill up the cutling with strands, and cover the parrel with leather. When in use the parrel is placed abaft the topmast, taking care to have the seam of the leather outside. The long legs are passed underneath the yards, up before all, and lashed to the short legs with a piece of rope called a parrel-lashing: in shifting topsail-yards, only one lashing is cast adrift, so the parrel always remains fast to the yard. A small greasy mat is secured to the yard between it and the mast. The length of the long leg, when fitted, will be from eye to eye, twice the round of the yard, and two-thirds the round of the topmast; and the length of the short leg, when fitted from eye to eye, will be two-thirds the round of the topmast; allowing four times the round of the rope on each leg for splicing the two eyes, will give the proper length to cut the rope for fitting a topsail parrel without waste; the ends are put in once and a half.

Q. How do you rig a topgallant yard?

A. 1st. The slings. Put a strop on the centre of the yard with a thimble seized in it.

2nd. The parrel.

3rd. Quarter blocks, which are double for the royal sheets and topgallant clewlines to reeve through.

4th. A grommet-strop, placed one-third out from the centre

with a thimble seized in it. Through this the lizard is rove when the yard-rope is stopped out.

*At the Yard-Arms.*

- 1st. The foot-ropes.
- 2nd. Head-earring strop.
- 3rd. The jackstay.
- 4th. Braces.
- 5th. Lifts.

The jackstay is secured to the yard by strips of leather nailed over it.

Royal yards are rigged in a similar way,

*Topgallant Parrel.*

A topgallant parrel consists of two strops, one long, and one short ; the long strop is spliced round the yard, and has two seizings on it, one close to the yard, the other to seize a thimble in. The short one is spliced round the yard with a thimble seized in it ; they are served with spunyarn, and, like a topsail parrel, are covered with leather.

The long strop is put on the port side of the fore and mizen, and on the starboard side of the main topgallant yard. The parrel lashing is spliced in the eye of the long strop. When secured in place, the lashing comes on the quarter of the mast ; pass three or four turns with the lashing through the thimbles of the strop, and hitch it round its own part.

*To Fit the Parrel.*

For the long strop. Take once the round of the yard, once the round of the mast, and once the round of the rope, which would be the length to marry the strop : then allow sufficient end to splice it.

The short strop is spliced round the yard with a thimble seized in it.

*The Length to fit it.*

Take once the round of the yard, once the round of the thimble, and twice the round of the rope. The strands of the splice are put in once and a half, and served all over. The strops are spliced, served, and the seizings put on before placing them on the yard

N. B.—A royal parrel is fitted in a similar way.

*Fitting lower Rigging.*

Q. How do you measure and warp off a shroud hawser for cutting out a gang of hemp lower rigging ?



*A.* Measure from upper part of bolster to outer edge of channels, which will be the distance to place the warping pins ; seize the end of the shroud hawser to the lower pin, and warp it off left-handed round the two pins, as many turns as you require pairs of shrouds; for the single shrouds allow for half-eye and splicing, then mark the centres ; and for the quarter or masthead service, measure one-third of the hawser from the upper pin, and mark it straight across, omitting the two inside parts on the right hand for the foremost swiftners, which will be served right through ; then cut the bights at the lower pin, or where the end of the hawser is secured.

*Q.* What is the difference in cutting out hemp or wire lower rigging ?

*A.* Wire rigging is cut on the straight ; the measure is the same as for hemp, allowing for the eye, and 2 ft. below the channel for the foremost pair of shrouds ; 1 ft. 6 ins. is allowed on each pair for the rise and carrying aft.

*Q.* What is the difference in fitting wire or hemp rigging ?

*A.* Wire rigging is wormed, parcelled, and served from end to end.

*Q.* What is the measure for the masthead eye ?

*A.* Once and one-sixth the round of the masthead.

*Q.* What seizing is put on to form the eye ?

*A.* A round seizing, consisting of seven lower and six riding turns ; all eyes are seized alike.

*Q.* How do you mark the shrouds ?

*A.* By hitching a piece of spunyarn to each eye, with one knot for the first or inside pair, two knots for the second, and so on, until the whole gang of rigging is numbered.

*Q.* The shrouds being marked, how do you proceed to fit them ?

*A.* Put a tackle on each end, and bouse them well taut, getting a good pull at intervals, until the shroud is well stretched ; if in a rigging loft, one end of the shroud is brought to a windlass. It is then wormed, backed, parcelled, and served to the required length.

*Q.* Where do you commence the parcelling ?

*A.* About 6 ins. within the marks for the service, and parcel towards the centre.

*Q.* Why do you parcel towards the centre ?

*A.* So as when the shroud is bent to form the eye the layers of parcelling will lay from the centre down each side of the eye, like tiles on the roof of a house, and prevent

any wet that may penetrate the service running on the rope.

*Q.* Are all shrouds served alike?

*A.* No; the foremost shroud, or swifter, is parcelled and served all through to where the dead-eye turns in, the other shrouds one-third down from the masthead.

*Q.* Why is this difference made?

*A.* To preserve the foremost shrouds against the chafe caused by the foot of the courses, &c.

*Q.* Are all foremost-shrouds or swifters parcelled and served all the way down?

*A.* No; not the mizen, there being no mizen course to chafe the foremost-shroud or swifter, it is only served one-third down like the other shrouds. This refers to hemp lower rigging only.

*Q.* What length ought the long and short legs of the lower masthead pendants to be when fitted, and how are they fitted?

*A.* The long leg one-third the length of the first pair of shrouds, measuring from the centre of the eye.

The short leg one-fourth the length of the first pair of shrouds, measuring from the centre of the eye.

A thimble is spliced in each end, the strands are put in once and a half, and marled down; it is then wormed, parcelled, and served throughout, the eye is seized in a similar way to the eyes of the shrouds.

*Q.* How do you measure for topmast rigging?

*A.* Topmast shrouds. Measure from upper part of bolster of the topmast crosstrees to the top rim, mark and cut as for lower rigging.

#### *Topmast Backstays.*

Measure from upper part of bolster of the topmast crosstrees to channels, mark for quarter service one foot longer than topmast shrouds, mark for turning in dead-eye as for lower rigging.

*Q.* How do you measure for topgallant rigging?

*A.* Topgallant shrouds. Measure from topgallant masthead to top rim, and half the length of the crosstrees, foremost shroud is served from the eye to below the necklace, the after one from one foot above the crosstree to below the necklace.

#### *Topgallant Backstays.*

Measure from topgallant masthead to channel.

*Q.* How do you measure for royal rigging?

A. Royal backstay. Measure from royal masthead to channel.

Q. How do you measure for clothing a bowsprit, and which is the first collar you would lash on ?

A. Two-thirds from knight-heads lash on the inner bobstay collar, then starboard and port bowsprit shroud-collars, port forestay-collars, middle bobstay collar, starboard and port bowsprit shroud-collars ; starboard forestay collar, and outer bobstay collar.

N.B.—The bobstay collars the diameter of bowsprit apart.

---

## FOURTH INSTRUCTION.—RUNNING RIGGING.

### PART II.

#### *Reeving Running Rigging.*

Q. Reeve the running gear of a course ?

A. Fore and main tack and sheet-blocks are clump-blocks, with a thimble in the strop to shackle to the clew of the sail.

#### *To Reeve a Fore Tack.*

Splice a running-eye in the end of the standing part, and put it over the bumpkin ; reeve the other end through the tack-block in the clew of the sail, from forward aft, through the block on the bumpkin, from out in, through the sheave hole in the bulwark inboard. If fitted with slips, fit the standing part of tack with a thimble.

#### *To Reeve a Main Tack.*

Splice a hook in the standing part, and hook it to an eyebolt in the deck, placed for that purpose, near the main tack block ; reeve the other end through the block on the clew of the sail, from forward aft, and through the main tack block on the deck from forward aft.

The standing part is sometimes fitted with a slip.

#### *To Reeve a Fore or Main Sheet.*

Splice a hook in the end of the standing part, and hook it to an eyebolt abaft the channels, reeve the other end through the sheet-blocks in the clew of the sail, from out in, and through the sheave near the standing part inboard.

*To Reeve a Fore or Main Clew Garnet.*

Take the end up through the clew garnet-block on the lower yard, reeve it from in out, down through the clew garnet-block, which is lashed or shackled to the clew of the sail, from in out, take the end up, and secure it round the lower yard, outside the quarter-block, with a timber hitch.

*To Reeve Fore and Main Buntlines.*

Reeve the buntlines, through the upper sheave of the buntline-block, then reeve both ends through the double-block, which is hooked to the foremost eyebolt of the lower cap on either side, from aft forward, down through the sheave holes in the fore part of the top; round the buntline-block, close up to the double block, then bend the ends of the buntlines to the foot of the course, either by toggling or clenching them. The buntline-whip is rove through the lower sheave of the buntline-block, and both ends led down through lubber's-hole on deck, and are rove through blocks or sheave holes. Two single blocks, in one strop, on end, are sometimes used instead of fiddle-blocks, as buntline-blocks; they are called shoe-blocks. When there is sufficient drift, buntlines are sometimes rove with single legs, and double whips. The ends of the legs are rove through thimbles, spliced into the inner holes at the foot of the courses, and made fast to the outer holes.

*To Reeve Leech Lines, Fore or Main.*

They are rove through a double-block under the top, from in out, down through the leech-line blocks that are seized on the jackstay of the lower yards before the sail, and are clenched or toggled to the leech of the sail; there are two on each side in large ships, but only one in small vessels.

*To Reeve Fore or Main Slab-Lines.*

They are rove through a double-block, on the quarter of the yard, from in out, through the slab-line blocks seized on the jackstay of the lower yard, between the yard and the sail, down abaft the course, and are clenched or toggled to the leech of the sail, in a similar way to a leech-line; when there are two leech-lines of a side, there are also two slab-lines; in taking a course in they act the same as a brail would to a fore and aft sail.

*To Reeve a Bunt Slab-Line.*

It is a single rope rove through a tail block, fast to the slings of the lower yards, it leads down abaft the sail, and is clenched to the foot.

*To Reeve a Reef Tackle.*

Reeve the end of the fall through a leading block at the lower cap, from in out, through a cheek in the lower yard-arm from in out, then through a block which is secured to the reef-cringle in the leech of the sail by clip-hooks, from in out, and make the end fast to the boom-iron with an inside clinch, the other end of the fall is led on deck, with sufficient length to admit of lowering the sail on deck ; thus, in shifting or bending courses, there is no necessity for using a Burton.

*To Reeve a Bunt-Whip.*

It is a single rope, with a clasp-hook in one end, to hook to the bunk becket, and rove through a single block, lashed to one of the upper links of the lower slings ; the hauling part being led on deck.

*To Reeve a Fore Bowline.*

Reeve it through the block on the bowsprit, from down up ; splice a running eye in the end, and bend it over a toggle in the bowline-bridle, in the leech of the foresail. The fore bowline-blocks on the bowsprit are span-blocks, fitted round and under the bowsprit, outside the inner forestay collar.

*To Reeve a Main Bowline.*

The main bowline is fitted with a light runner and tackle ; the runner is rove through a thimble, which is attached to the lower bowline-bridle, on the leech of the mainsail, by a slip toggle ; the runner and tackle are hooked forward by the foremast, and is always shifted from side to side in working ship, by the first part of quarter-deck men.

## REEVE THE RUNNING GEAR OF A TOPSAIL.

*To Reeve a Rope Topsail Sheet.*

Reeve the end through the quarter-block on the quarter of the lower yards, from in out, up through the cheek at the lower yard-arm, through the block in the clew of the sail, from in out, and secure the end round the lower yard-arm with an outside clinch.

*To Reeve a Chain Topsail Sheet.*

To reeve a chain topsail-sheet, bend a hauling-line to the

inner end of the chain, reeve it down through the cheek at the lower yard-arm, in through the rollers underneath the lower yard, through the gin in the slings of the yard, and secure it to the lugs of the whip-block by a bolt ; the standing part of the whip is made fast to an eyebolt in the deck, and the hauling part is rove through a sheave-hole in the bitts, or a leading block ; the other end of the sheet is secured to the clew of the topsail with clasp hooks or shackled. The cheek at the lower yard-arm is of iron when it is intended to reeve chain sheets.

*To Reeve a Topsail Clewline.*

Take the end up through lubber's-hole, reeve it through the foremost sheave of the quarter-block, on the topsail-yard, from in out, through the block which is lashed on the after part of the clew of the sail, from in out, and secure it round the quarter of the topsail-yard; outside the quarter-block, with a timber-hitch.

*To Reeve a Topsail Buntline.*

Take the end up through lubber's-hole, through the cheek of the tressletrees at the topmast-head, from aft forward, down through the thimble of the buntline-span ; splice a running eye in the end, and place it over the buntline-toggle, in the foot of the sail. In reeving a buntline that has been in use, or with a running eye already spliced in it, reeve it the reverse way, that is, place the eye over the toggle in the foot of the topsail, reeve the other end up through the thimble of the buntline-span, through the cheek of the topmast tressletrees, from forward aft, and pay the end down through lubber's-hole on deck, and reeve it through its proper sheave in the bitts.

*Q.* What are buntline spans, and their use ?

*A.* Buntline spans are simply two pieces of rope, about 2 ins. or  $2\frac{1}{2}$  ins. in size, according to the size of the topsail, and about one fathom and a half in length, with a thimble spliced in one end, through which the buntlines are rove, the other ends are knotted abaft the tye (in harbour) with a reef knot, and round the neck of the tye block at sea ; the reason the buntline span is secured round the neck of the tye block at sea, is to prevent the foot of the sail rising above the yard, also to spill the sail in taking the third or fourth reef in.

*To Reeve a Topsail Reef-tackle.*

Take the end up through lubber's-hole, inside the topmast

rigging, through the upper sheave of the sister block, from in out, down through the sheave at the yard-arm ; through the reef-tackle block, from in out, and secure the end round the goose-neck with an inside clinch.

*To Reeve the Second Reef-tackle.*

To reeve the second reef-tackle, take it up through lubber's-hole through a tail-block at the topmast-head, from in out, down through the block on the yard-arm, and bend it to the second reef-tackle cringle in the sail with a half-hitch, and the end seized back, or with clip-hooks if a single reef-tackle. The second reef-tackle cringle is placed between the second and third reef-cringles.

If a double reef-tackle, it is rove through a block, toggled or hooked to the cringle in the leech of the sail, and secured with an inside clinch round the goose-neck of the topsail-yard.

*To Reeve a Foretop Bowline.*

Take the end out through the sheave-hole in the head-rail, through the sheave-hole in the bees of the bowsprit, or through a block at the bowsprit end : splice a running eye in the end, and place it over the toggle in the lower bowline bridle in the leech of the sail.

*To Reeve a Maintop Bowline.*

Take the end up through lubber's-hole through a block lashed to the eyes of the fore rigging, and bend it with a running eye over the toggle of the middle bowline bridle in the leech of the main topsail.

*To Reeve a Mizentop Bowline.*

Take the end up through the inner sheave of the double block the crossjack brace is rove through, splice a running-eye, and put it over the toggle on the lower bowline bridle, in the leech of the mizen topsail, in a similar manner to the main and fore.

*To Reeve a Bunt-Whip.*

A bunt-whip consists of three single blocks, forming a runner and tackle. The runner-block is fitted with a long tail, which is secured round the topmast-head, or a thimble in the strop, and lashed under the crosstrees, or to the necklace ; one end of it has a hook spliced in it for hooking to the bunt-becket—the other end, the upper block of the tackle, is

turned in it. The lower block of the tackle is fitted with a tail, or a thimble, in the strop of a block, and is secured to the eyes of the lower rigging; when not in use it is hooked to a strop, to the eyes of the lower rigging, and kept up and down the mast; the hauling part is worked from the top.

*The long Bunt-Whip.*

This is simply a single rope, rove through a block, under the topmast crosstrees with a hook spliced in one end for hooking it to the bunt-becket; the hauling part is on deck. It is used when hauling out to, or furling from a bowline.

*Reeve the Running Gear of a Topgallant Sail.*

To reeve a topgallant sheet, take the end up through lubber's-hole, through the after sheave of the quarter-block on the topsail yard, from in out, up through the cheek at the yard-arm, before the lift and reef-tackle, up through the clew of the topgallant-sail, and place the sennit-eye over the spring-toggle, which is seized in the clew of the sail.

*To Reeve a Topgallant Clewline.*

Take the end up through lubber's-hole, through the foremost sheave of the quarter-block, on the topgallant-yard from in out, and bend it to the clew of the topgallant-sail with a sheet-bend.

*To Reeve a Topgallant Buntline.*

A topgallant buntline is a single buntline, fitted with two legs, each leg has a running eye spliced in the end of it, which goes over the toggle in the foot of the topgallant-sail, the other end is rove through the thimble of the lizard of the yard-rope, which acts as a buntline-span, then through a block from forward aft, which block is seized to the eye of the topgallant stay, down into the top, or through lubber's-hole on deck.

*To Reeve a Fore Topgallant Bowline.*

Take the end out, and reeve it from down up, through a span-block, which is fitted round the jib-boom funnel or seized to the jib-guys, and bend it to leech of the topgallant-sail, with a running-eye over the toggle. A main topgallant bowline is rove up through a sheave-hole, in the after part of the fore topmast crosstrees; a mizen topgallant bowline is rove through a block seized to the main topmast shrouds.



*Reeve the Running Gear of a Royal.*

To reeve a royal sheet, take the end up through lubber's-hole if led on deck ; if not, out of the top, up between the crosstrees, through the after-sheave in the quarter-block on the topgallant-yard, from in out, up through the cheek or sheave-hole at the yard-arm, up before the lift, and bend it to the clew of the royal with a sennit-eye over a spring toggle.

*To Reeve a Royal Clewline.*

Take the end up through lubber's-hole, if led on deck, or out of the top between the crosstrees, reeve it through the quarter-block on the royal yard, from in out, and bend it to the clew of the royal with a sheet bend. In large ships, royal sheets and clewlines are generally worked from the tops, and not led on deck.

## RUNNING GEAR OF JIB AND FLYING-JIB.

*To Reeve the Jib-Halyards.*

Take the end up the starboard side abaft all, reeve it from aft forward, through the jib halyard-block, then make a bowline with the end round the jibstay, pay it down, splice a thimble, with a clasp-hook on a swivel in the end, and hook it to the head of the jib.

*To Reeve a Jib Downhaul.*

Take the end out on the starboard side through the sheave-hole in the head-rail, through the jib downhaul-block at the jib-boom end, up through the upper hank or grommet,\* and bend it to the head of the jib or over the thimble in the jib-halyards, with a sheet-bend. Jib-sheets, in large ships, are fitted with double whips and pendants, an eye being formed in the bight of the pendant, and attached to the clew of the jib by a strop and toggle ; in some cases they are lashed or fitted with a shackle and screw pin. In small vessels the jib-sheets are single. The luff of a jib is attached to the jibstay by hanks and lacing, and the tack is secured to the jib-boom end with a tack lashing, which is spliced in the tack thimble, two or three turns being passed round the jib-boom, and through the thimble in the tack of the jib, and the end hitched round its own part ; sometimes it is fitted with a strop and toggle instead of a tack-lashing.

\* In addition to the lacing of a jib, there are always two or three hanks or a grommet, at the head of the luff.

*To Reeve the Flying-Jib Halyards.*

Take the end up the port side, abaft all, reeve it from aft forward through the flying-jib halyard-block, and pay it down on deck the port side of all the stays, splice a clasp-hook on a swivel in the end, and hook it to the head of the flying jib.

*To Reeve a Flying-Jib Downhaul.*

Reeve it through the sheave-hole in the head-rail on the port side, take it out underneath the man-ropes, and over the jib-guys, through the flying-jib downhaul block, at the flying jib-boom end, from down up, through the three upper hanks, and bend it to the head of the sail, or over the thimble in the halyards, with a sheet bend. The flying-jib is attached to the flying-jibstay by a lacing: the tack is secured in like manner to the jib by a tack-lashing round the flying-boom end; the sheets are fitted exactly in a similar way to the jib-sheets, and connected in like manner to the clew of the sail. In small vessels they are single, similar to the jib-sheets, and attached to the sail in the same manner.

## TO REEVE THE RUNNING GEAR OF STAYSAILS.

*Fore Topmast Staysail.*

To reeve the fore topmast staysail halyards, take the end up the port side, through the fore topmast staysail halyard-blocks (which is shackled the port side of the topmast-necklace) from aft forward, down before all, through the block which is hooked to the head of the sail, send the end aloft, and secure it to a link in the topmast necklace close to the halyard-block. These halyards are of great use in shifting the fore topsail or jib-boom.

*To Reeve a Fore Topmast Staysail Downhaul.*

Reeve the end out on the port side, through the head-rail, through the downhaul-block on the bowsprit end, from down up, up through the three upper hanks, and make it fast with a sheet-bend to the head of the sail. Tack lashing is spliced in the thimble in the tack of the sail, and passed two or three times round the bowsprit, each turn being passed through the thimble in the tack of the sail; the end is hitched round all parts of the lashing. Fore topmast staysails are seized to hanks round the port fore topmast stay. If a lacing is used instead of hanks it is only rove through every other eyelet-

hole in the luff of the sail, and round the stay : being seized to the eyelet-holes, it is not rove through. The sheets are fitted with whips and a pendant.

TO REEVE THE RUNNING GEAR OF A SPANKER OR BOOM-  
MAINSAIL.

*To Reeve the Peak Halyards.*

Take the end up the port side, through lubber's-hole, and reeve it through the port sheave of the double-block, which is iron-stropped and hooked to the after part of the mizen lower cap ; then down abaft the top, through the outer block on the gaff, from forward aft, up through the starboard-sheave of the double-block at the cap, from up down ; down abaft the top again, and through the inner block on the gaff, from aft forward, send the end aloft, and secure it round the neck of the double-block with a running-eye. (This also applies to boom-mainsails of brigs.)

The standing part of the peak-halyards is frequently made fast with a running-eye round the mizen topmast head, in which case they are rove through the inner block on the gaff first, from aft forward, and through the outer block last, from forward aft, but in the same way as before, through the double-block on the after part of the lower cap.

*To Reeve the Throat-Halyards of a Spanker.*

Take the end up the starboard side, abaft the mast, reeve it through the foremost sheave in the chock, abaft the trysail-mast, from starboard to port ; down through the throat halyard-block on the jaws of the gaff, from port to starboard, up through the after-sheave in the chock, from starboard to port ; then send the end down, and secure it with a running-eye over the neck or lower part of the block on the gaff. If the gaff is fitted with a double-block, or a span with two single blocks round the jaws, the standing part is made fast round the neck of the upper block, or through a hole in the chock, with a stopper-knot.

N.B.—This applies to the boom-mainsail of a brig.

*To Reeve a Spanker-Foot Outhaul.*

Reeve the end up through the sheave in the boom-end through a clump-block, fitted either with a lashing-eye or a clip-hook, to the clew of the sail, from forward aft, and secure it over the boom-end by an eyesplice ; sometimes it is fitted

with a pendant and whip, in which case a block is spliced in the end of the pendant, and the other block of the whip is hooked to an eyebolt, under the jaws of the boom.

*To Reeve a Spanker-Head Outhaul.*

When a spanker is fitted at the head with an outhaul and inhaul, the head of the sail is attached to small iron hoops which travel on an iron rod underneath the gaff.

The outhaul is fitted with a pendant and whip. The pendant is rove through a clump-block, which is lashed to the gaff end; one end of the pendant has a thimble and hook spliced in it, for hooking to the head-earring thimble in the sail, the other end has a thimble, or one of the blocks of the whip spliced in it; the other block of the whip is fitted with a hook, which is hooked to a strop at the jaws of the gaff. It is frequently made of chain, in which case a treble iron-bound block is hooked to the lower cap instead of a double-block for the peak-halyards, the third sheave is used to reeve the chain outhaul through.

*To Reeve the Outhaul.*

Reeve the end up through the starboard outer sheave of the treble-block, from forward aft, down through the sheave in the end of the gaff, and shackle it to the head-earring thimble of the spanker; an iron-bound single block is shackled to the other end, through which a whip is rove to another iron-bound block, hooked to the deck by the mizen mast.

*The Inhaul.*

The inhaul is a single rope, with a hook spliced in it, which is hooked to the thimble in the head of the sail, led along the gaff through a block at the jaws of the gaff on deck.

*The Tack-Tricing Line.*

The tack-tricing line is a double whip, the upper block secured to the jaws of the gaff, and the lower block is fitted with a tail, which is bent to a thimble in the lower part of the luff of the sail.

**BRAILS.**

*Peak-Brails.*

Span-blocks are fitted on the gaff for the inner and outer peak-brails. The outer blocks are single, and seized round

the gaff two-thirds out ; the inner blocks are double, and seized on, one-third out on the gaff. Both the inner and outer peak-brails are rove through them.

The throat-brails are rove through a block seized to the jaws of the gaff.

*Throat-Brails.*

The middle brails are rove through single blocks fitted with a span round the trysail mast, half way down, or seized to the luff of the sail.

Small vessels are only fitted with one peak-brail.

A treble block is now seized to the jaws of the gaff, which takes the peak and the throat-brails, therefore a fiddle-block is now used on the gaff for the inner peak-brails.

*To Reeve Brails.*

They are each in one piece of rope, and when the sail is bent and hoisted, the position for the brails is determined on; they are middled, and the bight of each rail seized to the after-leech of the sails, as marked, and rove through their respective blocks, from aft forward down on deck.

BOOM-SHEETS.

*Spanker-Boom Sheets.*

In large screw or sailing ships there are two double blocks on the boom, and three single blocks each side of the ship aft, one acting as a leading block ; the standing part of the sheet is spliced in the eye-bolt at the boom-end.

For small screws and paddle-wheel steam-vessels, there are two double and two single blocks, the single block being on the boom, the standing part is made fast to an eye-bolt in the boom-end ; where there is a stern gun, the blocks in the quarter should be fitted with a shackle.

In brigs, boom-sheets are rove through two double blocks on the boom, and two double blocks, and a leading block inboard on the quarter. Reeve the end through the leading block, from forward aft, through the lower sheave of the block on the boom from aft forward, through the lower sheave of the double block inboard from forward aft, so on, until the fall is rove in full, making the end fast round the boom, end with an eye-splice, or splicing it into an eye-bolt.

*A Lazy Guy*

Is a pendant with a hook spliced in one end, and a single

block in the other ; the fall is rove through another single block with a hook, the standing part is spliced in the ass of the block, in the pendant.

When in use, the pendant goes round the boom, and hooks to its own part between the topping-lifts and sheets, the block of the fall is hooked in the main chain for a brig, and the mizen for a ship ; it is used when running free, to steady the boom.

#### *Jaw Ropes.*

A jaw rope is a piece of rope rove through a hole in the jaws of the boom or gaff, from out in. A stopper-knot is worked in the end to keep it from coming through ; it is passed round before the mast through a number of round pieces of wood, called trucks, through another hole in the jaws of the boom or gaff on the opposite side, from in out, and a figure-of-eight knot is made in the end, to keep it from slipping through ; it is to a boom or gaff what a parrel is to a yard.

#### *To Reeve the Topping-Lifts.*

The standing part is spliced round a thimble to an eye-bolt attached to an iron band round the boom, about 12 ft. from the outer end, and is rove through a clump-block, iron-bound—in a brig, bolted to the main tressletrees, and in a ship, bolted to the mizen tresseltrees, from aft forward, down, through the snatch on the boom, A thimble is spliced in the end for hooking the tackle to.

The tackle is rove through a single and a fiddle-block, the standing part of the fall being spliced in the ass of the single-block ; the fiddle-block is hooked to the weather-topping lift, and the single-block to an eye-bolt under the jaws of the boom. A stopper is fitted round the boom, inside the snatch, for stopping the topping-lift in tacking, so as to shift the tackle.

When the topping-lift is fitted single, after the end is rove through the clump-block at the tressletrees, a double block is spliced in the end, and a fall is rove to a single block, hooked either in the chains or by the mast.

#### *Vangs, or Peak-Downhauls.*

Vangs in large ships are double, and in small vessels single. There is an iron band round the gaff a short space, or about one-seventh in from the gaff end, with an eye-bolt

on either side of it ; to these eye-bolts, the vang-blocks, which are single iron-bound blocks, are hooked with clasp-hooks.

The vangs are rove through the blocks, the standing part is spliced, if double, round a thimble in an eye-bolt in the ship's side, close to the fife-rail, or eye-splice put over the under part of a belaying pin, the hauling part rove through a sheave close to it.

In large ships they are fitted with a pendant and whip ; the standing part of the pendant is spliced round a thimble in the eye-bolt in the gaff, and a single block is spliced in the other end, through which the whip is rove, the hauling part being rove through a sheave in the fife-rail, and the standing part secured, as described for a vang.

#### *A Single Vang.*

The end is merely spliced round the thimble in the eye-bolt on the gaff, and the other end rove through a sheave in the fife-rail.

## SEIZINGS.

#### *A Throat or Round Seizing.*

This seizing is used for many purposes, such as inside and outside clenches, strops of blocks, turning in lower or topmast rigging and stays, seizing the eyes of rigging, &c. All small rope to be used for seizings should be well stretched for the purpose.

#### *To Pass a Throat or Round Seizing.*

Splice an eye in one end of the seizings, take it round both parts of the shrouds, and pass seven turns, working towards the standing part of the shroud, reeve the end back between the turns of the seizing already passed (which are called the lower turns), and up through the eye of the standing part of the seizing, and it will be in the right position to commence passing the six upper turns, or riding turns, which will exactly come between the parts of the lower turns ; care should be taken to heave each lower turn of the seizing well taut, by means of a Spanish windlass, and the upper turns well taut by hand. After passing the sixth and last riding turn, pass the end down between the two last turns of the lower turns, and heave it hand taut. Then take a round turn round all

parts of the seizings, heave it well taut with a Spanish windlass, and secure with a clove-hitch, one part of the clove-hitch being each side of the round turn, expend the end in round turns round the end of the shroud, and secure the end with a yarn. Any number of lower turns can be taken, the riding turns must always be one less in number ; 7 or 9 are the numbers of lower turns generally taken in turning a dead-eye in, or seizing the eyes of rigging.

*To Pass a Quarter or Flat Seizing.*

*Q.* How do you pass a quarter or flat seizing, and at what distance from the throat-seizing.

*A.* The width of the throat-seizing, or about 4 ins. from it. It is about half an inch less in size than a throat-seizing. It is passed and finished off in a similar way to the throat-seizing, each turn being hove well taut, but has no riding turns.

The reason of having an end part left after the throat and quarter seizings are finished off with a clove-hitch is in case of having to turn the lower rigging in at any future time, so the same seizing would do again.

*Q.* In turning a dead-eye, in wire rigging, what seizings do you use ?

*A.* A racking and end seizing, the racking seizing forming, as it were, a throat and quarter seizing.

The standing part of the seizing is made fast to the standing part of the shroud with an eye-splice. Thirteen racking turns are then passed from the eye towards the end, leaving sufficient space between each racking turn for a roundabout turn to lie. After the thirteen racking turns are passed, the roundabout turns are passed from the end towards the eye, each roundabout turn being passed between the racking turns ; when the last roundabout turn is passed, the end is passed up between both parts of the shroud, that is between the standing part and end, ready for passing the cross turns, which are passed by taking the end along the seizing and passing it down between the seventh and sixth turns along the seizing, again towards the eye, up between the two parts of the shroud as before, and again drawn between the seventh and sixth turns, then round the other way, over the thirteenth turn, repeating that also twice.

This also applies to wire stays.

*The End Seizing.*

This is merely a flat seizing.



*A Rose Lashing*

Is used for many purposes, such as securing the collars in clothing a bowsprit, and strops in rigging a lower or topsail-yard. In fact, all collars and block-strops, fitted with lashing-eyes, such as bobstay and bowsprit shroud-collars, jeer-blocks, truss-strops, topsail sheet-blocks, clew garnet-blocks, quarter-blocks for topsail yards, &c., when not fitted with tails.

NOTE.—Clew garnet-blocks are fitted at Portsmouth Yard with a pendant spliced in one end, and an eye in the other; the length of pendant is once and a third the round of yard, the pendant is passed from forward aft, under the jackstay, round the yard, and seized to the jackstay, then a small strop is placed over the block, and brought up abaft the yard, and seized to jackstay, for steadying the block.

A rose-lashing can be passed either with one end or two.

To pass a rose-lashing on one end, splice the other end into the eye of the strop or collar you are going to lash, then pass either from right to left, or left to right, passing it over the eye on one side and under on the other, until sufficient number of turns are passed to bear the strain equal to the collar or strop being lashed, which is generally about seven turns; then the end is passed between the crossing turns twice, and dipped up through as near the centre of the seizing as possible, and is finished off by crowning and walling the end close to the crossing turns.

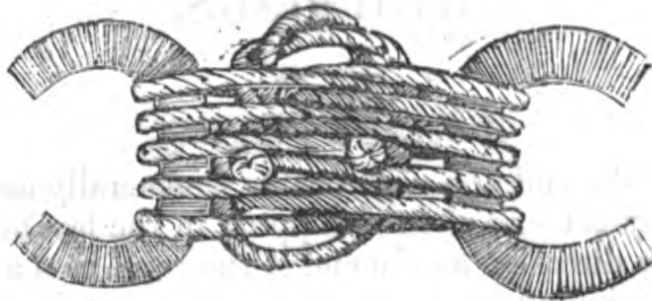
*To Pass a Rose Lashing on both Ends of a Lashing.*

The lashing is middled in the centre of one of the eyes; the eyes are then passed, one under, and one over the eyes; for instance, the end that goes over the right-hand eye goes under the left-hand eye, until sufficient number of turns are passed; the ends are then dipped, in opposite ways, through the crossing, each end twice each way; both ends are finished off, as before, being crowned first, and walled after.

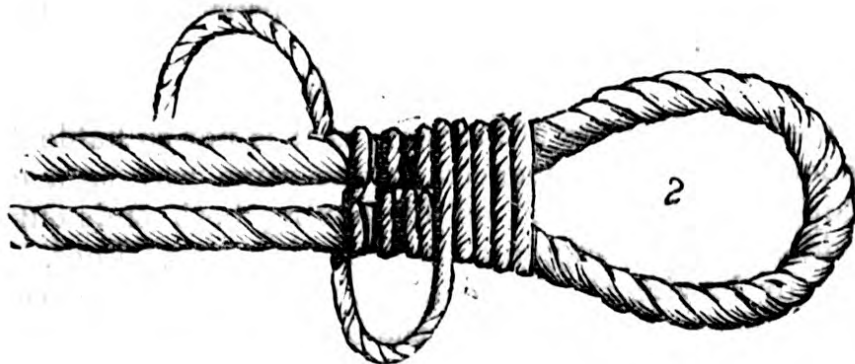
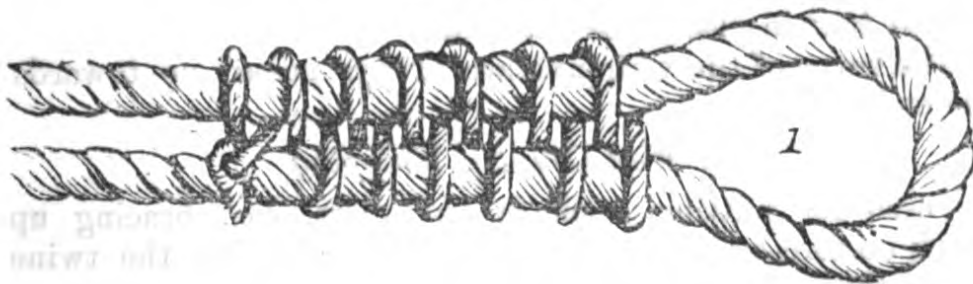
*A Cross Seizing*

Is used when the rigging is turned in with the end up; it is simply a round seizing, but instead of being finished off with a round turn round all parts, and a clove-hitch, after the riding turns are passed, the end is merely dipped down between the lower and upper turns, and the end is expended round the standing part of the shroud, and secured with a yarn.

ROSE LASHING.



RACKING SEIZING,  
Forming a Flat Seizing as used for  
Wire Rigging.



## WHIPPINGS.

---

### *A Common Whipping.*

To whip the end of a rope (twine is generally used for this purpose) lay the end of the whipping in the lay of the rope, in the same direction as the end of the rope, pass a few turns of the whipping over its own end to keep it in place, then lay the other end of the whipping pointing in an opposite direction to the first, and on the top of the turns already passed, and pass the remainder of the turns on the bight round the rope, and the both ends of the whipping, hauling the end through when sufficient number of turns have been passed, to keep it taut in place, and cut it off.

The turns of the whipping are always passed up towards the end of the rope.

### *A West Country Whipping*

Is used for putting a mark on braces, &c., bracing up mark on fore-brace. It is formed by middling the twine round the part of the rope to be marked, and half-knotting it at every half turn, so each half knot will be on opposite sides; when sufficient number of turns are passed, finish it off with a reef knot.

### *American Whipping*

Is used for the ends of hawsers, as it is not so liable to come undone. It is commenced in the same way as a common whipping, but finished off by having both ends out in the middle of the whipping, and forming a reef knot. This is done by leaving the first end out, when you commence to pass the turns on the bight over the last end.

### *A Sailmaker's Whipping, for Sennit, such as Topgallant and Royal Sea-Gaskets, or Jib-Tyers,*

Is put on with a needle and twine. The needle is entered where the whipping is to commence, and the twine is drawn through the sennit, leaving about an inch of end, then pass a number of roundabout turns round the sennit, and over the end of the twine, so as to keep it in place; when turns enough are passed, stick the needle through the sennit again, and pass two cross-turns from end to end of the whipping, passing

the twine through the sennit with a needle at each turn, securing it with two half-hitches at the upper end of the whipping.

*A Sailmaker's Whipping, which is used for the Reef Points of Fore and Aft Sails,*

Is commenced in a similar way to the other, but these points being made of round rope, the twine is drawn through the lay of the point by a needle, leaving about an inch end, over which the roundabout turns are passed. After passing the last turn of the whipping, stick the needle through the lay of the rope, and pass a cross turn from end to end of the whippings through each lay of the rope, thus forming three cross turns, and finish off with two half-hitches above the last turn; each point has two such whippings, the second being about 3 ins. from the first.

## ROPE-MAKING.

### *Hemp*

Is made from a tall fibrous plant, largely cultivated in Russia and Italy; the latter producing the finest and best hemp.

### *Yarns or Threads*

Are made from hemp laid up right-handed, each yarn or thread is supposed to bear the weight of one hundred pounds.

### *Strands*

Consist of a number of yarns laid up together, the number depending on the size rope the strands form; those intended for a right-handed rope are laid up left-handed, and for a left-handed rope, they are laid up right-handed.

### *Junk*

Consists of lengths of condemned rigging, cut into five-fathom lengths, or pads of outside yarns.

### *Rounding*

Is condemned running rigging, supplied for lashings or other purposes, where good rope is not required, and for making wads, &c.

*Oakum*

Is old rope unlaid, and the yarns picked into hemp, for caulking the seams in a ship's deck or side, and for many other purposes, cleaning brass-work, &c.

*Spunyarn*

Is a number of yarns, twisted up right-handed, varying in number, from three to fifteen yarns.

*Rope.*

All rope is distinguished according to how it is manufactured.

Ropes made of hemp are as follows :—

Hawser-laid rope.

Cablet or cable-laid rope.

Bolt rope.

Rumbowline, twice-laid, or re-manufactured rope.

Coir rope.

Hide rope.

Wire rope.

The size of a rope is denoted by its circumference and length of coil, according to the use it is intended for.

There are several descriptions of hawser-laid rope.

Hawser-laid rope for standing rigging is termed shroud-hawser rope. It is a four-stranded and right-handed, made in lengths of 106 fathoms.

The largest size made is  $14\frac{1}{2}$  ins., used for forestays of first-class ships.

The smallest size made is 2 ins., used for royal backstays of small ships.

N.B.—All four-stranded ropes, have a centre strand, in addition, called the heart, so as to insure the four strands, when laid up, laying smoothly without a hollow.

*Gun Gear*

Is hawser-laid three-stranded left-handed rope, generally termed reverse-laid rope. The yarns and strands being laid up right-handed, and the rope left-handed, renders it soft and more easy to handle ; for all it is not so durable, as it is more apt to admit the wet and cause it to rot.

The large size, which is used for gun-breechings, is most difficult to splice ; as the strands are unlaid, each strand has to be marled down separately to keep it together ; the yarns and strands being laid up the same way, they are apt to open out as soon as a strand is unlaid.

It is made from the best Italian yarns.

Hawser-laid right-handed three-stranded rumbowline twice-laid or re-manufactured rope, is hawser-laid, three stranded right-handed.

It is made from outside yarns. It is a coarse, soft, pliable rope, and very useful for many purposes, such as stage lashings, &c. ; it also makes good nippers.

There are no regular sizes for making this description of rope.

#### *Coir Rope*

Is three-stranded right-handed rope, made from the fibres of the cocoa-nut tree.

It is one-third lighter than hemp rope, but not nearly so durable, as it soon rots after being wet, if not well dried before it is stowed away; as it floats so light, it is very useful as warps, and quite equal in strength to hemp rope.

#### *Hide Rope*

Is nine-stranded left-handed, made in a similar way to cable-laid or cablet rope. It is used for wheel-ropes, as it is much stronger than hemp; when wet it swells and shrinks; therefore should, if possible, be kept dry, and, in all cases well greased, which duty is always assigned to the quartermasters.

Three-stranded rope is used for all common purposes, such as reeving running rigging, purchases, &c. It is made from half an inch to 10 ins. in circumference, in coils of 113 fathoms.

#### *Bolt Rope*

Is a three-stranded right-handed rope, made from the best Italian hemp, from three-quarters of an inch in circumference, to  $7\frac{1}{2}$  ins., in coils of 122 fathoms in length.

#### *Cable-Laid or Cablet Rope*

Is nine-stranded left-handed rope. It is made by first laying up with the sun, or right-handed, the nine strands into three separate ropes, three strands in each, and then laying the three ropes thus made up into one rope, left-handed, or against the sun; when completed, it resembles three small ropes laid up together. It is made from 2 ins. to 26 ins. in circumference.

All above  $2\frac{1}{2}$  in. in coils of 101 fathoms in length; 2 ins. and  $2\frac{1}{2}$  ins. are made in lengths of 102 fathoms.

#### *Wire Rope*

Is right-handed, three, five, and seven stranded. All lower rigging and lower stays in steamships are wire rope.

It has the great advantage over hemp in not stretching so much, or becoming impoverished by being constantly exposed to the heat of the funnel, &c.

The table given\* will show the comparative strength it bears to hemp and chain.

Three-stranded, is one-fifth stronger than four-stranded rope.

Lanyards for lower rigging, cat-falls, topsail-ties, halyards, lifts and braces, gun gear, and bolt-ropes, and all ropes of importance, are invariably made from the best Italian hemp.

It should ever be remembered by the young seaman that all right-handed ropes should be coiled down with the sun, and left-handed ropes against the sun; attempting to do it the opposite way will bring your rope full of kinks, and make a very unsightly coil.

---

## SAILMAKER'S INSTRUCTION.

---

### *A Sailmaker's Splice*

Is used for splicing the roping of sails together, or a larger to a smaller rope, such as a foot-rope of a topsail to the leech rope, clew ropes of jib to the leech and foot ropes; the leech rope of a boom mainsail, spanker or trysail, to the head or foot-ropes, &c.

*To Splice a Foot Rope of a Topsail to the Leech Rope.*

*To Form the Splice.*

Put a whipping on the leech rope, leaving end enough to tuck the strands twice; then put another whipping on the foot rope to a certain distance, according to the number of times you intend to tuck the strands, which must greatly depend on the relative disproportion of the ropes, and the degree of tapering you intend to give them; unlay the strands of both ropes to their respective whippings, then heave the turns out of the small rope, on the other side of the whipping to the distance you intend tucking the strands of the large rope; then heave two or three turns out of the large rope on the other side of the whipping, crutch the two ropes together, and put a stop at the crutch to keep them in place; tuck the

\* See tables at end of Book.

first strand of the foot rope through the corresponding strand of the leech rope left-handed ; reduce it by cutting off a few yarns, and pass it again back-handed round the same strand of the leech rope, and so proceed, working with the same strand of the foot rope round and round the same strand of the leech rope, reducing the strand gradually at each tuck until it is tapered down to nothing ; take care in tapering the strand, always to cut the inside yarns ; follow the same process with the other two strands of the foot rope, then tuck the strands of the leech rope into the corresponding strands of the foot rope, twice left-handed ; cut the whippings off, taper the ends down, worm, parcel, and serve over them.

If it is not to be served over, the ends are whipped together with two yarns out of one of the strands.

*To Lengthen a Rope of a Sail with a Single Strand.*

It is sometimes necessary to enlarge a sail with one or more cloths ; to do this, the roping must be lengthened ; the best way of doing which is by introducing an additional strand, instead of putting in a piece of rope, which could only be done with two long splices, and thereby causing a much larger portion of the sail to be ripped than in the present instance.

There are several methods given of performing this operation, but as they come to the same thing in the end, there is very little difference in them, only in the mere wording. Some recommend the rope to be cut in the centre first, where you propose introducing the additional strand, while others prefer cutting the strands at the extremities first : however, it is a mere matter of taste which you do.

For example, it is required to give a sail one cloth more spread, it will therefore be necessary to lengthen the head and foot rope.

To do this, rip the rope off four cloths : that is, two cloths each side of the place you intend to lengthen the rope. The width of a cloth is 24 ins., which will allow a drift of 8 ft. for inserting the new strand.

If a 3-in. rope, it will take 2 ft. for splicing, allowing 6 ins. to each strand ; cut the strands at the distance of 2 ft. 6 ins. from each other, as in Plate 1.

Cut one of the strands at A, and unlay it to C ; then cut one of the strands remaining at C, and unlay it to B, laying the strand A up again as far as B ; then cut the only remaining strand at B, which will be the centre, when your rope will be



in two parts ; by following this plan, the wrong strand cannot possibly be cut ; the rope will appear as represented in Plate 2.

Marry the long end A to the end B, then lay up the long strand C in the lays of the strand A, and marry it to the other strand B, which represents Plate 3.

Take a strand about 9 ft. or 10 ft. in length, of the same size rope, and marry one end to the short strand A, as shown in Plate 3 ; then fill up the space left from A to C, by laying in the new strand, and marry the other end to the short strand C ; you will then have four splices or knots, and it will appear as in Plate 4.

Then finish off, if a foot rope, as with an ordinary long splice, from which it will only differ in appearance by having to knot and tuck eight ends instead of six. Stretch the splice, put a west country whipping on the ends, and cut them off within 1 in. of the rope.

In laying the new strand in, care must be taken to exactly follow the lay correctly, or it will not come in the right position to knot the ends A and C.

The strands of a head rope are merely crossed, and both strands whipped together underneath by a couple of yarns out of one of the strands, not knotted and tucked, as in a long splice ; in sewing the sail to the head rope, the rope is cross-stitched over the ends where tucked.

This is one of the neatest operations that can be performed by a sailmaker ; but if not laid up right the first time, it becomes very troublesome, and generally ends in a failure.

A rope of a fore and aft sail can be shortened on the same plan, as low as 6 ins., where too much slack rope has been put on, and there is not enough rope to make a long splice.

*Q.* How do you work a cringle in the leech of a sail ?

*A.* Unlay a single strand from the size rope your cringle is required to be, whip both ends, reeve the strand through the left-hand eyelet-hole in the sail, having one end longer than the other nearly a third, keeping the roping of the sail towards you. If a thimble is to be put in the cringle, lay up the two parts of the strand together, counting three or five lays, according to the size of the thimble, taking care you always have an odd number of lays ; commence with the short end of the strands towards you, then reeve the long strand from you, through the right-hand eyelet-hole, taking it through the cringle, and it will be in the right position to lay up in the vacant space left in the cringle ; when done, the one end will hang down inside the right-hand eyelet-hole, and the

other end outside the left-hand one ; the ends are then hitched by being rove through their respective eyelet-holes, and passed over the leech rope, and under their own part, one hitch being towards you, and the other from you ; then tuck the ends under the first two strands nearest the hitch, heaving them well in place ; the cringle is then fidded out, and the thimble is put in on the fore part of the sail. The ends of the strands are then tucked back, left-handed, under one strand, and again under two, right-handed, as in the first place, heaving them taut in place at each tuck, the ends are then whipped with two of their own yarns, and cut off.

*To Finish a Cringle off on the Crown.*

Commence as before, but after laying up the strand together, instead of forming a hitch with each end, the ends are rove through their respective eyelet-holes, and tucked back under two strands of the cringles, and again laid up as far as the crown, forming a four-stranded cringle, and is finished off by tucking the ends under two strands, and crossing them under the crown of the cringle, and cut close off. Cringles in the clews of boom-mainsails, or spankers, also the reef-cringles of fore and aft sails, are made this way, as they are considered much stronger than cringles made on the other method, and do not weaken the leech rope by being tucked under the strands of it. Cringles, when worked in the clew of topsails, are made in the same way.

Another plan of finishing a cringle on the crown is, instead of laying the strands up to make a four stranded cringle, it is made like the first, as far as the hitch. After forming the hitch, as in the first plan, instead of tucking the strand under the two nearest strands of the leech rope, it is backed and tucked left-handed under the nearest strand to it in the cringle, then right-handed under the strands towards the crown, both ends being served the same way, the cringle is fidded out, the thimble put in place, the ends whipped and cut off.

N. B.—Thimbles are always entered in the cringles on the canvas side of the leech rope ; if entered on the rope side they are liable to take the edge of the canvas, when being forced in place, and carry the stitches away.

In working a cringle in a piece of rope, such as the roping of an awning, the only difference is, there are no eyelet-holes, therefore the strand is tucked under two strands of the rope it is to be worked in ; instead of being rove through an eyelet-

hole, it is worked and finished off exactly like the first, taking care, before entering the second end in the rope to form the cringle that at least two clear strands are left; but if a bowline-cringle, more play is allowed, as it has no thimble; but there are generally small metal thimbles fitted in the eyelet-holes of the sail.

#### *Twine*

Is made from the finest hemp. There are two descriptions of twine used in sailmaking—roping, and seaming twine; the former for sewing the sail to the roping, and the latter for sewing seams.

#### *Canvas*

Is made from flax or hemp, in widths of 18 ins. or 24 ins., and in lengths of about 40 yards, made up in rolls called bolts. The stoutest or coarsest used in the Navy is called No. 1 canvas, and the finest and thinnest No. 8 canvas.

## SAILS, AND HOW FITTED.

#### *Courses*

Are fitted with two reef bands composed of a single part of canvas, one-third the width of the canvas in breadth, each placed at one-sixth the depth of the sail from the head. A belly band, also single part of canvas, half the width of the canvas in breadth, is placed half way between the lower reef and foot; and a foot band, extending from clew to clew, also a single part of canvas half the width of the canvas in breadth.

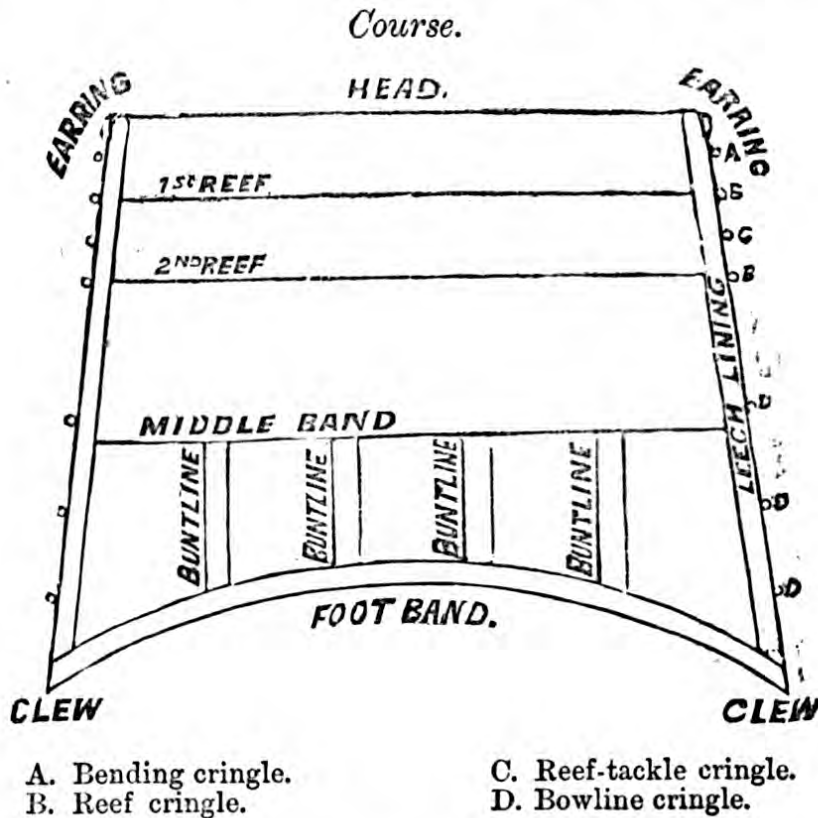
The leeches are lined from clew to earring with whole breadth, and the buntline patches, four in number, are placed at equal distances apart along the foot, extending from foot to middle or belly band.

Holes are worked two in a cloth in the head and reefs, and also for sticking the cringles in the leeches, at the foot in each centre of the buntline patches, and at the clews for the seizings.

Marline holes are worked along the foot, and the foot and clew ropes wormed, &c., similar to topsails.

The largest ropes are the clew ropes, which are spliced with the foot rope, about a foot or 18 ins. outside the outer buntline patches, and with the leechropes a short distance from

the clew, the foot and leech ropes being of one size. The ends of the head rope are spliced into the earrings of the leech ropes. A metal thimble is placed in each buntline, similar to topsails, and iron thimbles in the cringles in the leeches,



except the bowline cringles, which are three in number in main courses, and two in fore courses. Courses and topsails are seized at each clew with 1 in. or  $\frac{3}{4}$  in. bolt rope, according to the size of the sail.

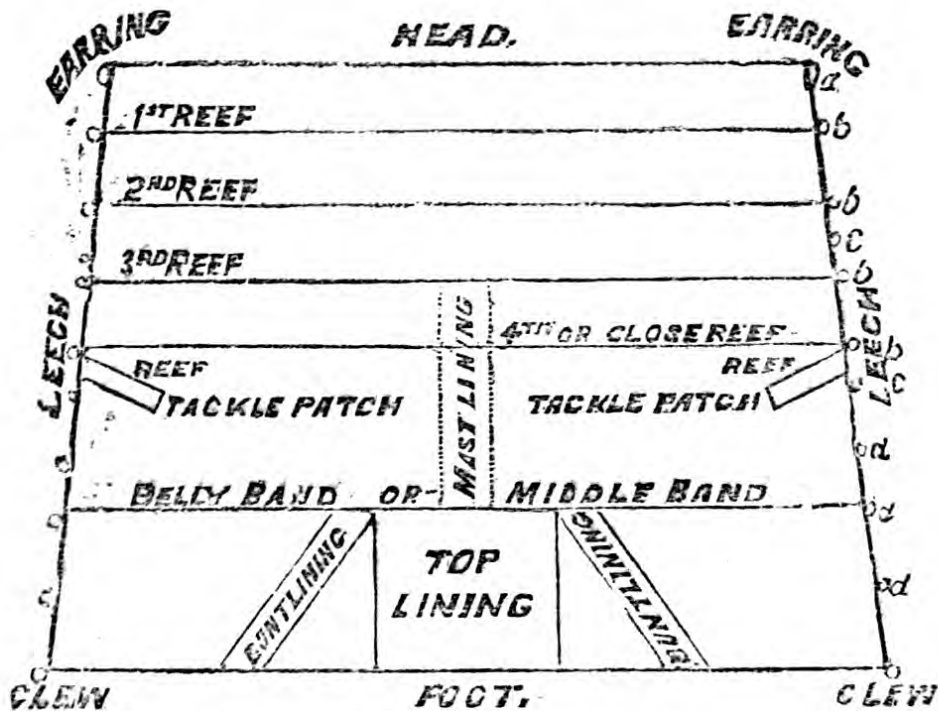
### *Topsails*

Are tabled all round the edges, and have four reef bands, of half breadth (24 in. canvas), doubled, the lower close reef being generally at half the depth of the sail, and the others at nearly equal distances apart, between that and the head. A middle or belly band, of half breadth, single, half way between the lower reef and the foot, and a foot band also, of half breadth, single, extending from the top lining, on each side, to the clew. The width of the top lining is usually about one-fifth the length of the foot, and the depth from foot to middle band, with a mast lining of about two cloths, extending from the upper part of the top lining to the third reef.

The leeches are lined from clew to earring, the lining being half-cloth wide at the head, and one-and-a-half cloths wide at the foot.

The reef-tackle patches in large sails are of whole breadth, and in small sails, two-thirds wide at the outer part and one-third wide at the inner part; they are from two to three yards long, and placed diagonally to the opposite clew. The centre of the buntline cloths, which are of whole breadth, is placed at one-third the length of the foot from the clew, and the inner edge of the upper part of the buntline cloths brought to the outer edge of the top lining at the middle band.

*Topsail.*



A. Heading rear cringle.  
B. Reef cringle.

C. Reef tackle cringle.  
D. Bowline cringle.

Holes are worked two and one in a cloth alternately, in the head and two upper reefs, and two in a cloth in the other two reefs; holes are also worked in the leech of the sail, for sticking the reef and bowline cringles in, also in the centre of the lower part of the buntlines, and at the clews, for the seizings. Marline holes are worked along the foot and a short distance up the leeches, for the purpose of lacing the foot of the sail with white line to the foot rope, which

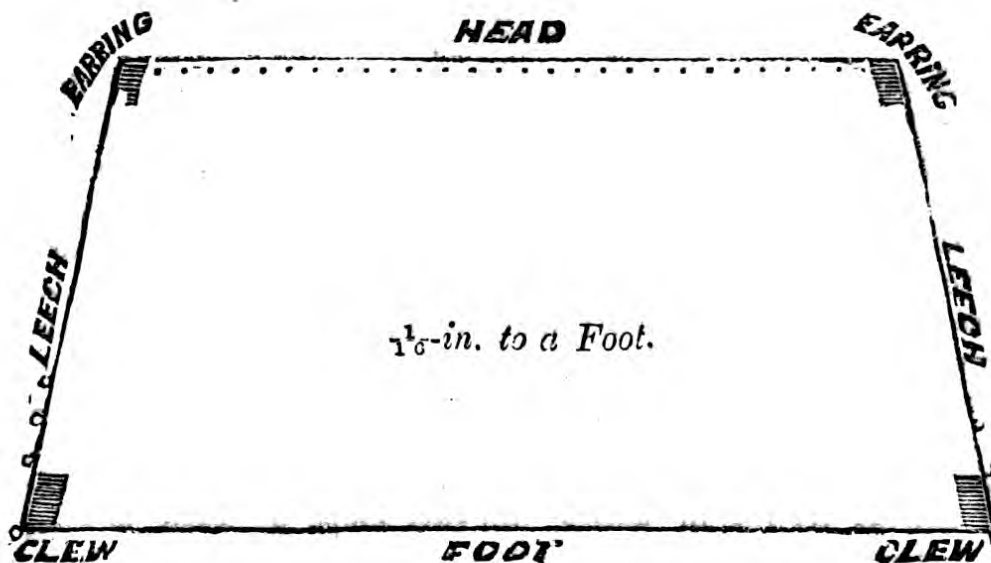
is first wormed, tarred, parcelled with canvas, and served with spunyarn.

Topsails have head, foot, and leech ropes; the ends of the head rope are spliced into the earring of the leech ropes, and the foot rope carried round the clews of the sail and spliced with the leech ropes, from 3 ft. to 6 ft. from the clew, according to the size of the sail. Thimbles, made of mixed metal, are placed in the buntline holes, and iron thimbles in the clews and in the reef and reef-tackle cringles.

Topsails are fitted with four, three, or two bowline cringles, according to the depth of the sail.

#### *Topgallant Sails.*

Two holes are worked in each cloth in the head, each corner of the sail is lined, and two or three bowline cringles, according to the depth of the sail, are worked in the leech ropes.



The ropes are generally of three different sizes, the head rope extending from earring to earring, the leech ropes, from the head earring, to between the second and third bowline cringles, when fitted with three, and between the two bowline cringles, when fitted with two, and the foot rope through the foot and up the leeches, splicing with each leech rope. The upper bowline is placed at half the depth of the sail, and the others at equal distances between it and the clew. The clews are served with spunyarn and marled with small line, one foot each way.

*Royals.*

Two holes are worked in each cloth in the head, and corner pieces fitted, same as topgallantsails. The ropes are of two sizes only—viz., head rope, from earring to earring, and a



body rope on the foot and leeches. No thimbles are used in either these sails, or topgallantsails.

*Boom, Mainsails, Spankers, &c.*

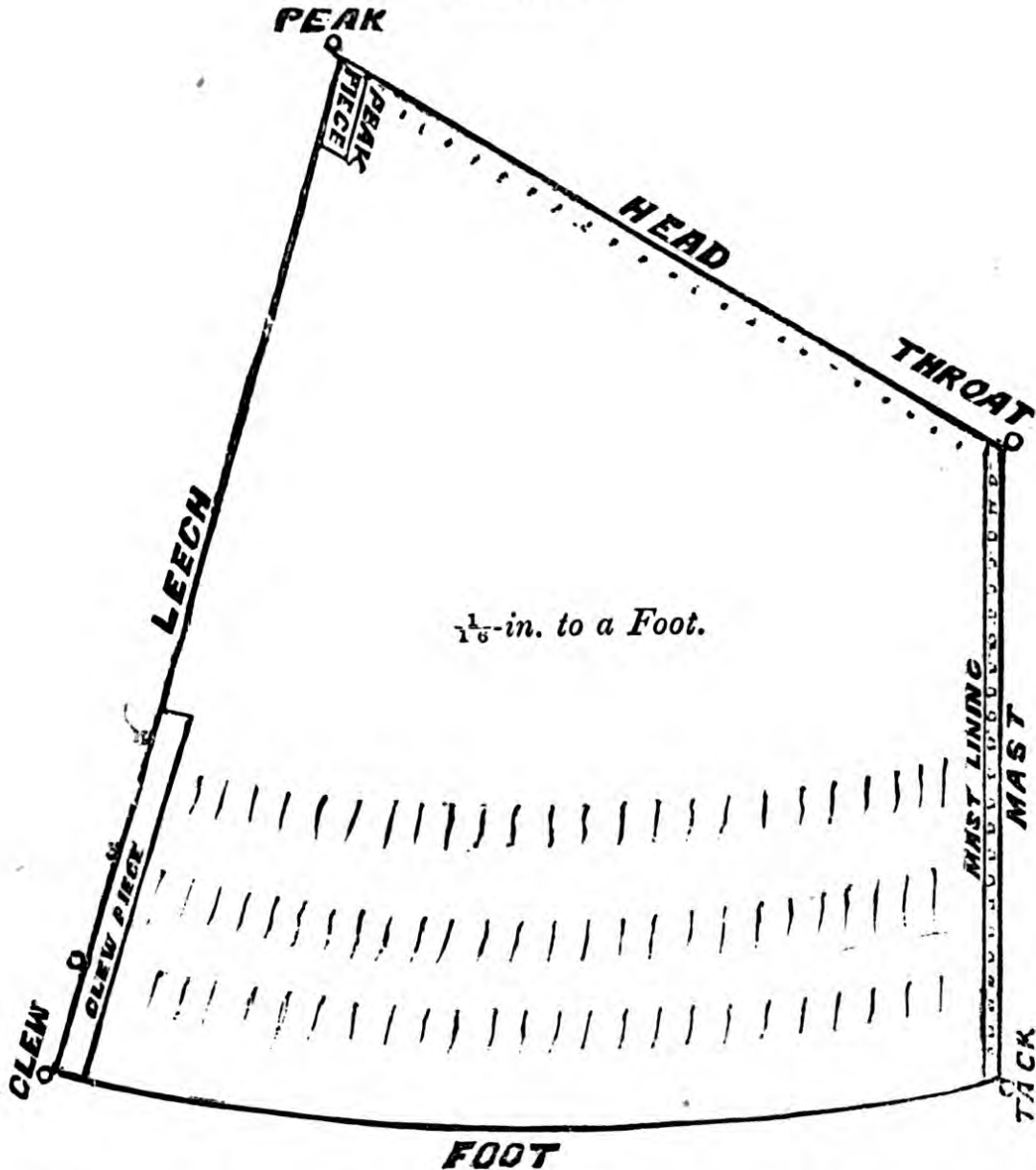
These sails are lined with a clew piece of whole breadth, from the clew to about four or five feet above the upper reef cringle; a peak piece, also of whole breadth, from the peak to about four or five feet down the leech, according to the size of the sails, a mast lining one foot wide, from throat to tack; also a piece about one foot wide, under the clew piece, extending from about 1 ft. 6 in. above the upper reef to the clew; the corners, and clew as peak are likewise strengthened by small patches, called clinker pieces.

Head holes are worked, two per cloth, in sails made of canvas 24 ins. wide, and two and one alternately in sails made of canvas 18 ins. in width, and two holes at each corner, and two at each reef, in both leech and luff, for sticking the cringles; also holes in the luff of the sail, about three-quarters of a yard apart, for seizing it to the mast hoops.

The reefs are usually three in number, the upper one being placed about midway between the throat and tack, the others at equal distances between the upper one and the tack. Small sails are only fitted with two reefs. Reef points, made of stout white line, are crowfooted in the middle, a hole is then made through every seam, and one end of the point passed through, and the crowfoot securely sewn to the sail.

The largest rope on these sails is the clew rope, which extends from the upper part of the clew piece, where it is spliced with the leech rope, round the clew, and about 3 ft. into the foot, then spliced with the foot rope, which, in

*Mainsail.*



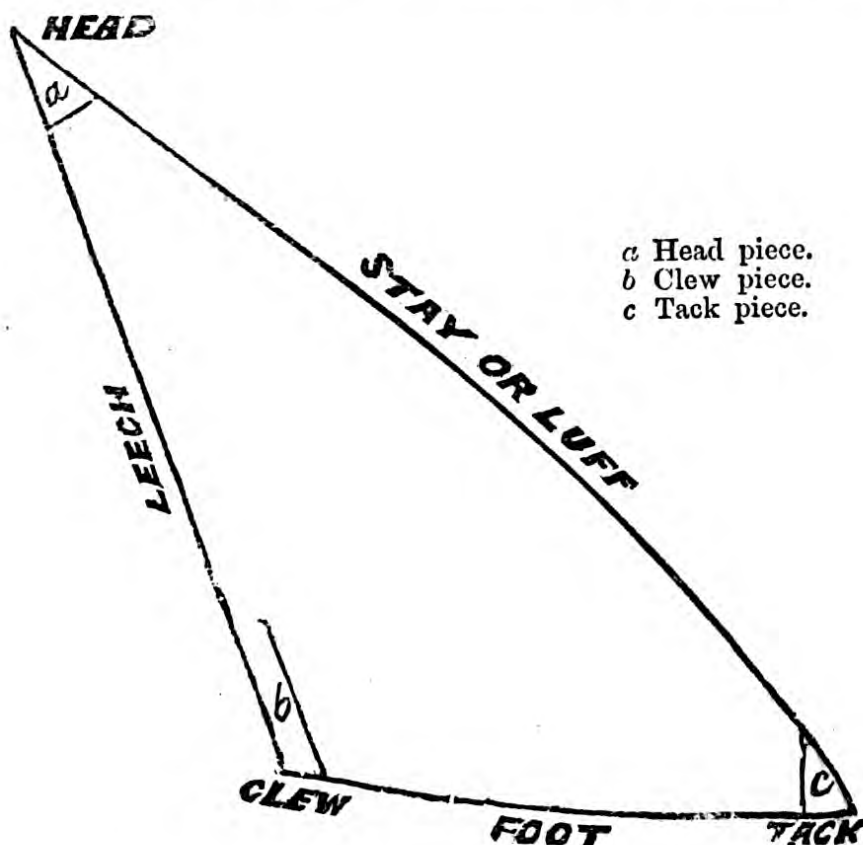
its turn, is spliced with the mast or luff rope, about 2 ft. from the tack in the foot of the sail, the mast or luff rope is then carried round the tack, up the luff, and about 2 ft. into the head; it is then spliced with the head rope; the head rope terminates about 2 ft. from the peak, where the peak rope is spliced on, which is spliced with the leech rope about 4 ft. or 5 ft. below the head.



Cringles, with iron thimbles, are stuck at each corner, at each reef, both in leech, and luff, and likewise midway between the lower reef and tack.

*Jibs.*

The edges are turned over and tabled or hemmed down, to make the sail strong enough to bear the strain of the holes and roping stiches; the width of the tabling varying



according to the size of the sail. Lining, head, clew, and tack pieces, as *a*, *b*, *c* (see sketch). Holes, 3 ft. apart, are worked (grommets) in the stay, for the lacing.

*Roping.*

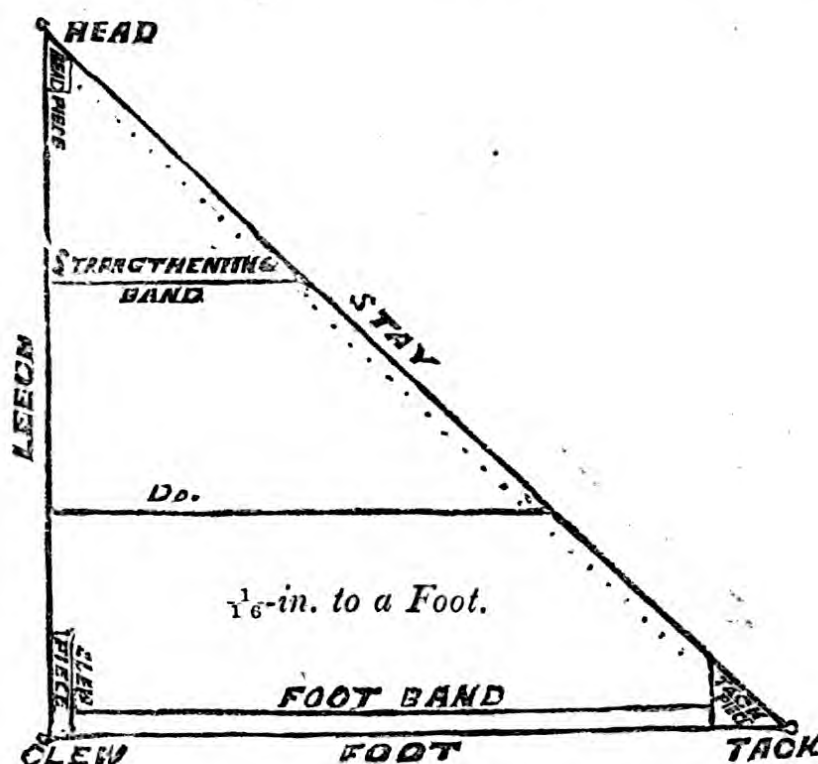
The largest size rope is sewn on, commencing at the top of the clew piece, and continued through the foot to about 3 ft. or 4 ft. up the stay, where it is spliced into the stay rope, which is sewn on up the stay, continued round the head, and spliced with the leech rope at the lower part of the peak piece, the leech rope being in its turn spliced with the clew rope.

Large sails have eyes formed with the rope, and seized with line at each corner, the clew rope being served and marled 2ft. each side of the clew.

In small sails, two holes are worked at the clew and a cringle stuck in.

### *Staysails (Lower)*

Are lined as follows:—A clew piece about two yards long, and peak and tack pieces about one yard long, a foot band of one-third breadth, and two bands also of one-third breadth,



sewn across the sail at equal distances between the head and clew. Holes for the stay lacing or hanks are worked three-quarters of a yard apart in the stay of the sail, and they are roped similar to jibs.

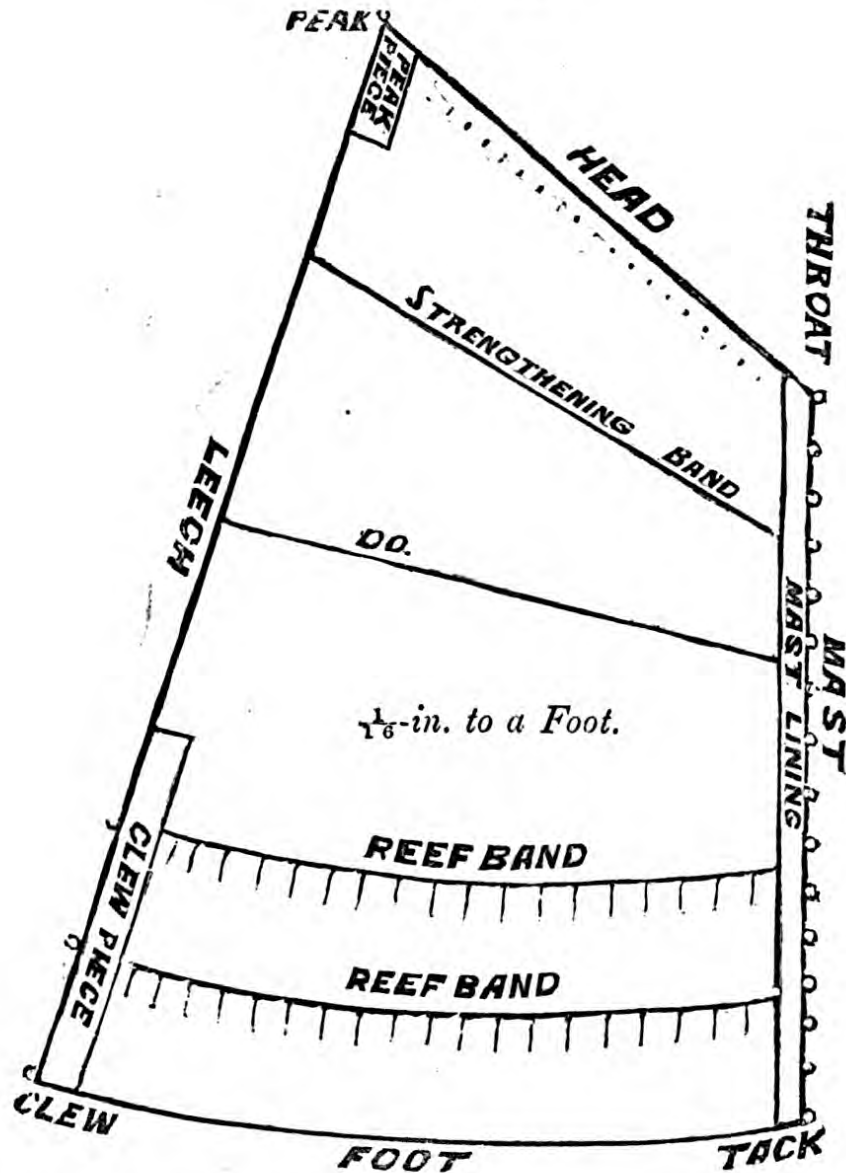
Staysails, topgallant, and royal are similar in every respect to jibs.

### *Trysails (Storm)*

Are fitted similar to other gaff sails, with the addition of having reef bands of one-quarter breadth and strengthening bands of one-third breadth, the former to take the reef hanks, and the latter at equal distances between the upper reef and the throat of the sail, with the exception of having cringles

stuck in the mast or luff rope about 3 ins. apart, for lacing, instead of the grommets worked in the sail to seize it to the

*Storm Trysail.*



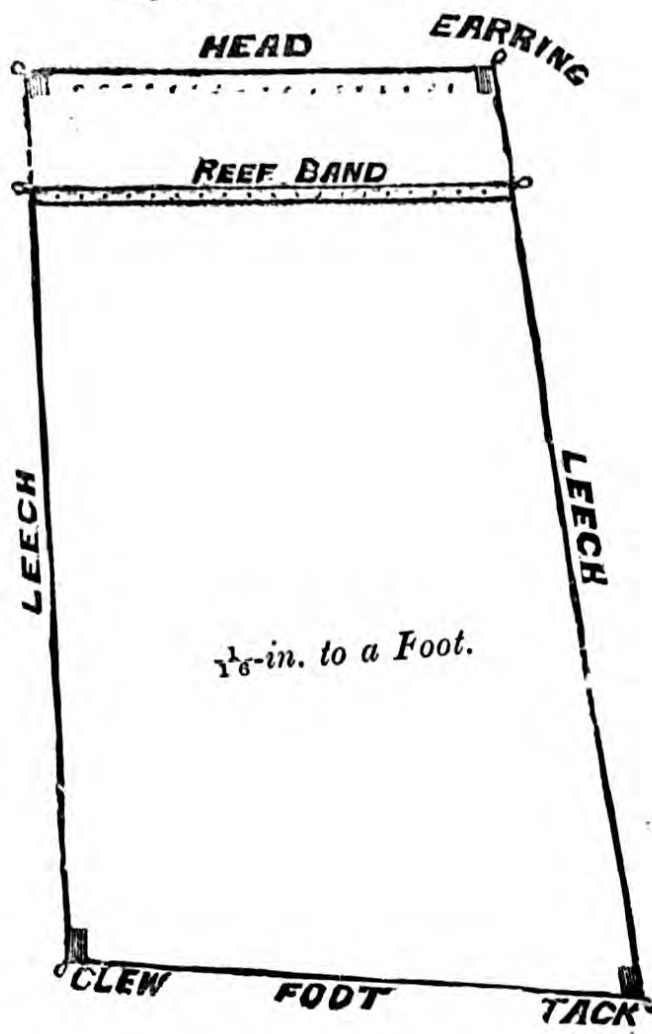
mast-hoops, and are fitted with two reefs only, each about one-sixth the depth of the mast. In small sails, one reef about one-fifth the depth of the mast.

*Lower and Topmast Studdingsails.*

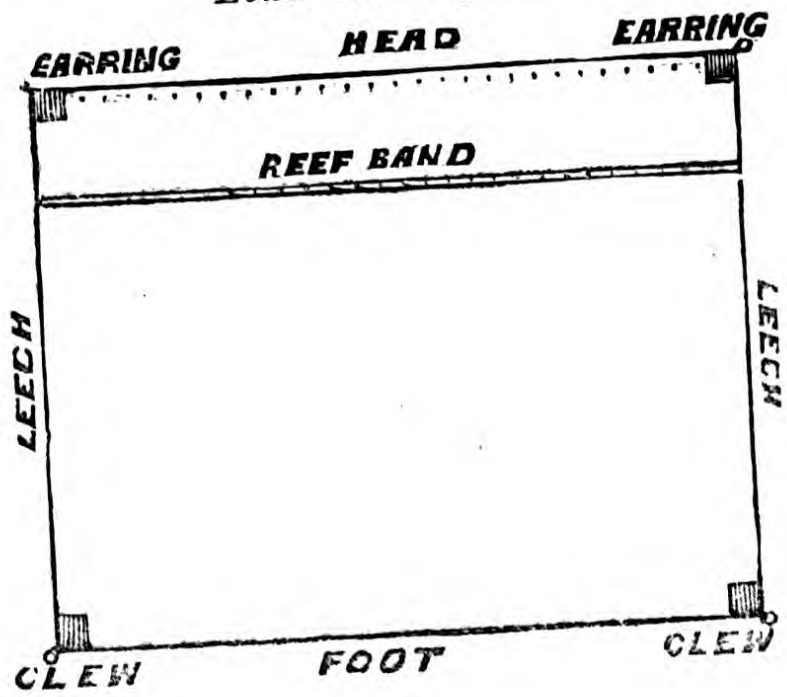
These sails are lined at each corner similar to topgallant-sails, and have a reef band of one-quarter breadth at one-eighth the depth of the sail, from the head.

Two holes are worked in each cloth, in both head and reef,

*Topmast Studdingsails.*



*Lower Studdingsail.*



*The Establishment or Number of Sails Issued to Ships for Sea Service is as follows :—*

DENOMINATION OF SAILS.	3-deck Ships, 2-deck Ships, and Frigates.	Corvettes, Sloops, and ALL Vessels SHIP-rigged.	Hector Class, Barque- rigged.	Troop Ships, Barque- rigged.	Schooner-rigged Sloops and Gun Boats.			
					1st and 2nd Class.	3rd Class.	4th Class.	
Second jibs or inner ... ..	1	1	...	2	2	2	1	
Jibs or outer ... ..	2	2	2	2	2	2	2	
Flying jibs ... ..	1	1						
Fore courses or squaresails ...	2	2	2	2	1	1	1	
Fore topsails ... ..	2	2	2	2	2	2	1	
Fore topgallantsails ... ..	2	2	2	2	2	2	1	
Fore royal ... ..	1	1	1	1	...	1		
Fore trysail ... ..	...	1	...	1	1	1	1	
Fore gaffsail ... ..	1	1	2	1	2	2	2	
Main course or squaresail ...	2	2	2	1	1	1		
Main topsails ... ..	2	2	2	2	1	1		
Main topgallantsails ... ..	2	2	2	2	1	1		
Main royals ... ..	1	1	1	1	...	1		
Main trysail ... ..	1	1	1	1	1	1	1	
Main gaffsail ... ..	1	1	1	1	1	1	1	
Main gaff topsail ... ..	...	...	...	...	...	...	1	
Mizen course ... ..	1							
Mizen topsails ... ..	2	2						
Mizen topgallantsails ... ..	2	2						
Mizen royal ... ..	1	1						
Mizen trysail ... ..	1	1	1	1				
Spanker ... ..	2	2	2	2	1	1	1	
Gaff topsail ... ..	...	...	1	1	1	1	1	
Studding- sails.	{ Stay- sails.	Fore ... ..	2	2	2	2	2	1
		Fore top ... ..	2	2	2	2		
		Main ... ..	1					
	{	Fore ... ..	2	2	2	2	1	1
		Fore top (large) ... ..	1	2	2	2	2	1
		Fore top (small) ... ..	1					
	Fore topgallant ... ..	2	2	2	2			
	Main topgallant ... ..	2	2	2	2			

## SAIL INSTRUCTION.

### PART I.

*Q.* Name the sails of a full-rigged ship ?

*A.* Main and fore courses are set on the main and fore yards ; topsails, topgallantsails, and royals, on the yards they are named after. Spanker on the mizenmast. Trysails on the fore and mainmast. Fore topmast staysail jib and flying-jib on the bowsprit, jib, and flying jib-booms. Topgallantsails, royals, and studdingsails are called small sails, and are only used in fine weather. Main topmast and maintopgallant staysails are set on the main topmast and topgallant stays, fitted for the purpose. The storm sails are fore and main storm staysails, which set on stays fitted for the purpose. Fore and main storm-trysails, which are set on the fore and main trysail-masts, but on shorter gaffs than are used for the large trysails, and a mizen trysail, but in a similar way to the main and fore trysails. Boat sails, for the use of the boats. Wind sails, to give ventilation below. Smoke sails, to be used when a ship is lying at anchor, head to wind, to protect the galley funnel, and keep the blacks from flying about the deck.

There are also a number of fancy sails—viz., a ringtail, which is set by halyards being rove at the spanker or boom-mainsail gaff end, the tack being hauled out to a boom, fitted on the spanker-boom end, similar to a studdingsail-boom on a yard. A watersail sets under the spanker-boom end. A spritsail, which sets under the bowsprit. Skysails are set over royals.

Merchant ships frequently carry sails above these.

*Q.* Name the running gear of a course, and how it is bent to the sail ?

*To the Leech.*

*A.* Reef-tackles, bowlines, leechlines, and slablines.

*To the Clews.*

Tacks, sheets, and clew-garnet.

*To the Foot.*

Buntlines and slab-buntlines, in the bunt a bunt-whip.

Reef-tackle blocks of courses are fitted with clasp-hooks,

and are hooked to the reef-tackle cringles in the leech of the sail.

The leech-lines and slablines are bent to the leech of the sail with a running-eye over the same toggle, which is seized to the upper bowline-crinkle; when there are two leechlines and slablines the upper ones are bent to a toggle seized to the reef-tackle cringles. In brigs the leechline is rove through the leechline cringle, taken up abaft the sail, and hitched to the jackstay abreast of the leechline block. This is termed doubling the leechline, as it serves the double purpose of leech and slabline.

#### *Bowlines.*

The fore-bowline goes with a running-eye over a toggle, seized to the bowline bridle.

The main is fitted with a light runner and tackle, and attached to the lower bowline-bridle with a slip-toggle.

#### *Tacks, Sheets, and Clew-Garnets*

Are shackled to the clew of a sail.

The buntlines are bent with running-eyes over toggles, which are fitted with double strops, *two* each *side* of the foot of the sail; there are two legs to each buntline, each side of the sail.

Bunt slabline is a single rope clenched to the foot of a course on the after part of the sail.

A bunt-whip is hooked to a becket sewed to a double part of canvas in the bunt of the sail when furling.

*Q.* What gear do you let go and haul on in setting a course?

*A.* Let go and overhaul leechlines, slablines, reef-tackles, buntlines, slab-buntlines, and ease down the clew garnets.

Haul on the weather-tack and lee-sheet.

*Q.* What gear do you haul on and let go in taking a course in?

*A.* Haul on clew-garnets, leechlines, slablines, buntlines, slab-buntlines. Let go the bowlines, and ease away the tack and sheet.

*Q.* Name the running gear of a topsail, and how it is bent?

#### *To the Yard.*

*A.* Topsail-tye and halyards.

#### *To the Leech.*

Reef-tackles (large ships carrying heavy topsails are fitted with first and second reef-tackles) bowlines.

*To the Clew.*

Sheets, clewlines.

*To the Foot.*

Buntlines.

*To the Bunt.*

Bunt jigger.

The halyards are hooked in the chains. The tye-blocks are secured to a band round the sling of the yard by a bolt.

*Reef-Tackles.*

The reef-tackle pendant is rove through the thimble in the crown of the strop of the reef-tackle block, through the upper bowline-cringles, hitched, and the end seized. If the second reef-tackle is fitted, it is bent to the second reef-tackle cringle, which is between the second and third reef, with a half-hitch, and the end seized back.

Bowlines go with a running-eye over a toggle to the lower bowline-bridle in a fore or mizen, and the middle bowline-bridle in a main topsail. The sheets, if chain, are either hooked to the clew with clip-hooks, or shackled.

If rope, a thimble is seized in the strop of the topsail sheet-block, by which they are shackled to the clew.

Clewlines are lashed abaft the crew.

Buntlines are secured with a running-eye over a toggle.

A bunt-jigger is hooked to the bunt-becket, and is used in hauling the bunt up in furling sails.

*Q.* What gear do you let go and haul on in setting a topsail?

*A.* Let go clewlines, buntlines, and reef-tackles, haul on topsail-sheets and halyards.

*Q.* What gear do you let go and haul on in taking a topsail in?

*A.* Let go the topsail-sheets and halyards, and haul on the clewlines and buntlines.

*Q.* Name the running gear of a topgallantsail and royal?

*A.* Of a topgallantsail, halyards, clewlines, buntlines, and bowlines.

Halyards are bent with a studdingsail halyard-bend round the slings of the yard, or to a thimble in a strop; the former is the best plan, as it carries the yard much closer up to the sheave-hole of the mast.

*To the Leech.*

Bowlines are bent with a running-eye over a toggle.



*To the Clew.*

Sheets and clewlines. The sheets are bent with a sennit-eye over a spring-toggle, and the clewlines with a sheet-bend through the clew of the sail.

*To the Foot.*

Buntlines are only fitted to topgallantsails in large ships, and is a single buntline with two legs, which are clenched to the foot of the sail, or fitted with a running-eye over a toggle.

*Of a Royal.*

Halyards. Sheets and clewlines, which are bent in the same way as topgallant sheets, clewlines, and halyards.

*Q.* What gear do you let go, and haul on in setting a topgallantsail and royal?

*A.* Let go clewlines for a royal, and bowlines, buntlines, and clewlines for a topgallantsail. Haul on sheets and halyards.

*Q.* What gear do you let go and haul on in taking a topgallantsail and royal in?

*For a Topgallantsail.*

*A.* Let go bowlines, sheets, and halyards, and haul on the clewlines and buntlines.

*For a Royal.*

Let go sheet and halyards, and haul on clewlines.

*Q.* Name the running gear of a jib, flying-jib, or staysail.

*A.* Halyards, downhaul, jib-pendants, and whips or sheets. Lacing for jibs, hanks for fore topmast-staysails, becketts for storm-staysails, tack-lashings, clew ropes, reeving-lines, foot-lines.

*Q.* How, and to what part of the sail is the gear bent?

*A.* The halyards of jibs and staysails are hooked to the head cringle; they are fitted with clip-hooks; when double, the clip-hooks are seized in a thimble in the strop next the crown of the block.

The downhaul is rove through the head-crinkle and secured with a sheet-bend.

Jib-pendants, or sheets, are secured to the cringle in the clew of the sail with a toggle and strop. This also applies to staysails.

Luff-tackles are used as sheets for storm-staysails.

The lacings of a jib, flying-jib, main-topmast or topgallant

staysails, are rove through the eyelet-hole in the luff of the sail, and round the stay. Sometimes the lacing is stopped to the eyelet-holes, and not rove through them, but it is not so secure.

*Fore Topmast Staysails.*

The eyelet-holes in the luff are seized to hanks which are on the fore topmast stay.

*Storm Staysails,*

Fore and main, are fitted with becketts in the eyelet-holes in the luff of the sail, with an eye in one end, and a knot on the other end of the becketts, they are passed round the stay, and secured by putting the knot through the eye.

*Q.* Why are jibs and flying-jibs fitted with lacings, and a fore topmast staysail with hanks?

*A.* Jib or flying-jib stays can be unrove, brought in on the fore-castle, and then rove through the lacing, but as a fore topmast staysail is set on one of the fore topmast stays, which cannot be let go in bending or unbending the sail, the sail must be taken out to it, therefore all staysails set on standing stays must go with hanks or becketts.

*Tack-Lashings*

Are spliced in the tack-cringles of a jib or staysail; they are secured round the bowsprit for a fore topmast staysail, jib-boom, and flying jib-boom, for a jib or flying jib with three round turns, each turn being passed through the cringle in the tack of the sail, and secured to its own part; in some cases, for the sake of smartness, a strop and toggle is used for the purpose.

*A Clew Rope*

Is merely a rope's-end bent to the clew of a jib or staysail when the sheets are not bent.

*A Reeving-Line*

Is a rope's-end bent to the becket in the end of the jib or flying-jibstays, to reeve them through the sheave holes in the jib and flying jib-boom ends in shifting jibs or flying-jibs.

*Foot-Line*

A foot-line is a rope's-end bent to an eyelet-hole in the foot of the jib, and led through a block at the bowsprit-cap, to haul it taut along the jib-room for furling at sea.

*Q.* What gear do you let go and haul on in setting a jib or staysail?

*A.* Let go the downhaul, and haul on the halyards and jib-whips or sheets.

*Q.* What gear do you let go and haul on in taking a jib or staysail in?

*A.* Ease off the sheets, let go the halyards, haul on the downhaul.

*Foot-Line or Gap-Rope*

Is a rope's-end rove through a block at the bowsprit-cap, and bent to an eyelet-hole in the foot of the jib, or to the clew of the jib.

It is useful for hauling the foot of the jib taut along the jib-boom when stowing the sail at sea blowing fresh, as it brings it and steadies it in place on the boom while the men are gathering it up.

It is also useful for flattening it in fine weather.

When rove through a block at the head of the jib, and bent to the clew, it is very useful in lightening the clew over the stays in shifting the sheets over.

*Q.* Name the running gear of a boom-mainsail, spanker, and trysail?

*Boom Mainsail.*

*A.* Throat and peak halyards, vang, and downhaul. Tack tricing-line, tack-tackle, lacing, boom-sheets, and topping-lifts.

*Q.* How, and to what part is the gear bent?

*A.* Peak and throat-halyards are hooked to the gaff. Vangs and downhauls spliced or hooked to the outer part of the gaff.

*Tack Tricing-Line.*

The tail in the lower block is passed through the thimble in the tack of the sail, and hitched to its own part.

*Tack-Tackle*

Is hooked to the tack of the sail.

*Lacing*

Is a piece of soft greasy rope, spliced in an eyelet-hole in the luff of the sail above the reefs.

*Boom-Sheets*

Are rove through a block on the outer part of the boom.

*Topping-Lifts*

Hooked to an iron band fitted with two eyes on the boom.

N.B.—This applies also to a spanker.

*Q.* What gear do you let go and haul on in setting a boom-mainsail?

*A.* Let go vang and downhauls, tack tricing-line, and ease the boom-sheets.

Haul on the topping-lifts, peak and throat-halyards.

*Q.* What gear do you haul on and let go in taking a boom-mainsail in?

*A.* Haul on the weather sheet, vang and downhaul, and lower the peak and throat-halyards, when the boom is amid-ship, lower the topping-lifts, crutch the boom.

*N.B.*—This applies to a spanker also.

*Q.* What is the use of a tack tricing-line?

*A.* To trice the tack of the sail up when required.

*Q.* What is the use of a tack-tackle?

*A.* To haul the tack of the sail close down when on a wind.

*Q.* Name the running gear of a spanker?

*A.* In addition to the gear attached to a boom-mainsail, as already explained, a spanker is fitted with an outhaul and brails, the gaff being kept always swayed up in place; the peak or throat-halyards are not used in setting or taking the sail in.

#### *Outhauls.*

A foot-outhaul is hooked to a thimble in the clew of the spanker.

A head-outhaul to a thimble in the peak.

#### *Brails.*

The bights are seized to the after-leech.

*Q.* What is the difference in securing the after-clew of a boom-mainsail and a spanker?

*A.* The clew of a boom-mainsail is secured to the boom-end by an earring passed round the outer end of the boom, or shackled.

The clew of the spanker is fitted with an outhaul.

*Q.* What gear do you let go and haul on in taking a spanker in?

*A.* Let go the brails, and haul on the outhaul, ease off the weather vang, downhauls, and sheets, and top on the topping lifts.

*Q.* What gear do you haul on and let go in setting a spanker?

*A.* Haul on the brails, always manning the lee-brails best, so as to spill the sail.

Let go the outhaul, haul in the sheet ; when the boom is over the crutch, lower the topping-lifts.

When the head of a spanker is fitted to run on an iron rod under the gaff, it is fitted with an outhaul at the head as well as the foot, also an inhaul.

*Q.* Name the running gear of a trysail ?

*A.* The same as a spanker, with the exception of no boom.

The gaffs are usually kept swayed up in place, but are sometimes lowered and swayed up each time the sail is taken in or set, similar to a boom-mainsail.

Brails are fitted to a trysail in the same manner as they are to a spanker, the sheet which answers the purpose of an out-haul is generally a luff-tackle hooked to the clew of the sail.

A piece of rope, called a lazy-sheet, is spliced in the clew thimble.

*Q.* What is the difference in securing the tack of a trysail to that of a spanker ?

*A.* A piece of rope, called a tack-lashing, is spliced in the tack-thimble by which the tack is secured ; it does not trice up like a spanker, therefore is not fitted with a tricing-line or tack-tackle.

*Q.* What gear do you let go and haul on in setting a fore or main trysail ?

*A.* Let go the brails and vang, and haul on the sheet.

*Q.* What gear do you haul on and let go in taking a trysail in ?

*A.* Ease away the sheets, haul on the brails (the lee-brails best), so as to spill the sail, steady taut the vang.

*Q.* What is the use of a lazy-sheet ?

*A.* To secure the clew of the sail while you hook or unhook the double sheet.

*Q.* Name the running gear of a gaff-topsail ?

*A.* Halyards, sheet, clewline, tack, and lacing.

*Q.* How, and to what part of the sail, is the gear bent ?

*A.* The halyards are bent to the yard with a studding-sail halyard-bend, about one-third from the inner yard-arm.

The sheet is fitted in various ways—viz., sometimes with clip-hook, or a common hook and mousing, or a screw hook ; in either case it is hooked to the clew of the sail ; it is also, in some cases, fitted with a toggle and strop.

#### *The Clewline*

Is rove through the clew of the sail, and secured with a sheet-bend when single ; when double, a tail is fitted to the lower

block, and bent to the sail in a similar way. The upper clew-block is seized to the slings of the yard, and acts as a downhaul as well as a clewline.

*The Tack*

Is fitted with a hook, which is hooked to the thimble in the tack of the sail.

*The Lacing*

Is a piece of rope, one end of which is spliced in one of the upper eyelet-holes, in the luff of the sail, the other end being passed through each of the lower eyelet-holes, and rove round the mast as the sail is hoisted.

*Q.* How is the yard secured to the mast ?

*A.* By a parrel.

*Q.* What gear do you let go and haul on in setting a gaff-topsail ?

*A.* Hoist on the halyards, pass the parrel and lacing, let go the clewline, haul down the tack, and haul out the sheet.

*Q.* What gear do you haul on and let go in taking a gaff-topsail in ?

*A.* Ease off the sheet, haul up the clewline, cast off the lacing and parrel, lower the halyards, and haul down on the tack, which acts as a downhaul.

*Studdingsails.*

*Q.* Name the running gear of a lower, topmast, and top-gallant studdingsail.

*A.* Lower studdingsail, inner and outer halyards, tack, long and short sheets, tripping-line.

*Inner Halyards*

Are either hooked, or a tail is fitted to the block, which is hitched to the inner corner of the head of the sail.

*Outer Halyards*

Are bent to the yard with a studdingsail halyard-bend half way or one-third out on the yard.

*Tack*

Is bent to the outer lower corner or clew of the sail, with a sheet-bend or running-eye over a cross-toggle.

N.B.—This applies to all studdingsails.

*The Long and Short Sheets*

Are formed out of one piece of rope, rove through the thimble in the inner lower corner or clew of the sail, and seized together.

*Tripping-Line*

Is bent with a sheet-bend to the tack, or outer lower corner of the sail.

*Topmast and Topgallant Studdingsail.*

Halyards, downhaul, tack, and sheets.

*Halyards*

Are bent with a studdingsail halyard-bend to the yard one-third out.

*Downhaul*

Goes with a running-eye over the outer yard-arm for a topmast, and the inner yard-arm for a topgallant studdingsail.

*Tack*

Is bent with a sheet-bend to the outer clew of the sail.

*Sheets.*

There are two to a topmast studdingsail, a long and a short one, formed out of one piece of rope by being rove through the clew of the sail and seized. A topgallant studdingsail has only one sheet.

*Q.* What gear do you haul on in setting a lower, topmast, or topgallant studdingsail?

*A.* Halyards, tacks, and sheets.

*Q.* What gear do you let go and haul on in taking lower, topmast, or topgallant studdingsails in?

*A.* Haul on the tripping-line and sheet for a lower, and the downhauls and sheets for a topmast or topgallant studdingsail, ease away the tacks, and halyards, and short sheets.

*Loosing Sails.*

The lower and topsail yards are generally marked with a white band of paint round them, at a certain distance outside the quarter, called laying-out marks. After the pipe goes, loose and furl sails, and the order is given "away aloft," the hands get on the yards as quickly as possible, keeping between the laying-out marks and bunt, until the order, "trice up, lay out" is given.

Sail loosers on the lower and topsail yards, at the order "lay out," should clear away the gaskets and second reef-earrings as quickly as possible, and see the other reef-earrings clear, that is if the topsails and courses have no reefs in, but the bunt should never be let fall before the quarter and

yard-arm gaskets are clear. Very often, at the order "let fall," the men in the bunt, without ascertaining if the outer gaskets are clear, let fall the bunt, and should one of the quarter or yard-arm gaskets be fast, the whole weight of the sail comes on it, and, in all probability, the lanyard of the gasket has to be cut; the captain of tops, &c., should always see the stops of the top-bowline gone, and the bunt-jigger of the topsail unhooked, also the bunt-whip of the courses; this, at times, has been neglected, and the bunt-becket has been torn out of the sail. Topgallant and royal yard loosers should be very careful to commence loosing at the yard-arms first, and lay in as they cast the gaskets off, more particularly at sea, and never let the bunt fall first, as it might be attended with serious consequences; for instance, it is blowing fresh, the bunt of the sail is let fall before the yard-arms are loosened, the sail fills with wind like a bladder, rises above the yard, the hand at the yard-arm, not expecting it, is knocked backward, and most likely falls on deck.

In loosing jibs, care should be taken by the hand taking the cover of the jib or flying-jib off to cut the stop of the jib-halyards, and see the jib-pendants clear of the eyebolts in the bowsprit cap, and foot-line let go.

N.B.—In stowing jibs, before the covers are put on, the jib-halyards are always stopped to the lower part of the jib-stay, and the clew of the jib and cross-in jib-pendants are always stowed between the eyebolts in the foremost part of the bowsprit-cap.

---

## PART II.

Now that it has become a general practice throughout the service to stow courses and topsails away in the sail-room, furled, ready for bending, the gaskets are sewed in the head-rope of the sail for this purpose, and the bending strop is seized in place, ready for hooking the sail tackle to.

### *A Bending Strop*

Is simply a pair of bail slings, only unlike slings, one bight is not rove through the other, but merely seized together with spunyarn when in use. The strop or slings are passed round the bunt of the sail after it is made up for bending, one bight is passed down abaft the sail, up before all, and seized to both parts of the other bights, sufficient length being left on the upper bight for hooking the sail tackle to. This plan



of fitting a bending strop is not, however, very safe, as everything depends on the seizing.

The bending strop is sometimes seized to the head rope of the sail, as well as to act as a preventer in the event of the other seizing slipping or carrying away; but the best and securest plan of fitting it, is to have two eyelet-holes worked in the head of the sail, just below the head rope, the sail being strengthened in the wake of the eyelet-hole by a patch of canvas. Cut the bending strop to length, reeve it from aft forward, through one hole, then from forward aft, through the other hole, splice both ends together, thus the splice will be on the after part of the sail; when covered with canvas, a strop fitted this way can scarcely be seen, and is always in place; it is generally drawn through the eyelet-holes when the sail is set close to the foremost bight, and hangs down abaft all; in furling, it is tucked in the sail out of sight.

When used for bending, it is rendered through the eyelet-holes, the bight on the after part of the sail being passed round the bunt of the sail, up before all, and seized to both parts of the bight on the foremost part of the sail; for this purpose the strops or slings are marked and seized each side of the eyelet-hole, to prevent it slipping, leaving sufficient length on the bight on the fore part of the sail for hooking the sail tackle to. A strop fitted this way, for all the seizing might slip or carry away, would never allow the sail to fall on deck.

*To Furl a Course on Deck for Bending or Shifting.*

Stretch the sail taut along the roping next the deck, hitch the earring to any convenient place, to keep the head taut. Gather all the slack sail over towards the foot, then lay the second reef-band on the head, haul the second reef-earring taut out. Bring the leech taut in as far as the inner leech-line cringles, leaving the toggles out over the head ready for bending the leechline, and if a fore course, leave the bowline cringle out to bend the bowline.

Bring the clews in over the head of the sail, about 4 ft. from the midship roband on either side, then lay the buntline toggles about a foot over the head, between the clews, ready for bending the buntlines to.

Extend the hands along the head of the sail, as if they were on the yard, and gather up, as in furling, until they come to the skin, then all step across the sail again, kneel down, and roll it taut up, making a snug furl, pass the gaskets, footing

them well taut, pass the bending strop, and seize it in place ready for hooking the stay-tackle to. Stretch the head-earring along the head rope, as near the bunt as possible, and stop them, ready to be got hold of as soon as the sail is above the fore or main yard.

The sail is now ready for bending or stowing away.

*Q.* How do you furl a topsail on deck for bending or shifting?

*A.* Stretch the sail taut along the roping or after part of the sail next the deck.

Gather all the slack sail over towards the foot, then lay the second reef-band along the head, stopping the second reef-crinkle to the head-earring cringle. Get hold of the head-earrings, and tauten the head of the sail. Bowline-knot the third reef-earring in the second reef-crinkle, and the fourth reef-earring in the third reef-crinkle, take the two clews in about 6 ft. over the head, and about 4 ft. on either side of the midship roband; by having the clews well out, it will be easier to bend the sheets and clewlines. Bring the leech in along the head as far as the reef-tackle cringles, leaving out the reef-tackle pendants and bowline-toggles, at least, a foot over the head rope, then bring the buntline-toggle in between the clews, leaving them also a foot over the head-rope, ready for bending the buntlines, extend the hands along the head rope, as if on the yard, and gather all the slack sail into the skin, leaving the yard-arms as light as possible, and, at the same time, making a shapely bunt, step across the sail and face about, kneel down, and roll the sail taut up in the skin, pass the gaskets and foot them taut, then bring the clews up under the fore part of the sail and stop them to the head rope abaft all. Pass the bending strop, and seize it in place, ready for hooking the sail tackle to.

Stretch the head-earrings along the head-rope, and stop them as near the bunt as possible, so they can be got hold of readily, directly the sail is above the top.

The sail is now ready for bending or stowing away.

*Q.* How do you make a jib up for bending or shifting?

*A.* Stretch the foot along the roping or port side next the deck, making the sail up in folds on the foot, leaving the luff rope out, and all parts of the lacing clear. Take the bight of the tack-lashing round all parts of the sail, and hitch it to its own part, or secure it with a seizing.

*Q.* How do you make a course up for stowing away (not furled)?

A. Stretch the sail taut along the roping next the deck. Gather the slack sail over towards the foot. Bring the second reef-band, belly-band, and foot in, and taut along the head rope, laying the leech rope of each inside the other. Leave the robands and gaskets out. Bring the clews in towards the bunt, as far as possible, so as to leave out at the leech or ends of the sail, when made up, the reef-tackle cringles, bowlines, and leech-line toggles, then carry the clew out again, and leave them out also. Carry the buntline-toggles over the head rope, and leave them out.

Q. How do you make a topsail up for stowing in the bins (not furled) ?

A. Stretch the sail taut along the roping or after part next the deck. Gather the slack sail over towards the foot, then lay the third reef-band, belly-band, and foot rope, along the head rope, laying the leech rope of each inside the other. See all the robands, gaskets, reef-tackle cringles, bowline, and buntline-toggles, and clews out, the third reef-earring bowline knotted in the second reef-crinkle, and the fourth reef-earring in the third reef-crinkle. Bring the clews in towards the bunt, so as still to leave the bowline-toggles out at the leech, take them out to the leech again, thus having all parts of the sail inside the leech ropes. The robands, gaskets, and buntline-toggles out at the head, the clews, reef-tackle cringles, and bowline-toggles at the sides.

Extend the hands along the sail facing the head, kneel down, and roll it taut up, securing it with the gaskets or spunyarn stops if required.

Stretch the head-earring along the head, and secure them as near the bunt as possible, so as the men in the tops can readily get hold of them when bending. Seize the bending strop in place, and the sail is ready for stowing away.

Q. How are topgallantsails and royals made up for stowing away ?

A. Stretch the head of the sail taut along the roping or after part next the deck. Gather all the slack sail over towards the foot, then carry the sail towards the head in a similar way to a topsail or course, making three folds of it. Bring the clews towards the bunt till the leech rope of each fold lays inside the leech rope of the other ; then take the clews out over the leech rope again, roll the sail taut up, leaving the robands out, and the bight of the head-earring hitched round the sail. Secure the sail with ropeyarn stops. It is then ready for stowing away.

Q. How do you make gaff-topsails up for stowing away?

A. A gaff-topsail is made up on the head, the tack is brought in towards the head, so as to square the foot. The foot is then laid along the head rope, and the sail rolled taut up and stopped with spunyarn stops, ready for stowing away.

Q. How do you make a jib or staysail up for stowing away in the sail bins?

A. Stretch the after-leech along the roping or port side next the deck. Bring the head and tack towards the sheet, until it nearly forms a square, then roll up taut on the after-leech, and secure it with ropeyarn stops; the sail is then ready to stow away.

Q. How do you make a boom-mainsail, spanker, or trysail up, for stowing in the sail-room?

A. On the after-leech; double the head and foot in towards the middle of the sail, roll it up snugly, and secure it with ropeyarn stops, it is then ready for stowing away.

Q. How are studdingsails made up?

A. Rolled taut up on the outer leech, secured with ropeyarn stops, and the tally is left out.

Q. How are boat's sails made up?

A. Rolled taut up on the after-leech, secured with spunyarn stops, and the tallies left out. Avoid making boat-sails up on the head, as it stretches the sail in the heads, and spoils its set.

Q. How are awnings made up?

A. Stretched taut along the deck, both parts brought together, and rolled taut up on the ridge rope, which is fitted with stops, for securing it.

### PART III.

#### *Bending and Shifting Sails.*

Q. How do you bend a course?

A. Supposing the course to have been stowed away, furled ready for bending, with the bending strop seized in place.

The sail is brought on deck and laid athwartships under its respective yard, roping of the head next the deck.

The stay-tackle is then hooked to the bending strop, and having ascertained the sail is clear of turns (if necessary it should be swayed up and down for this purpose, and lowered again), bend the gear, hook the reef-burton blocks, either to the first or second reef-cringle, as directed, taking care it is

over the tacks and sheets, bend the leechlines and buntlines ; the head rope of the course is marked in the wake of the leechline blocks, to these marks the leechlines are stopped either with a roband or a yarn, care being taken that the leechlines are clear of each other, the inner one being stopped inside the outer one. The tack and sheet-shackle is now fitted with a ring on the shoulder, to which the clew-garnets are shackled, instead of being lashed to the clew, so in shifting courses, one shackle answers the purpose of all three.

Shackle the tackle and sheets, and lash or shackle the clew-garnets in place.

Hang the clews to the strop of the stay-tackle block.

When all is ready, man all the gear and stay-tackle, overhauling the tacks and sheets well. At the order "sway away," take down the slack of clew-garnets, and walk all the gear up together ; see if the leechlines have been stopped with care, so as to come up taut to each leechline-block ; the head of the sail will haul taut along the yard, and a few hands will be able to bring the sail to the jackstay ; when the head-earrings are secured, the robands passed, slablines bent, and the bunt-whip hooked to the bunt becket, and hauled well taut, cut the seizing of the bending strop and leechlines if stopped with yarns. Hook the reef-tackle blocks to the reef-tackle cringles, toss the sail well up, and pass the lanyards of the gaskets round the jackstay, round the clew-garnets, taut up to the quarter blocks, and steady taut the tacks and sheets. Pass the clew-hangers.

*Q.* How do you bend a course made up not furled ?

*A.* The sail is laid athwartships, under the yard to which it belongs, cast adrift on deck, and the gear bent. The leechlines and buntlines are stopped to the head of the sail. The reef-tackles are hooked to the first reef-cringles. Tacks and sheets are shackled, and the clew-garnets are lashed to the clews ; when ready, man the reef-tackles, leechlines, and buntlines, and clew-garnets, and walk all the gear up together.

As soon as the head-earrings are fast and the robands secured, shift the reef-tackles to their own cringles and bend the slablines. The sail is then ready for either setting or furling.

*Q.* How do you bend a topsail ?

*A.* Supposing the topsails to be all ready made up, furled for bending, the bending strop seized in place, they are laid

athwartships, abreast their respective yards, the roping of the head next the deck, and the sails clear of turns.

NOTE.—A double whip, kept rove at the topmast-head, will be found most useful in unbending and shifting sails, shifting topsail yards, &c. This tackle is named the centre burton.

The sail-tackle is overhauled down, and hooked to the after part of the bending strop. When the sail-tackle is worked on the main deck, a bowline, bent to the strop of the sail-tackle block, will keep the sail in going up clear of the top rim. Man the sail-tackles, and walk it up until the clews of the sail are above the top.

Bend the reef-tackles, and second reef-tackles, if fitted, buntlines and topsail-clewlines, so as to have command of the sail in case the lanyards of the gaskets should get loose, and the sail blow adrift.

NOTE.—Second reef-tackles are only bent to heavy topsails.]

As soon as the topsail is up, the captain of the top, who is in the bunt of the topsail yards, sees it is clear of turns, and secures the midship roband as quick as possible, and hooks the bunt-jigger, the reef-tackles being bent, the yard-arm men get hold of the head-earrings, and lay out with them in hand, the hands on deck clapping on the reef-tackles at the same time, which lights the sail out to the yard-arms, assisted by the men on the yard ; the outer turns of the head-earrings are passed as quickly as possible, the hands on each side of the yard facing towards the bunt, and lighting the head of the sail taut along the yard-arms ; the midship roband having been previously well secured, prevents the head of the sail being hauled more out to one yard-arm than the other ; as soon as the two outer turns of the head-earrings are passed, the four inner turns are passed, and the robands secured round the jackstay. The sheets, if chain, are either hooked with clip-hooks or shackled ; if rope, the topsail sheet block is fitted with a thimble and shackled, and the clewline-block is lashed abaft the clew. Bowlines are bent. The seizing of the bending-strop is cut as soon as the bunt-jigger is hooked, and hauled well taut. When all the gear is bent, the hands on the yards cast off the lanyards of the gaskets, which are secured to the sail, toss the sail well up, taking care to have a good skin, and pass the lanyards of the gaskets round the jackstays, always remembering to reeve the first and second reef-earrings, and tuck them into the sail. It should ever be borne in mind the longer the clews are, the easier it will be to bend the sheets and clewlines. In shifting courses and topsails for exercise, it

is a common practice to send the sails down by the buntlines, but now it is the custom to keep the bending-strop in place, and shift the sails furled, they are sent down equally as quick by the sail tackle ; it is, however, a wise precaution, in shifting heavy topsails, to use the topsail buntlines as well as the sail-tackle, as if anything happens to the sail-tackles or bending strop, the buntlines will save the sail from falling on deck.

*Q.* How is a topsail bent, made up, not furled ?

*A.* The sail-tackle is hooked to the bending-strop, in the same way as it is when being bent or shifted furled. If the sail is secured with ropeyarn stops, they are cut as the sail is swayed about the top ; if secured with gaskets, the lanyards are cast off by the men in the top. When the clews are above the top, and it is ascertained the topsail is clear of turns, and on the right slew, the head of the sail is lowered level with the yard, and the midship robands secured. The gear is bent as before explained. When the men at the yard-arms have the outer turns of the head-earring passed, and the hands on the yard have hold of the head of the sail ready for passing the robands, and the fore part of the top is clear of men, cut the seizing of the bending-strop, and let the sail fall.

*Q.* How are topgallantsails and royals bent ?

*A.* They are always bent on deck, and brought to the yard with head-earrings, and robands, the same as a topsail.

*Q.* How do you bend a jib ?

*A.* To bend a jib. Reeve the stay through all parts of the lacing, from head to tack, and then bend the reeving-line to the becket of the stay ; reeve the downhaul up through the lacing, from tack to head, and bend it with a sheet-bend to the head of the sail ; hook the halyards to the head-cringle, pass the bight of them round under the foot, and all parts of the sail, and stop the bight to its own part, bend the clew-rope, pull up on the halyards, when high enough haul out on the reeving-line and downhaul, easing the halyards as required. Pass the tack-lashing, bend the jib-pendants, cast off the clew rope, put on jib-purchase, and set the stay up ; cast off the bight of the halyards from round the jib, and hoist the sail.

*Q.* How are staysails bent ?

*A.* A fore topmast staysail is passed out on the bowsprit, the holes in the luff of the sail are usually seized to hanks on the port or lower fore topmast stay. The halyards are hooked to the head of the sail, and the downhaul is rove up from tack to head, through the three upper hanks, and bent

to the head of the sail, the tack-lashing is secured in place, and the sheets or pendants are toggled to the clew, the sail is then ready for setting or stowing.

When a fore topmast staysail is brought to the stay with a lacing, it is passed through every alternate hole only, in the luff of the sail, and round the stay, the lacing being seized to the holes it does not pass through.

Main topmast and topgallant staysails are generally bent in the foretop, they are brought to their respective stays with lacings. The topgallant staysail stay is generally marked, and the head of the sail is seized to it when the stay and halyards are in one. Halyards, downhaul, and sheets are bent in the usual way.

The storm staysails are laid abreast their respective stays, they are brought to the stays with beckets. Luff-tackles are used for sheets. Halyards, downhaul, and tack-lashings are bent and secured in the usual way.

*Q.* How are storm trysails bent?

*A.* They are brought to smaller gaffs than those used for the regular trysails, beckets being used instead of a lacing; all the other gear is bent in the usual way.

*How to Bend a Boom-Mainsail, Spanker, or Trysail.*

All gaffsails are brought to the gaff in a similar way.

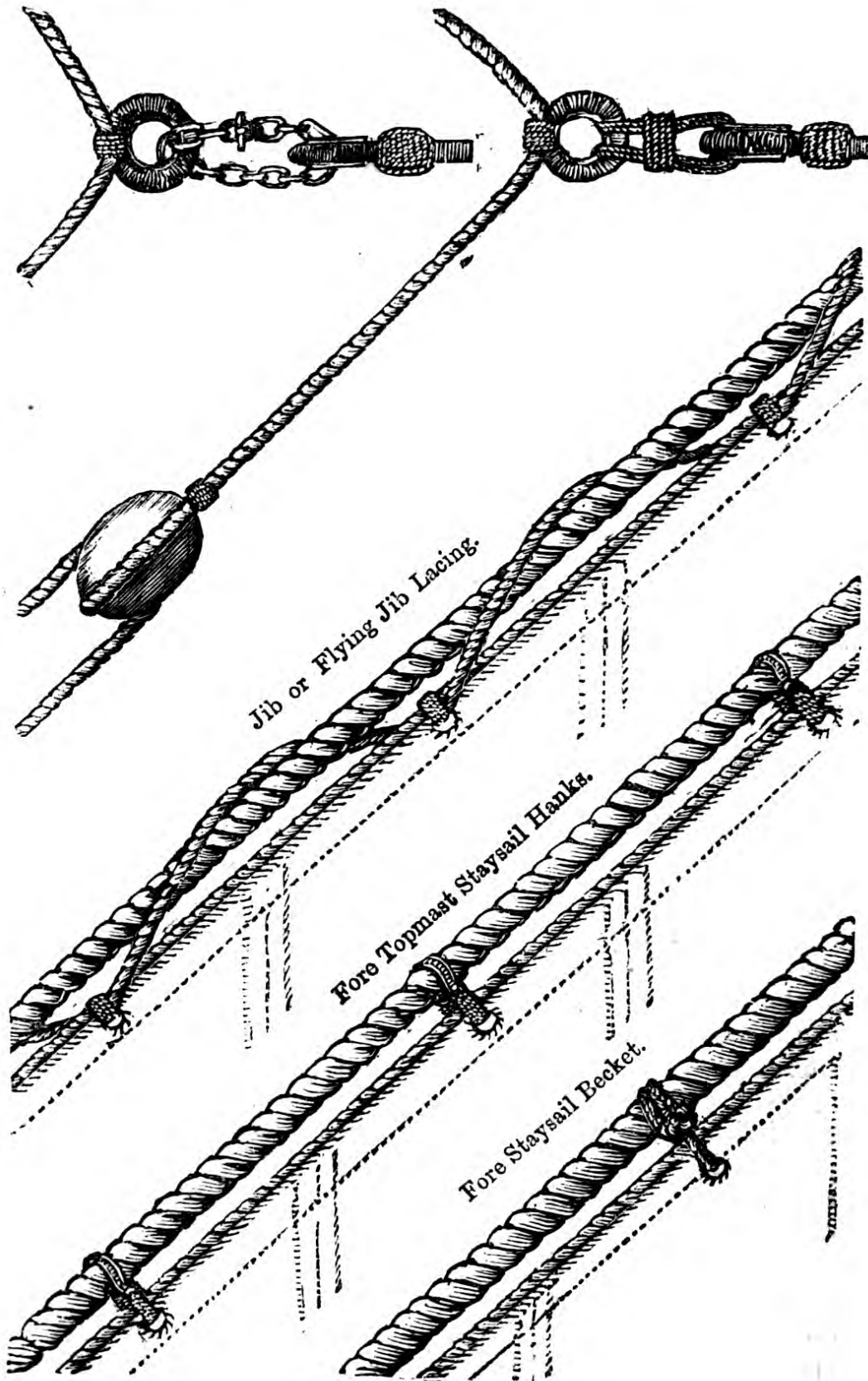
The gaff is lowered down low enough for the hands to work conveniently, and steadied in place by the vang, over to the side of the deck the sail is lying. A score is made under the gaff abaft the jaws, with an eyebolt on either side of it. The head-earring thimble or hook of the sail is placed between the two eyebolts, and a bolt passed through the three, with a head at one end, and secured with a forelock at the other. It is, however, sometimes, shackled. The head of the sail is brought to the starboard side of the gaff or the roping next the gaff, and laced in a similar way to a studdingsail, or in roundabout turns round the gaff, and through two holes in the head of the sail from the throat towards the peak. The peak-earring is secured with two outer turns, two thumb-cleats being nailed to the gaff end to keep them out in place, or a hole for the purpose bored through, and with four up and down or inner turns. If a new sail, the lacing should be passed slack, and the head on no account stretched in hauling the peak-earring out. In bending a spanker or trysail dip the head of the sail through the brails; as soon as the head is secured, sway the gaff up, seizing the



HEADSAILS.

T Chain Strop.

Jib Sheet.



hoops on above the reefs as the sail rises, splice the lacing in below the hoops, selecting a soft, greasy piece of rope for this purpose, reeving the end through the cringles before the mast, from side to side, as the sail rises.

If a boom-mainsail or spanker, bend the tack-tricing line, and if required hook the tack-tackles. If a trysail, secure the tack-lashing.

The after-clew of a boom-mainsail is secured to the boom-end by an earring, or shackled before the sail is hoisted.

The outhaul-block is hooked to the after-clew of a spanker, and steadied out in place. A piece of rope, called a lazy sheet, is spliced in the clew of a trysail, to secure it until the sheet is hooked.

*Q.* How do you bend a gaff-topsail ?

*A.* The gaff-topsail is bent to the gaff-topsail yard on deck, in a similar way that a studdingsail is to a studdingsail yard.

*Q.* How are studdingsails bent ?

*A.* There are holes in the yard-arms for hauling the earring out to ; the head of the sail is secured to the yard with hitching turns, sometimes a grommet is fitted in one of the head-earring cringles of the sail, which goes over the yard-arm, two thumb-cleats being nailed on the yard to keep the grommet from slipping in. The other earring is hauled out in the usual way. Tyers are also substituted instead of a lacing.

*Q.* How are boatsails bent ?

*A.* In a similar way to all fore and aft sails, being roped on the port side ; they are brought-to on the starboard side of the gaff or yards ; never stretch the head of a new boat-sail in bending it, as it will ruin its set for ever after.

#### *Shifting Courses Furled.*

The men on the lower yards stop the leechlines and buntlines to the head of the sail, unhook the bunt-whip, cast off the clew-hangers, the lanyards of the gaskets from the jackstays, and secure them round the sail, also the lanyards of the bunt-gaskets round the bunt, cast off the robands and inner turns of the head-earrings, keeping fast the outer turns until the order is given to "ease in ;" the earrings are then let go, and the sail is lowered by the buntlines and reef-tackles, the gear unbent and bent to the other course, as already explained in bending courses, the stay-tackle is then hooked to the bending strop, when all is again ready for swaying the sail up.

*Shifting Topsails Furled.*

In shifting topsails, as soon as the men are at their respective stations aloft, the lanyards of the bunt-gaskets are cast off from abaft the mast, and well secured round the bunt of the sail ; great care should be taken in doing this well, so as to keep the bunt together as the sail goes down ; nothing looks worse than a sail blown adrift and falling on the deck in an unshapely lump ; equal care should be taken in casting the lanyards of the other gaskets off the jackstay and securing them taut round the sail. When the sail is landed on deck it ought to be ready to stow away ; this will not be the case if care is not taken in securing all the lanyards of the gaskets taut round the sail. The clew-hangers, robands, and inner turns of the head-earrings are cast off, all the gear is unbent with the exception of the buntlines, the bights of which are hitched round each side of the bending strop. In shifting topsails for exercise, they are generally sent down by the buntlines. The outer turns of the head-earrings are let go at the order to "ease in." In sending the other topsail up, proceed as explained in bending topsails.

*To Shift a Jib.*

Stopper the jib-stays, off jib-purchase, and bend the reeving line. If the jib is set, haul the sail down, bend the clew-rope, stop the bight of the halyards round the sail, cast the tack-lashing off, unbend the jib-pendant, sway on the halyards, ease away the downhaul, and clap on the clew-rope and haul the sail in on the forecastle, easing away the reeving line at the same time, unbend the gear and unreeve the jib-stay. The sail can either be made up for stowing away or for re-bending.

## PART IV.

*Reefing and Furling Sails.*

*Q.* How do you reef a course ?

*A.* For this purpose the sails are either taken in altogether, or the clew-garnets and buntlines well raised, the reef-tackles hauled close out.

When the sail is properly laid for reefing, the hands go aloft and lay out.

The earring is passed outside the rigging, on the yard-arm, which answers the same purpose as a reef-cleat on a topsail-yard, and through the reef-cringles, from aft forward, taking as

many turns as possible, passing it through the reef-cringle each time ; as the whole strain of the tack comes on the reef-earring, sufficient number of turns should be taken to be equal to the same amount of strain as the leech-rope. The second reef is taken in in a similar way.

The second reef is seldom, if ever, taken in in the mainsail.

As soon as the earrings are secured, toggle the reef-beckets, overhaul the reef-tackles, and lay in, when the sail can be again set.

Should the sail be hauled close up, see the leechlines and slablines are overhauled sufficiently to admit of the earring being hauled out.

*Q.* How do you reef a topsail ?

*A.* If on a wind, the weather braces are rounded-in, so as to spill the sail ; if running free the yards are braced forward for the same purpose ; the topsails are then lowered on the cap, and the reef-tackle hauled out, so as to leave a slack leech for the men at the yard-arms to haul the earrings out.

In taking the third or fourth reef in, the clews of the topsails are raised, and the buntlines steadied well taut.

The yards are always laid with the braces well taut, and the reef-tackles hauled out, before the order is given to the men to lay out. The second reef-tackle, in large ships, is generally used in taking the first and second reefs in.

*Q.* In reefing topsails, after the word "lay out" is given, what ought the men on the yard to do ?

*A.* Get hold of the spilling-lines and gather up, and get hold of the reef-line as quickly as possible, the men at the yard-arms see their earring clear, and ready for passing, when the hands have hold of the reef-line, all face to leeward, and light the sail out to windward, so as to assist the man at the weather yard-arm in hauling the weather-earring out. When out to windward, all face to windward, and light the sail over to leeward, when the lee-earring is out, toggle away ; when the earrings are out, the men at the yard-arms will make a signal by holding up (the man at the starboard yard-arm his right hand, and the man at the port yard-arm his left hand) as a signal, so as to prevent any singing out, which should always be avoided, more especially aloft. At night, when the signal cannot be seen, the man at the weather yard-arm, when the weather-earring is out, will give the order "haul out to leeward," and when out to leeward, the man at the lee yard-arm will give the order "toggle away."

No other man should speak on the yard.

Q. How many turns would you take with the first reef-earring?

A. One outer, and two inner.

Q. How many turns would you take with the second reef-earring?

A. One outer, and three inner.

Q. How many turns would you take with the third reef-earring?

A. Two outer, and three inner.

Q. How many turns would you take with the fourth reef-earring?

A. As many outer turns as I could get.

Q. Explain what you mean by an outer and inner turn?

A. Outside the lift, a reef-cleat is nailed on to the yard-arm, fitted with notches or stops, over which notches the reef-earrings are passed, so as to keep the head of the sail taut out. The first reef-earring over the first notch, and the second over the second, and so on; these are the outer turns. The inner turns are passed round the yard-arm, in a similar way to a head-earring, each turn passing through the reef-cringles, the ends of the earrings are secured round the topsail-lift with a clove-hitch.

Q. What gear ought to be hauled well taut before the hands lay out on the topsails and lower yards?

A. Braces, lifts, trusses, and rolling-tackles; as the courses are never reefed but in bad weather, there is certain to be considerable motion on; therefore, for the safety of the hands going aloft, the yard should be well secured and kept as steady as possible.

Q. How are reef-pendants to a boom-mainsail fitted?

A. They have a stopper-knot fitted at one end, and the other end is pointed with a becket in it.

Q. How is the reef-tackle hooked to it?

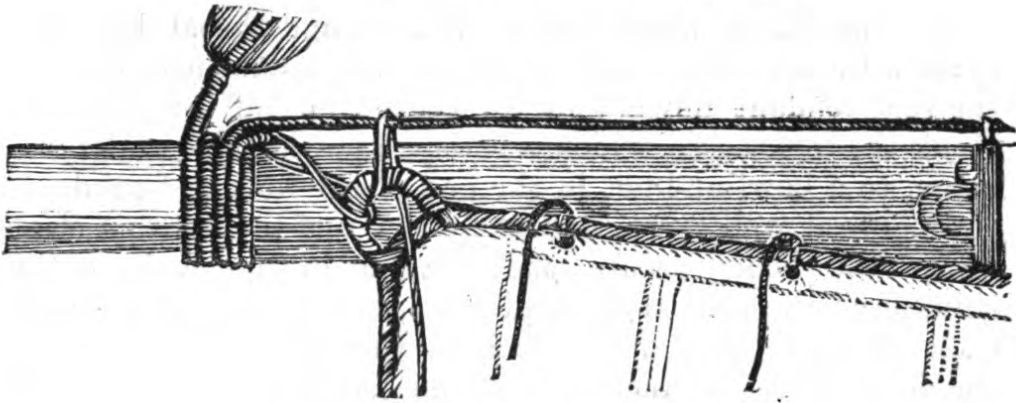
A. A bowline-knot is formed in the end of the pendant to which the reef-tackle is hooked.

Q. How is a reef-pendant rove in the sail?

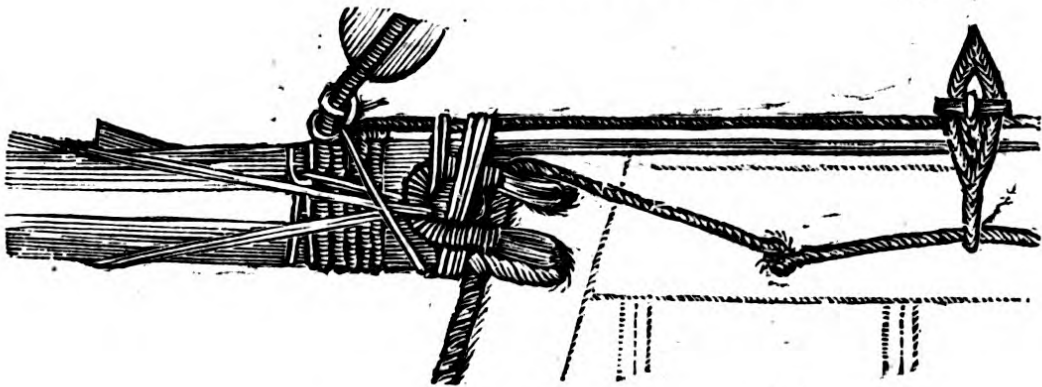
A. The pendant is rove through an eyebolt at the boom-end through the thimble of the reef-cringles to which it belongs, down through a cheek fitted with a sheave on the other side of the boom, the end brought in and stopped round the boom ready for use.

The eyebolts and cheeks for the reef-pendants on the boom-end are fitted on alternate sides, so that the pendants work clear of each other.

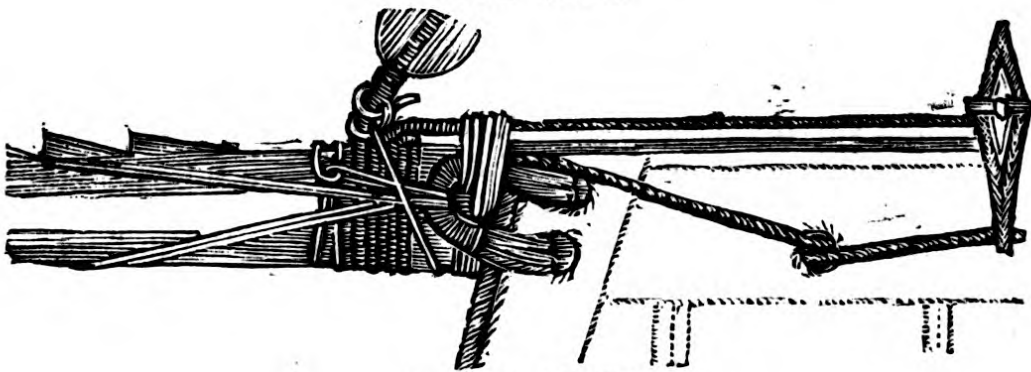
BENDING AND REEFING TOPSAILS.



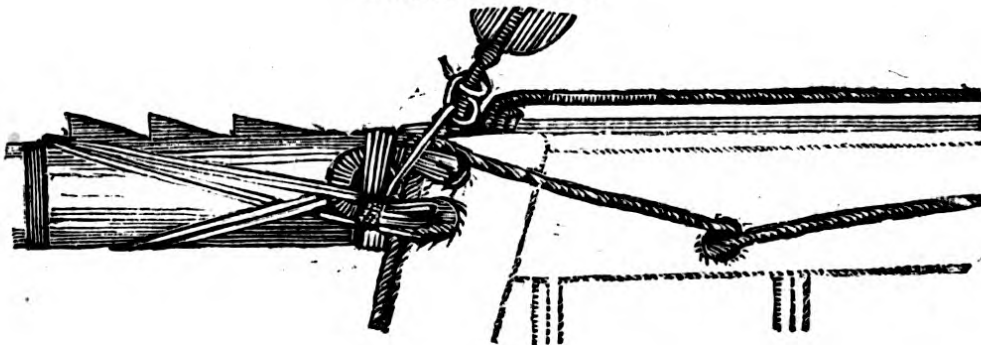
PASSING A HEAD EARRING.



FIRST REEF.



SECOND REEF.



THIRD REEF.

*Q.* How do you reef a boom-mainsail?

*A.* Haul in the sheet, lower the peak and throat halyards to slack the after-leech and luff of the sail sufficiently to haul the reef-pendant down, and to secure the luff of the sail. Hook the reef-tackle, which is always kept hooked under the boom, to a bowline-knot in the end of the first reef-pendant, and bouse it well down, and belay the reef-tackles to a cleat under the boom, secure the thimble in the tack to the thimble in the first reef-crinkle, by passing a tyer through each thimble three or four times, tie the reef-points over the foot, shift the tack-tricing line block up to the first reef-crinkle, ease the sheet and hoist the sail again.

This also applies to a cutter's mainsail, or a spanker, when the after-clew is shackled to the boom end; when the second reef is to be taken in, the first reef-pendant is stoppered and hitched round the boom, and the reef-tackle unhooked, ready to hook to the second reef-pendant.

The first and second reef-pendants are always kept rove.

*Q.* How do you reef a spanker or trysail?

*A.* Brail the sail up, easing away the outhaul for a spanker, and the sheet for a trysail, lower the throat and peak halyards to the required distance, so as to insure slack-sail enough to enable you to take the reef in; steady taut the vang, and if a spanker, the boom-sheets; if the first reef, secure the thimble in the clew, and the tack-thimble to the thimbles in the first reef-crinkle in the after-leech and luff of the sail with a tyer; a regular earring is generally fitted to the after-leech, then tie the points over the foot. Shift the outhaul, if a spanker, to the thimble in the first reef-crinkle in the after-leech, and the tack tricing-line to the first reef-thimble in the luff.

If a trysail, hook the sheet to the first reef-crinkle in the after-leech, hitch the tack-lashing to the first reef-crinkle, when complete, ease the vang, and sway the gaff up in place, ease down the brails, and haul on the outhaul or sheet.

The other reefs are taken in in a similar way.

*Q.* How do you furl a course?

*A.* When all the gear is hauled taut up, the sail is laid in the right position for furling, the leechlines bring the leeches taut along the head of the sail, and the clew-garnets carry the clews of the sail up to the bunt of the yard.

At the order "lay out," the outer hands on the yard get hold of the leech as quickly as possible, and pass it in towards the bunt, taking care to form a skin in doing so.

The hands on the quarter and bunt of the yard gather

the foot of the sail on top of the yard in the bunt, and then they work all the slack-sail in between the clews and the yard, towards the bunt on both sides, equalizing as much as possible the sail on each quarter of the yard ; by doing this the sail will be light at the yard-arms, and a good bunt will be formed ; as soon as the bunt-becket can be reached, hook the bunt-whip, and pull up on it, let go the buntlines, and foot the sail well down in the bunt skin.

All hands on the yard look towards the bunt, and give one good skin up together, pass your gaskets and clew-hangers, and lay in, and down from aloft smartly.

*Q.* How do you furl a topsail ?

*A.* As soon as the yards are lowered on the cap, the clews are hauled close up, and the buntlines carry the foot of the sail to a certain distance above the yard, for which purpose they are marked, both buntlines being kept square.

It is a general practice in the Navy to haul the second reef-earring out in furling, this is done to give sufficient skin to stow the sail in (hence the order which is usually given, "the second reef-earring in a furl").

In furling sails it is the duty of the captain of tops to be in the bunt, as everything depends how the sail is stowed there, whether it will be a slightly furl or not. A bulky, misshaped bunt to a sail, denotes a slovenly set of topmen.

As soon as the order "trice up, lay out second reef-earring and furl," is given, the men at the yard-arms should at once get hold of the second reef-earring and haul it out, bringing the second reef-crangle out square with the head-earring cringle, and the leech-rope of the second reef inside the leech-rope between the first reef-earring and head-earring ; it is not supposed to be secured, only steadied taut and kept in place by hand, or by the man at the yard-arm putting his foot on it, the second reef-crangle is gathered in towards the bunt ; when the second reef-earring is stowed inside the skin thus formed, care should always be taken that this is really done, for some hands, with a mistaken idea of smartness, neglect hauling the earring out at all, but commence to pass the leech in at once, the consequence is, all the sail is gathered into the bunt, the buntlines are let go, the foot of the sail comes down on the already over-filled bunt ; the bunt jigger for a topsail, and the bunt-whip for a course is hauled on, and the men in the bunt of the yard endeavour to foot the sail in the skin without success, in all probability, during this time the officer carrying on is hurrying them, the consequence is,



the bunt-gaskets are passed, and the boom lowered on a badly furled sail, which, in nine cases out of ten, ends in extra drill ; whereas, if the second reef-earring had really been hauled out, and the leech of the sail passed in from the second reef, it would equalize the sail and give ample room for properly stowing the bunt ; therefore, it should be borne in mind by young beginners, that the cause of badly-furled topsails commences at the yard-arm, and is generally the cause of a badly-formed bunt.

As soon as the second reef-earrings are out, the man next the yard-arm man should get hold of the leech of the sail under the second reef-earring, and hand it in towards the bunt, then commence to gather all the slack sail into the skin, formed by the second reef, the hands in towards the bunt gathering the foot and all the slack sail up in their hands, in between the clews and the yard towards the bunt on both sides, making it as light as possible at the yard-arms ; when all the slack sail has been gathered in, and the bunt-jigger is hooked, pull up on the bunt-jigger, and lower the buntlines, footing the sail well into the bunt as it comes down, and taking care there is an equal quantity of sail on each quarter. All hands look towards the bunt, and give one good final heave up together ; as soon as the sail is fairly in the skin, pass the gaskets and clew-hangers, and lay in as quickly as possible ; no hand should linger on the yard after his work is done.

*Q.* How do you furl a topgallantsail or royal ?

*A.* At the order "lay out," get hold of the leeches and hand them taut in from the yard-arms, gather the foot of the sail on top of the yard, in the bunt, working all the slack sail in between the clews and the yards, shake the sail down into the skin, equalize the bunt, having as much sail on one quarter as on the other, then skin the sail well up, and pass the gaskets.

*Q.* How is a jib stowed at sea ?

*A.* The hands on the jib-boom get hold of the foot of the sail and lay it taut along the jib-boom to form a skin, keeping it under their breast, they then gather up all the slack sail into the skin thus formed, and pass the stops.

A footline should be fitted to all jibs in large ships, to assist the men on the boom to get the foot of the sail taut along, and keep it in place : it is most useful in bad weather.

*Q.* How is a jib furled in harbour ?

*A.* The second or third cloth from the after-leech is taken

for a skin, according to the size of the jib, for this purpose ; the seam of the cloth, be it the second or third, whichever is to be your skin, is stopped to the jibstay above the lacing, and brought taut in along the jib-boom ; if it is the third cloth, the first and second will hang down between the furlers and the jib-boom ; all the slack sail is then picked up, and laid under the third cloth, the first or second on one side, and the fourth and fifth on the others, are then tucked under the slack sail, thus the third cloth forms a complete cover for the sail ; the gaskets are then passed.

*Q.* How do you furl a boom-mainsail ?

*A.* After the boom is crutched, lower the gaff down, so as when the hands stand on the boom they will be able to reach over the gaff to pick the sail up, the boom acting as a foot-rope.

Steady the gaff taut by the vang, and a rope's-end round it as well.

#### *Man the Boom.*

First the hands will get hold of the slack sail, about 4 ft. from the head, the same side of the gaff as they are standing, and lay it on top of the gaff under their breast, so as to keep it in place for a skin, then pass the after-leech taut in towards the jaws, leaving little or no sail at the peak. Gather up all the slack sail from the foot, then lean well over the gaff and get hold of the slack sail kept for the skin, shake the sail well down in the skin thus formed, toss it well up together so as to have no wrinkles in the skin, and pass the gaskets.

*Q.* How do you furl a spanker or trysail ?

*A.* Haul the lee-brails close up, or if laying head to wind, haul the starboard or port-brails up as convenient, steady through the slack of the other, form a skin with the after-cloth, gather all the slack sail in, pass the gaskets ; when furled this way they are fitted with covers.

*Q.* How do you furl a trysail with the gaff lowered down ?

*A.* When the gaff is lowered down, steady it well taut with the vang, and, if necessary, by passing a rope's-end round it. Make a rope fast to the peak and jaws, to act as a foot-rope ; where a gaff-topsail is fitted, the gaff-topsail sheet will answer this purpose.

Take the clew up to the jaws, gathering the after-leech along the head of the sail, then gather all the slack sail up from the foot, forming a skin, with the sail near the head, when skinned well up, pass the gaskets, and cover the sail.

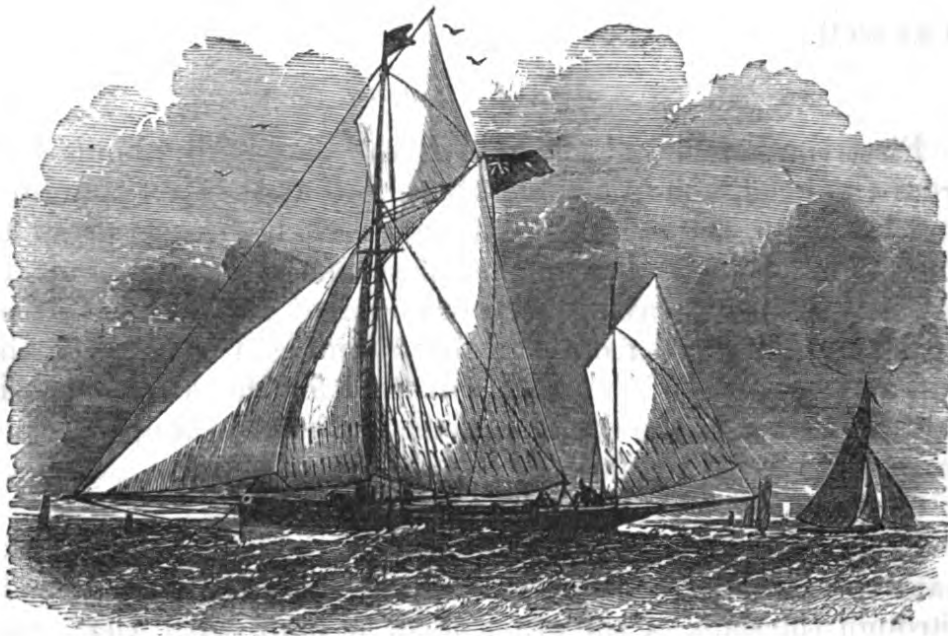
When a spanker or trysail is fitted with covers, they are secured by one long gasket being passed with roundabout turns round the sail and gaff.

*Q.* How do you furl a gaff-topsail ?

*A.* Bring the sheet and tack in square with the head, roll it up taut, so as to form a good skin. It is generally secured with centipede gaskets round the yard ; in a cutter it is usually fitted with a cover, and stowed on the main boom.

*Q.* How do you furl a studdingsail ?

*A.* Studdingsails are furled square on their heads, tack sheet and downhaul cringles being left out, the sail being secured with centipede gaskets.



YAWL.

## BOAT EXERCISE.

### PART I.

*Q.* You have been taught to pull an oar, and you are now stationed in a boat. What is the first thing you would attend to on your boat being ordered to be manned alongside ?

*A.* Take my place on the thwart I am stationed on, and see I have the right oar corresponding to the number of my

thwart, put the fender next me out, and see my oar ready for tossing.

*Q.* What precaution is necessary in manning a boat at sea, or when a ship is rolling much?

*A.* Not to toss the oars, or ship the mast until clear of the ship, for fear they should catch under the ports, or any other part of the ship's side, and go through the bottom of the boat.

*Q.* What is to be done at the order "shove off"?

*A.* In fenders, the off bowmen haul in, and coil the painter down if out, the bowmen nearest the ship or landing-place bear the boat off.

*Q.* What precaution would you take at the word "down oars?"

*A.* Ease the oar down by the hand nearest the gunwale.

*Q.* What is to be done at the word "bow"?

*A.* The men pulling on the foremost thwart to give one stroke after the word bow, if a double-banked boat, look at each other, lift the hand nearest the gunwale as a signal to toss together, toss their oars, and boat them, take up their boat-hooks and stand firmly on the head-sheets, the man nearest the ship or shore to fend the boat off, the outer man to hook on, all fenders to be put out.

*Q.* What is to be done at the order "way enough"?

*A.* Give one stroke after the order, lift the hand nearest the gunwale, as a signal, toss the oars together, always waiting for the order to boat them; when it is necessary, the short boat-hook will be used by the man sitting on the after-thwart nearest the ship or landing place, who will boat his oar for that purpose.

*Q.* When the boat you belong to is ordered to be lowered, what are the necessary things you should attend to?

*A.* See the plug in, rudder shipped, oars and boat-hooks properly secured, the falls clear for running, and a proper turn taken for lowering, life-lines clear, and the lanyards of the gripes gone.

*Q.* What is a boat's fall?

*A.* A tackle by which a boat is hoisted up to the davits.

*Q.* You say you would see the life-lines clear, and lanyards of gripes gone; explain what they are, and their use?

*A.* Gripes are made of sword matting, made fast to the davit-heads, usually crossed outside the boat, and passed under her, and secured by lanyards in-board, to keep the boat steady when at sea, or when the ship is rolling; life-lines are also secured to the davit-heads, and are used for steadying the boat

when being hoisted, also to keep her from sending fore and aft, which is done by crossing the life-lines ; that is, the man in the stern taking the foremost, and the man in the bow taking the after life-line ; when the boat is high enough to take a turn with the falls, the bight of the life-lines is rove through the slings, and over the davit-heads, then two or three round turns round all parts.

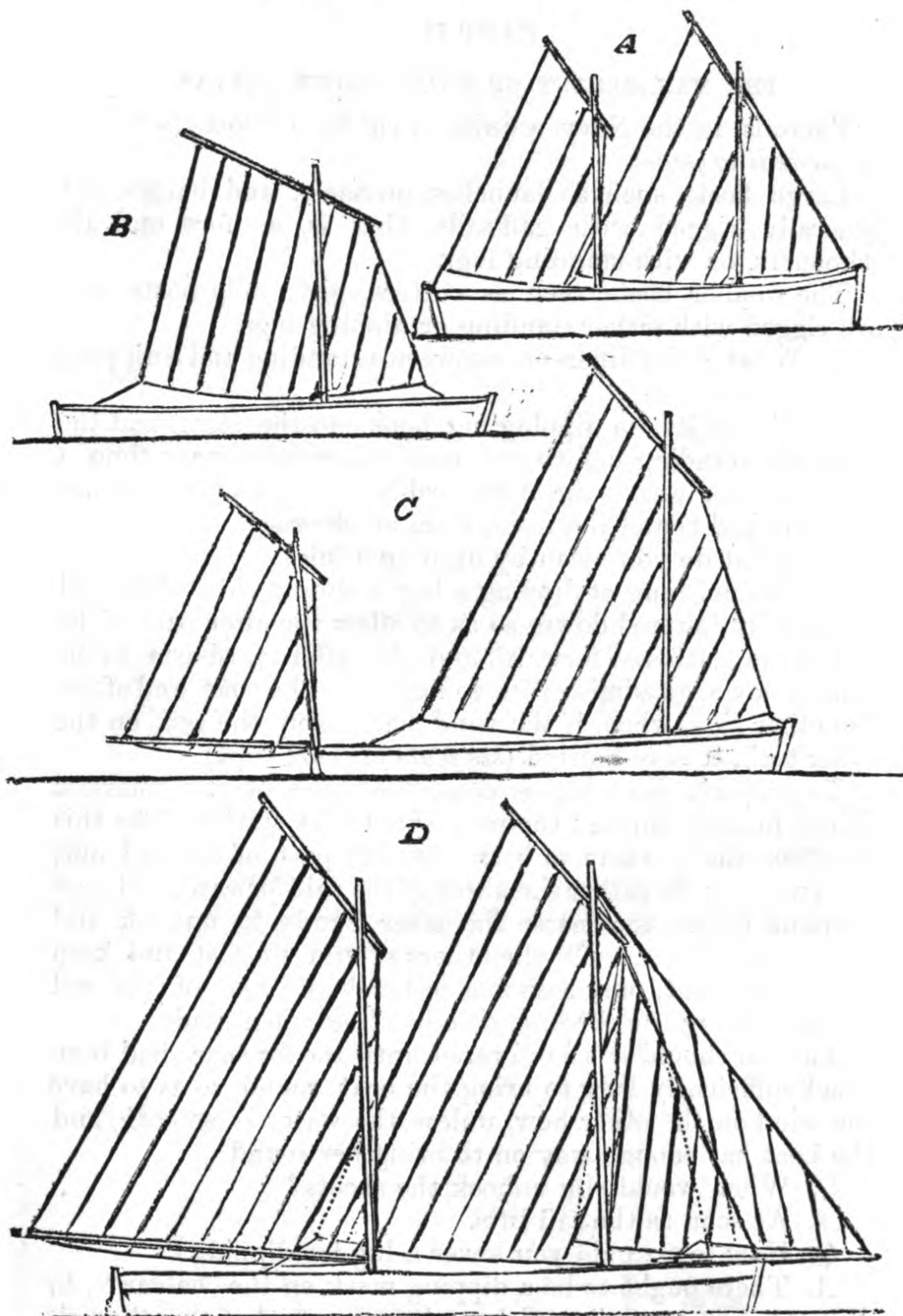
*Q.* What is to be done when a boat is ordered to be hoisted up ?

*A.* The coxswain and one of the bowmen generally go into the boat, hook the slings in their proper places, haul taut the steadying lines, and make them fast, see that the oars and boat-hooks are properly secured, and before hooking on the boat's tackles, look over their heads to see they are clear of turns ; the foremost tackle should always be hooked first when a ship is lying in tide way, or moving ahead at sea, the danger of the after tackle being hooked first, and the boat having no boat-rope in from forward is, she may swing broadside to the tide, and cause some accident ; when the order is given to "haul taut and hoist away," the men in the boat should take hold of the life-lines, and light themselves up, taking their weight off the boat until high enough ; the man tending the foremost tackle should stand before, and the man tending the after-tackles abaft the boat's-tackles. When the boat's-tackles are belayed, it is the coxswain's duty, or the man tending the after-tackle, to see the plug out, so as to prevent the boat holding water in the event of rain ; life-lines, if not required, to be properly coiled down in the boat, rudder unshipped, rowlock plates shipped, fenders in, gripes properly passed and secured, and the falls clear for lowering ; the bowmen, after assisting in those things, if at sea, will see a boat-rope passed forward ready for lowering.

*Q.* What is a steadying line, and its use ?

*A.* Slings are hooked to the bottom of a boat, steadying lines are secured to the boat's gunwale, from a hook in the upper part of the slings, so as to prevent a boat capsizing when a strain is brought on the tackles ; boat's tackles should always be fitted with a thimble (instead of a hook) to take the hook in the slings ; hooks in boat-tackles are very dangerous when a ship is rolling much, as if not rounded up out of the way smartly they may catch some part of the boat, or even hook a man out of the boat, and cause some serious accident.

*Rig of Boats used in the Navy.*



A. 28-foot Cutter Life-Boat, Standing Lug, Fine Weather Rig.  
B. 28-foot Gig, Dipping Lug. C. 30-ft. Cutter, Dipping Lug.  
D. 42-ft. Launch, Standing Lug. SCALE  $\frac{1}{4}$ -inch to a foot.

## PART II.

## THE MANAGEMENT OF BOATS UNDER CANVAS.

There is, in the Navy, a uniform rig for all boats (*see plate on preceding page*).

Large boats, such as launches, pinnaces, and barges, are generally rigged with gaff-sails, that is, as fore and aft schooners, or with standing lugs.

The smaller boats, such as cutters, gigs, jolly-boats, &c., are rigged with either standing or dipping lugs.

*Q.* What is the difference between a standing and a dipping lug?

*A.* The tack of a dipping lug hooks to the stem, and the tack of a standing lug to the mast, therefore every time a boat tacks or wears, the after yard-arm of a dipping lug has to be dipped round the mast, from aft forward.

*Q.* What do you mean by dipping a lug?

*A.* The meaning of dipping a lug is simply this. The sail is partially lowered down, so as to allow the after part of the sail to be gathered forward, and the after yard-arm to be canted down, to admit of its going before the mast, and aft on the other side, when, if the wind has taken the sail on the other tack, it is re-hoisted (*see plate on next page*).

To properly dip a lug is considered one of the smartest things in boat sailing: the men should be stationed for this purpose, the bowman to bear the fore part of the sail out, the two next to gather the sheet of the sail forward, and pass it round before the mast, the after hands to unhook and rehook the sheets. All the others should sit fast and keep still in the boat, only assisting to hand the foot of the sail along, shifting the sheet, and re-hoisting when ready.

The sail should not be lowered until the fore part had been aback sufficiently long to bring the boat round, so as to have the wind on the other bow, unless the water is smooth, and the boat has enough way on to bring her round.

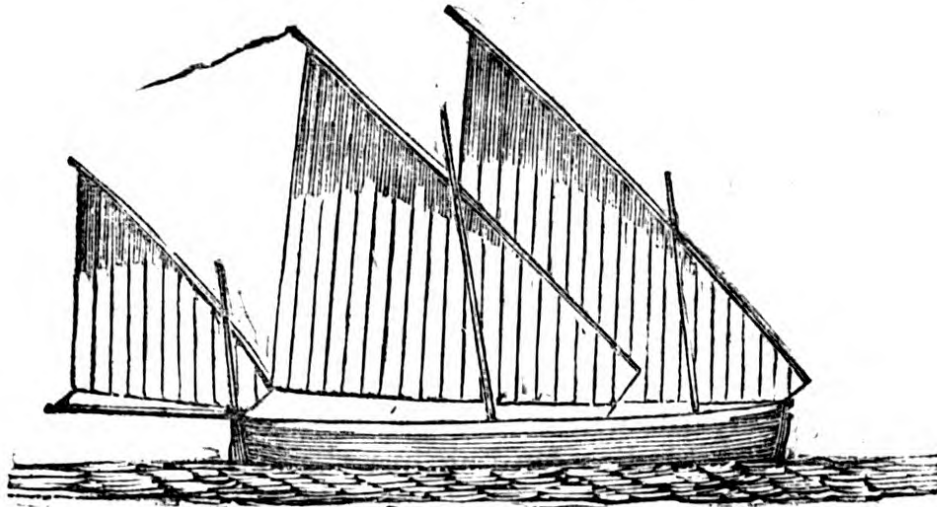
*Q.* When would you unhook the sheets?

*A.* As soon as the sail lifts.

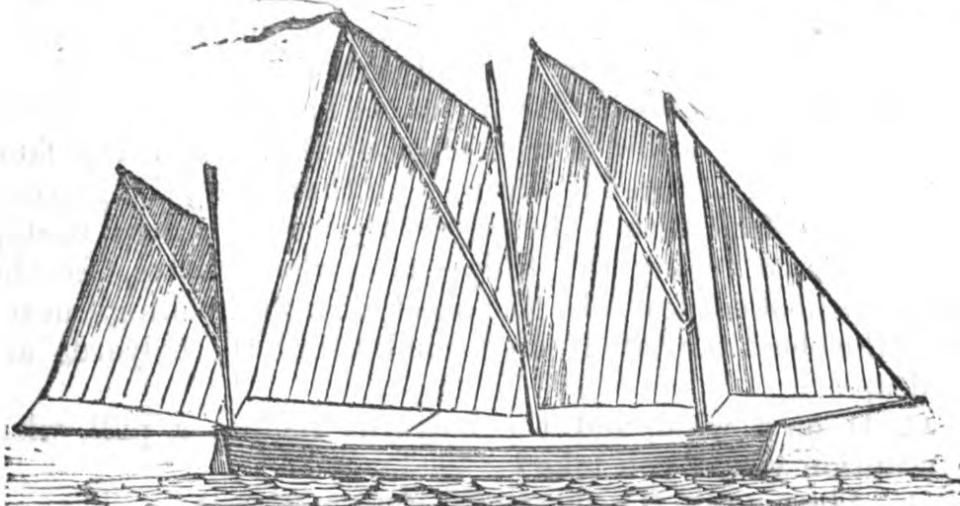
*Q.* How low would you lower a lug for dipping?

*A.* There ought to be a dipping mark on the halyards, to prevent the necessity of lowering the yard more than is necessary for dipping the after yard-arm round the mast, and also to keep the sail high enough, so as to have sufficient of the sail aback before the mast to carry the boat round and insure as little slack sail as possible on top of the men sitting

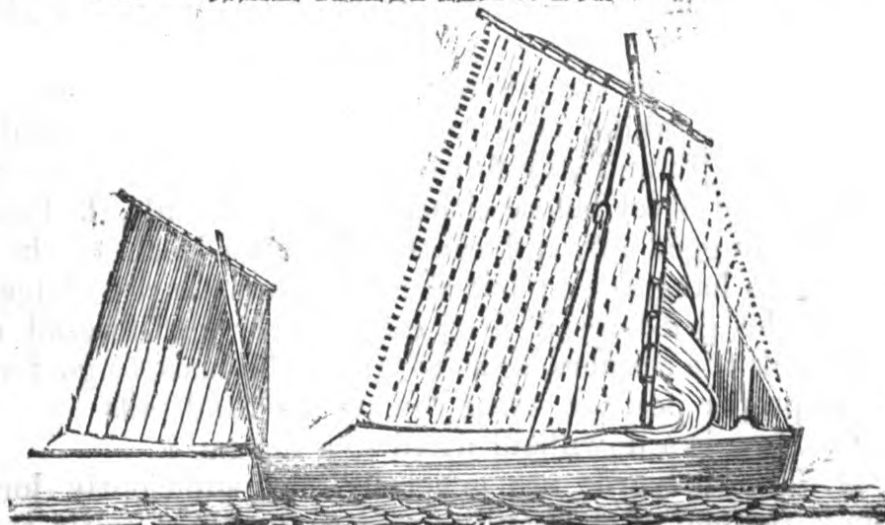
*Different Rig of Boats.*



**SETTEE**



**THREE SPRITS AND A JIB**



**DIPPING A LUG**



on the foremost thwarts; if in a cutter, one of the men stationed on the after-thwart should keep the mizen-sheet in hand, so as to ease off, in case the boat comes-to in re-hoisting the sail.

*Q.* Where would you belay the halyards of a lug-sail?

*A.* Always to windward.

*Q.* How do you dip a lug in wearing?

*A.* Just before the wind is right aft lower your sail to the dipping mark, gather it forward, dip the after yard-arm round before the mast. Shift the hauling part of your halyards to windward, and as soon as the wind is on the other quarter re-hoist your sail; never, if possible, allow a boat to gybe in a fresh breeze, as it will be very difficult to lower the sail down, the halyards will be between the mast and the sail, and the sail will be binding hard against the mast.

*Q.* What precautions would you take before making sail?

*A.* Before stepping the mast, see the halyards are rove, and that nothing will be required aloft, and when once the mast is stepped, see the ends of the halyards are within reach, so there will be no necessity for any of the hands to stand on the thwarts; never allow a man to go up the mast, many fatal accidents have occurred in this way; if there is anything wrong at the mast-head, such as the halyards becoming unrove, unstep the mast and rectify it. Ship the rowlock plates, see the halyards hooked clear, also the sheet clear for hooking; never haul the sheet taut aft if on a wind before the halyards are well up.

*Q.* If on a wind, and the halyards require a pull, what precaution would you take?

*A.* Always ease the sheet off before getting it.

*Q.* How would you make sail in a boat rigged with gaff sails?

*A.* Always set the jib or stay-foresail before setting the gaff-foresail, taking care to steady the runners hand taut first. The jib and stay-foresail act as a forestay, and if the gaff-foresail is set before either of the head sails, the foremost head is dragged aft, and causes the after-leech of the gaff-foresail to hang slack; but should circumstances oblige you to set the gaff-foresail first, ease off the gaff-foresail sheet, and slack the runners, so as to allow the mast to go forward in its proper position when you set the head sails.

*Q.* How is a downhaul fitted to a lug sail?

*A.* The halyards are generally cut sufficiently long to admit the end of the hauling part to be fitted with an eye, and hooked to the traveller before hoisting the sail.

Q. How do you take a lug sail in ?

A. Check the sheet, haul down on the downhaul, and the luff of the sail at the same time, so as to spill the sail ; never gather down on the after-leech, as it causes the fore part of the sail to fill, and binds the traveller to the mast, so as to prevent its running down freely.

Q. What is to be observed in taking a reef in a boat-sail ?

A. Never roll the foot of a sail, as it holds more water, and tends to force the boat to leeward.

Q. What ought the crew to do in the event of a boat being capsized or swamped ?

A. As a rule, everyone should remain by her, as she will assist those that cannot swim to keep afloat, and those that can swim will, with the help of the boat, be able also to render valuable assistance, and insure confidence to the former.

Q. When ought you to reef in a boat ?

A. Directly she begins to wet, or show any inclination of being crank ; never allow the boat's crew to stand up ; when reefing, the men should be properly stationed before you begin, so each man might know what he has to do without confusion ; the hands not engaged in reefing should be made to sit perfectly still ; keep the boat under command, but the sails should be lifting, the halyards checked, and the sail lowered sufficiently for the men to handle without rising in the boat.

Q. What precaution would you take in belaying a sheet ?

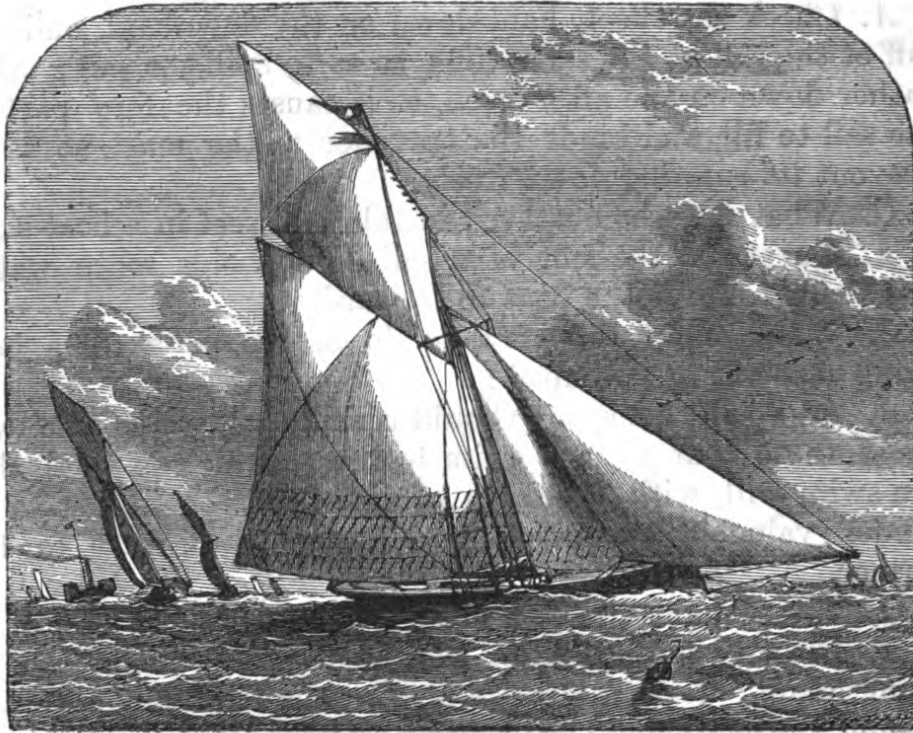
A. A sheet should never be belayed, but always kept in hand ; as the safety of the boat's crew might depend upon this, a careful, trustworthy hand should always be selected for this duty.

Q. When laying on your oars under sail, what precaution would you take ?

A. Heave them out of their rowlocks, and let them rest abaft on the gunwale.

Q. Where would you bend the halyards of a standing and dipping lug ?

A. The proper distance to sling a dipping lug is one-third from the foremost yard-arm, and a standing lug one-quarter, so as to insure your sail to set well.



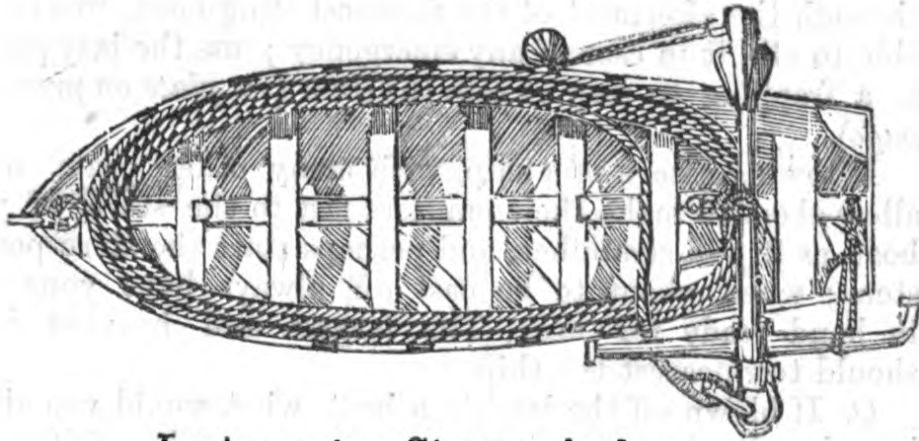
A CUTTER ON A WIND.

## PART III.

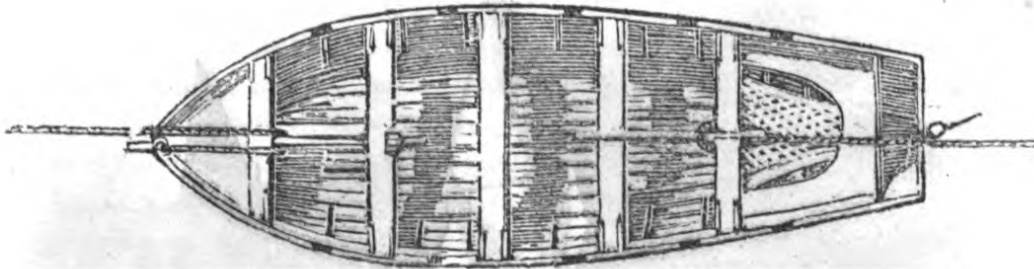
*Q.* If sailing in a stiff breeze, what precaution would you take in placing your crew ?

*A.* All hands should sit on the bottom boards, as little of them as possible ought to appear above the gunwale ; keep the men out of the bows, and in a heavy sea always endeavour to keep a boat's head on to it. Never allow the crew to sit to windward, and should they be sitting to windward in a breeze, and you are about to pass a ship, make them resume their proper places on the thwarts before you are under her lee ; there is always an eddy wind under the stern of a ship lying head to wind, and invariably a great indraught of water ; frequently, boats passing close under the stern of large ships are suddenly taken aback, and were the crew in such a case sitting on the weather gunwale, or all hands over the weather side, it might be the means of capsizing the boat, and causing some fatal accident.

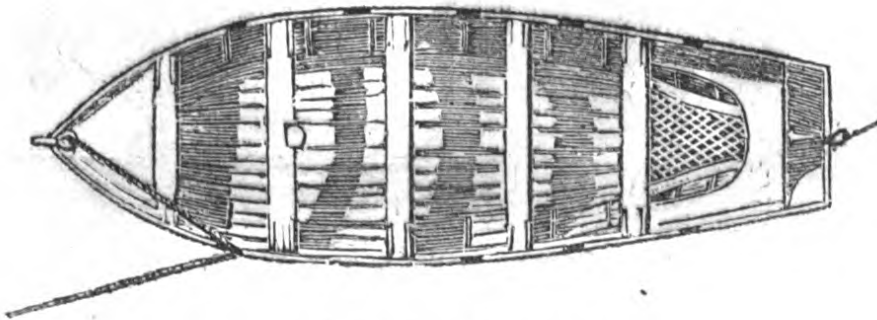
In towing alongside a ship, get your tow-line from as far forward as possible from the ship you are towing alongside ; if towing astern, the shorter your tow-line is the better. Never make a tow-line fast, but toggle it with a stretcher



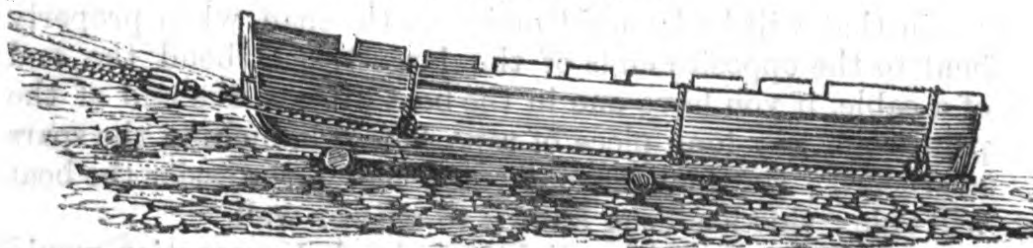
*Laying out a Stream Anchor.*



*Towing.*



*Towing Alongside.*

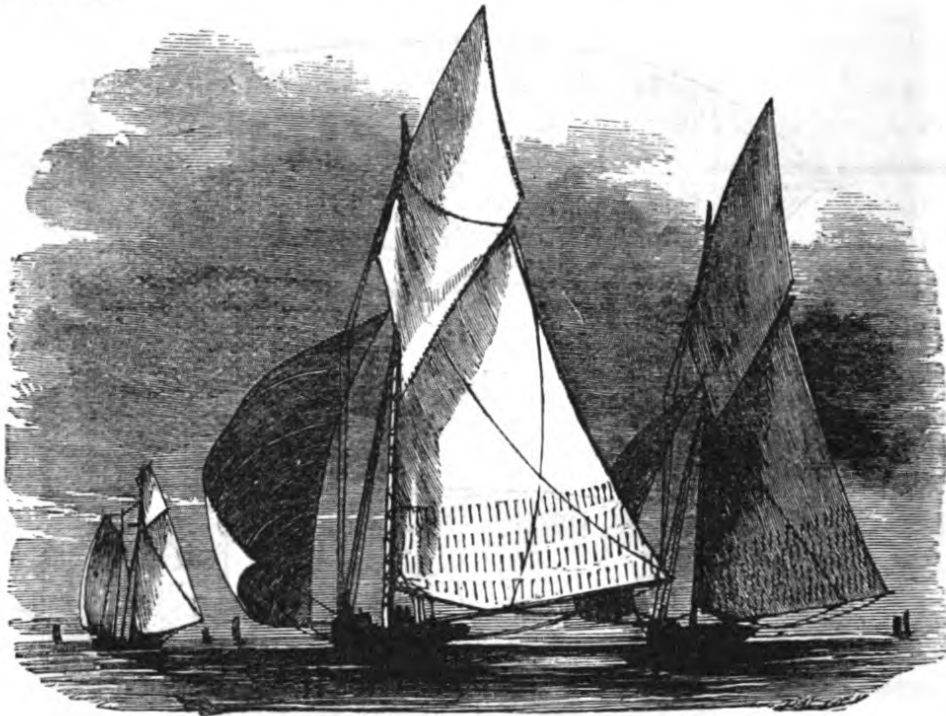


*Hauling a Boat up on a Beach.*

through the aftermost of the foremost sling-bolts, so as to be able to slip it in case of any emergency ; use the lazy painter as a frapping to frap it into the stem (*see plate on preceding page*).

If towing astern of a ship, with many other boats, never allow them to make their painters fast to the stern of your boat, as it will strain her, and perhaps start the stern-post or stem ; when about to be cast off, always have your oars in hand ready for use. The largest and heaviest boats should tow nearest the ship.

*Q.* If blown off the land in a boat, what would you do to keep her head on to the sea, and prevent her drifting to leeward ?



CUTTER BEFORE THE WIND.

*A.* Securely lash all her spars, oars, &c., together. Make a span of any rope you have in the boat equal to the strain that will be brought on it ; to the span, when properly bent to the opposite ends of the largest spar, bend the end of a cable, if you have one in the boat ; if not, the end of the painter, or any long piece of rope, before launching the spars overboard ; the longer scope you can give, the easier the boat will ride ; this has been known to answer well.

*Q.* If using oars in a light wind, what precaution would you take when the breeze freshens ?

*A.* In using oars under sail, in light winds, always boat

them directly the breeze freshens, or at least, the lee oars, to prevent the possibility of catching a crab, that is, the oars becoming entangled in the water, the blades going in the opposite direction to which you wish, the loom flying forward against the hands using the oars, and in five cases out of six capsizing them backwards off the thwarts in the bottom of the boat, causing confusion among the other hands, and is often the means of three or four others on the lee side catching crabs, which ends either in splitting and carrying away the lee gunwale, or in capsizing the boat.

*Q.* If sailing on a wind, and caught in a squall with a lug-sail, what would you do ?

*A.* Let go the fore sheet at once, and put the helm down ; and as the wind often shifts in a squall, it is a safe precaution to lower the foresail down until you see the extent of the squall, and whether the wind is likely to remain steady ; if taken aback, the sail would so bind against the mast that there would be great difficulty in getting it down, it would most likely cause the boat to gather stern way, and if blowing fresh, would create such confusion among the crew, which might perhaps induce them to stand up in the boat, and in all probability capsize her. Many accidents have occurred this way, causing the loss of many valuable lives ; also through not shortening sail in time. This also applies to a boat schooner-rigged.

*Q.* If sailing with the wind abeam, and caught in a squall, what would you do ?

*A.* Keep the sheet flowing, and the halyards clear for running.

*Q.* When about to sail, what ought you strictly to observe ?

*A.* Great care should always be taken in seeing a boat's sails well and properly set, so as to render her manageable ; also sightly to other ships.

A great deal is done in handling a boat, in having the sails properly trimmed, and the crew or any weight on the boat judiciously placed ; all weight, as much as possible, should be kept out of the bows and stern, and placed amidships ; you can easily tell by the helm if a boat is in trim or not.

When in trim, she will carry her helm nearly amidships ; by being obliged to give much weather or lee helm, the rudder is dragged across her stern, and the boat's way is retarded.

Weather helm is often produced by allowing the bowman to sit right forward, and press the boat by the head, also by carrying a press of sail; attention to the jib or mizen sheets, in a boat where the sails are well set, will invariably relieve the helm.

*Q.* If working to windward among shipping, or into an harbour, and in doubt as to whether you will weather any particular object, what ought you to do?

*A.* It is always safer to tack, as invariably there will be some tide running, and if a lee tide, and you shake the boat up, she loses her way, becomes unmanageable, the consequence is, you foul the danger you have tried to avoid, and will cause, in all probability, some damage to your boat; should the masthead foul the bowsprit or spanker-boom of the ship you are trying to weather, she is nearly certain to capsize, and most likely drown some of your crew.

*Q.* Being unable to fetch a ship, what assistance can she render you?

*A.* If it is blowing hard, or in a strong tide way, keep as much as possible in her wake, so as to pick up a buoy or small boat when veered astern from the ship for your assistance, a deep-sea lead-line or small hawser is generally used for this purpose; as soon as you have picked it up and secured it to your boat, she is walked up alongside by all hands on board the ship clapping on the line veered astern.

*Q.* How would you tow a spar?

*A.* The smallest end first.

*Q.* What preparation would you make if in charge of a boat under sail, before going alongside a ship, and what guide have you for properly laying your boat alongside the gangway?

*A.* Much depends upon the judgment of the coxswain in going alongside a ship; the general rule, however, is to get the main-yard end on, but this must greatly depend upon whether the ship is in a tide way or not, or whether the boat is light or heavily laden. In coming alongside, unship the bowsprit, see the boat has been properly baled out, fenders out, slings, if possible, should be hooked, and everything ready for the boat to be hoisted up if you know she is not to remain down, and always remember that a heavily laden boat carries her way much longer than a light boat.

*Q.* How would you haul a boat up on a beach, or launch one?

*A.* All boats ought to be fitted with a hole in the fore foot, about 1 in. in diameter, for the purpose of placing an iron

bolt or a strop to hook a tackle to, or bend a rope's-end, for the purpose of hauling her up.

Before leaving the ship to haul a boat up on a beach to scrub her bottom, or for any other purpose, see a boat's anchor and a luff-tackle in the boat, place her thwarts or stretchers under her keel, bury her anchor in the beach well up, bend a rope's-end to the ring of it, and make a long strop, so as to allow sufficient drift to hook the tackle to a strop round the iron bolt in the hole in the fore foot of the boat, or to a strop rove through it; hook the single block of the luff to the strop secured to the ring of the anchor, and the double block to the strop in the fore foot of the boat, man the tackle, leaving sufficient number of hands each side of the boat to keep her in an upright position, and walk her up (*see plate, page 147*).

To prevent the anchor coming home or rising, place a stretcher or an oar under the upper arm or flue, and station a couple of hands to keep it down. This also applies to launching a boat which has been left high and dry by the tide.

Never attempt to haul a boat up, or launch one, by clapping a number of hands on her painter, as it only tends to bury her bow in the sand or mud, and you stand a chance of starting her stem.

If not fitted with a hole in the fore foot, make a rope fast round her stern, well down to the keel, and hitch it round the bow, and hang it by a rope's-end over the boat to keep it from falling under the keel, to which hook your tackle, or bend a rope's-end to it, and clap all hands on it, leaving a sufficient number of hands each side of the boat to keep her in an upright position.

*Q.* What are the salutes to be paid to Officers of different ranks in passing them in boats?

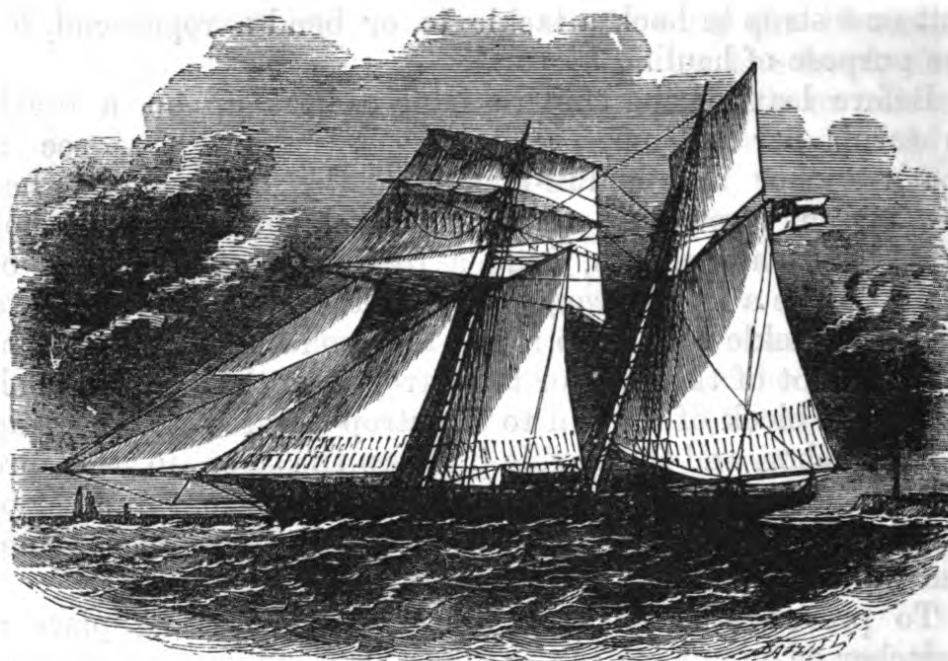
*A.* If under canvas, never cross the bow of a superior officer, and if near, always pass to leeward of him. The coxswain should always stand up and pull his hat off. Passing an Admiral, all the boat's crew should stand up and keep their hats off while passing.

In rowing and passing an Admiral, toss the oars, and all hands stand up with their hats off while passing.

In passing a Captain or a Commander, toss the oars, the coxswain standing up with his hat off.

In passing any other Commissioned Officer, lay on your oars, the coxswain standing up with his hat off.





TOPSAIL SCHOONER YACHT.

## THINGS TO BE OBSERVED.

Never put the helm down suddenly. When about to tack always ease it down; putting the rudder right across the stern deadens a boat's way; about three-quarters down will be found quite sufficient for any purpose.

Never go away in a boat without your shoes, as it will give your ship a slovenly name, as also smoking in a boat, lounging on the gunwale, hailing a ship or boat in passing, or the shore. **STRICT SILENCE** should always be observed, for the credit of the ship you belong to.

Never leave a boat without leave, and never sit on the gunwale.

If a boat has stern way, put the helm the opposite way you wish her head to go, as it has the opposite effect to what it has in head way.

If sent to another ship on duty in charge of the boat, deliver your message, and return to your boat immediately. If required to remain alongside in a tide way, make fast to the swinging boom, unless ordered to lay off on your oars.

Always clearly understand a message you are to convey, also the answer given, before leaving the respective ships.

If under sail, and meeting another boat on opposite tacks, the boat on the port tack gives way to the boat on the starboard tack; that is, she passes to leeward of her; boats going free, or running before the wind, give way to boats on a wind.

If sent to convey stores or luggage keep the weights as much amidships as possible ; above all things see the well clear, ready to bale the boat out if required.

Before going alongside of a ship under weigh or hove to, observe if she has head or stern way.

Never overload a boat, more particularly with men or sand ; the former may be attended with loss of life, and it should always be remembered that sand is much lighter when dry than when wet.

A boat fast to the swinging boom, or astern, may be kept clear of the ship by making a wash deck bucket fast over-board to her stern.

If going up a river, where a bridge is too low to admit of your passing under, or any weight that cannot be moved, and it only requires a foot or some inches for the gunwale of the boat to clear, take the plug out, and sink her to the required distance.

If in charge of a boat under sail, get your oars out directly the wind falls light ; nothing denotes laziness so much as to see a boat drifting about under canvas waiting for a breeze.

Always learn your boat's recall, which in well-regulated ships is painted on a board ; also the general recall, secured in a safe place in the boat, sometimes on the back-board.

If ordered to lay a warp out, coil enough of it forward in the boat to take two round turns and two half-hitches the instant your boat gets to the buoy or ship you are going to secure to.

If you are going to lay a warp to windward, or against a tide, coil the whole of the warp in the boat, pull to the place you are ordered to, make it fast, and drop down on the ship, paying out as the boat goes ; this is called making a guess warp of it, as you have to well judge your distance to your ship, and in many cases, when you have paid the warp out too quickly you are unable to reach the ship, and another boat is obliged to bring a line to your assistance, which denotes a lubberly way of performing the duty intrusted to you.

It should ever be borne in mind by young and inexperienced seamen, that you cannot carry as much sail on a wind as you can running before it, therefore before rounding to, or hauling on a wind, great caution should be observed, and the sheets and halyards kept well in hand, ready to shorten sail at the shortest notice ; the crew for this purpose ought to be properly stationed.

Great care should be observed in running in a fresh breeze

dead before the wind ; if taken by the lee you are nearly certain to capsize the boat if the sheets and halyards are not well in hand. When unable to lay your course by the wind coming on the sheet quarter, haul up a little, lower your sail and shift over, and resume your course.

When in charge of a boat watering with casks, or taking in provisions, always, if possible, stow the midship casks with slings on, ready for hoisting out.

Never take more in a boat than she will carry ; great judgment is required, whether in loading a boat with luggage, provisions, or water, not to risk the safety of the boat or crew.

If watering from the beach, keep the end of the suction hose in a tub, or a piece of rag round the brass strainer on the end of the suction hose, as the least thing drawn in, such as small gravel, will choke the valves and stop the work.

If sent to take another boat in tow, pull well ahead clear of her oars without fouling her, and directly you have the end of her painter inboard and secured, give way ; when well done it causes no delay ; but should you pull alongside of her, or get athwart-hawse, you considerably delay the work, and in many instances lose more ground than you can possibly gain for some time again.

In a cutter, or any large boat, if sent to weigh an anchor or any heavy thing over the stern, place the rope over the roller fitted to the taffrail, and ship the awning stanchion over it, which is fitted with two legs, so as to prevent the possibility of its slipping, flying over the quarters, and capsizing the boat ; also take care to keep your crew well forward, to counter-balance the weight brought on the stern.

Paddle-box boats are stowed upon the tops of the paddle-boxes, and are most useful in embarking or disembarking troops, baggage, coaling, or for provisioning and watering ship.

*Q.* How are boats built ?

*A.* All cutters, gigs, and small boats are generally clinker, commonly called clinker-built boats.

Launches, pinnaces, barges, and paddle-box boats, are either carvel or diagonally-built boats.

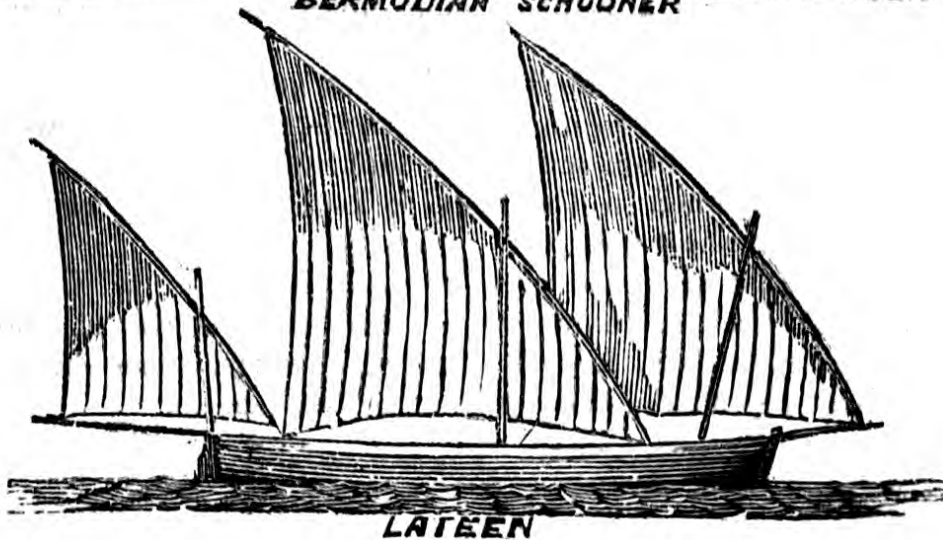
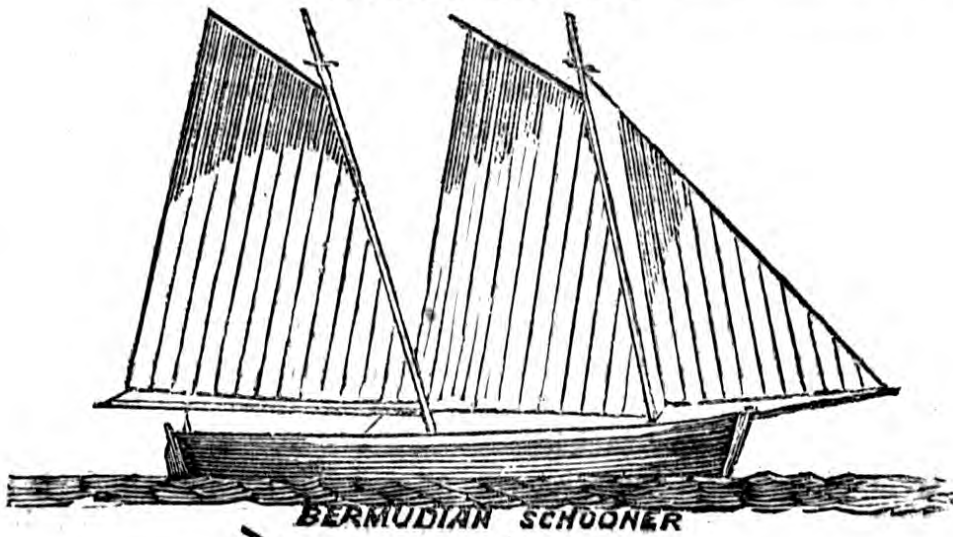
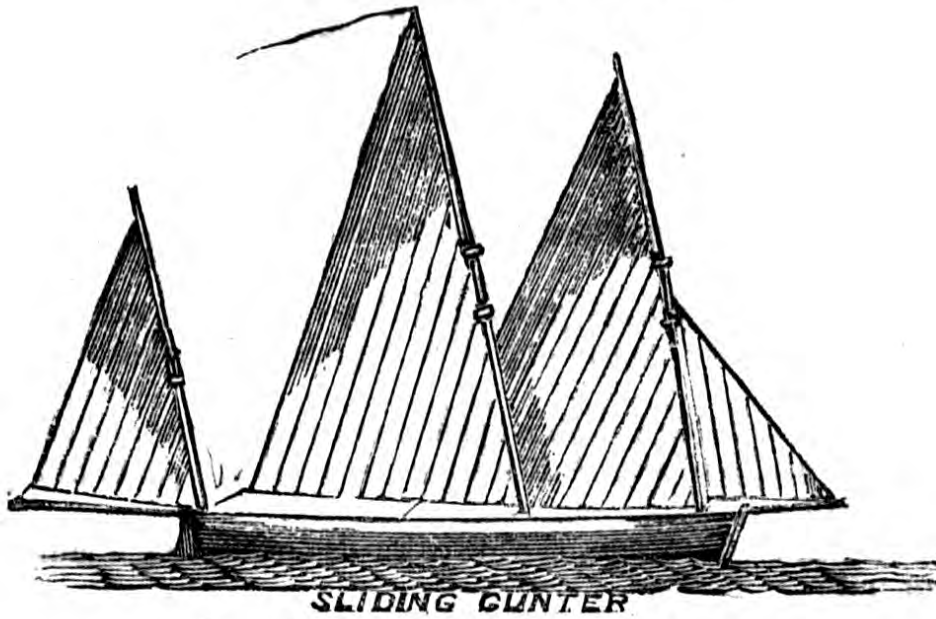
*Q.* What is a clinker, or clinker-built boat ?

*A.* Where the lower end of one plank in the side of a boat overlaps the next plank below it.

*Q.* What is a carvel-built boat ?

*A.* When the planks lie in a fore and aft direction flush with each other, the edges close together, and caulked to make them water tight.

*Different Rig of Boats.*



Q. What is a diagonally-built boat ?

A. A diagonally-built boat resembles a carvel-built boat, only the planks lie obliquely across the boat's timbers, instead of fore and aft.

Q. What wood are boats built of ?

A. In the Navy they are built of elm or mahogany ; light gigs are built of fir.

Q. Name the purchases used for hoisting boats in and out ?

A. For a launch, a regular purchase is fitted, called the launches purchase, consisting of a runner and tackle at the yard-arms.

Stay-tackles, fitted with a span between the fore and main mast, and the fore and main tackle to the lower pendants or preventers.

Q. How do you secure the lower yards for hoisting a launch in or out ?

A. The top burtons are hooked to the lower cap and the lower yard-arms, to assist the lifts, taking care to have an equal strain on each ; luffs are hooked as rolling tackles to the quarter strops on the lower yards, and to strops round the hounds of the lower masthead, to strengthen the yard in the bunt and assist the trusses.

Q. What precaution would you take before hoisting a launch, or any other heavy boat in ?

A. Pass all the movable gear out of her.

Q. What purchase is used for hoisting a pinnace or barge in ?

A. Yard and stay-tackles.

Q. In hoisting a boat in, in a sea way, when there is a motion, or a ship is rolling, what precaution ought to be taken ?

A. A luff-tackle should be hooked in a fore and aft direction, the fall led in on the forecastle, and steadied well taut, to keep her from serging ; a sufficient number of men should be stationed in the boat, to keep her clear of the ship's side and sheet anchor.

Q. Name the principal parts of a boat ?

A. Keel, keelson-board, stem, stem-board, sternpost, and board ; rudder-irons, knees, timbers, thwarts, stern-sheets, head-sheets, gunwale, thole-pins or rowlock-holes.

*Number and Description of Boats allowed to the Different Classes of Ships in H.M.'s Navy.*

DESCRIPTION AND LENGTH OF BOATS.	SHIPS OF THE LINE.				FRIGATES.			CORVETTES.				SCH.-RIG.-SLOOPS OR GUNBOATS.			
	Three-Decked	Two-Deck, First Class.	Two-Deck, Second Class.	Two-Deck, Third Class.	Special.	First Class.	Second Class.	First Class.	Second Class.	Third Class.	Fourth Class.	First Class.	Second Class.	Third Class.	Fourth Class.
Pinnace Launches . 42 ft. or 40 ft. 36 ft.	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1
Barge or Pinnace . 32 ft. or 30 ft. 28 ft. or 25 ft.	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Cutters . . . . . 30 ft. 28 ft. or 26 ft. 25 ft. or 23 ft.	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Jolly Boats . . . . . 16 ft. 18 ft. or 30 ft. 28 ft.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Gigs . . . . . 20 ft. 24 ft. or 22 ft.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Cutter Gigs . . . . . 14 ft. 12 ft.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total No. allowed to each Class . . . . .	10	9	9	9	9	9	8	7	6	5	5	5	5	5	3

*The different Duties generally performed by the Boats  
of a Ship of War are as follows :—*

Launches are employed in all heavy work, such as laying out anchors if the ship is on shore, watering and provisioning ship. Barges are used for light work, embarking or disembarking any person of distinction ; they are only supplied to flag ships.

Pinnaces are also used for watering, provisioning, coaling, and many other purposes ; in fact, they are looked upon as the working boats of the ship.

Cutters are used for the general duty of the ship, such as answering signals, landing officers, &c., and are always lowered to pick a man up when overboard, and are sent with the larger boats to assist in towing.

Jolly boats and dingies are used for the purpose of landing the stewards and servants when in harbour, or a short distance from the shore, for marketing, or for any other light work.

Galleys are long gigs, pulling six or eight oars, set apart for the use of the Admiral or Captain. Gigs are also for the use of the Captain, and if a ship is supplied with more than one, it is used for landing Officers or conveying them to other ships, &c., &c.

ALLOWED TO "WARRIOR" OR "BLACK PRINCE."

DESCRIPTION OF BOATS.	LENGTH.	NUMBER OF BOATS ALLOWED.
Steam Launch, No. 25 .	42 feet	—
Launch . . . . .	42 feet	1
Pinnacle . . . . .	32 feet	1
Cutter . . . . .	30 feet	1
Life-boat Cutters . . .	28 feet	1
Galley . . . . .	32 feet	1
Gig . . . . .	30 feet	1
Gig . . . . .	26 feet	1
Jolly . . . . .	25 feet	1
Dingy . . . . .	14 feet	1

PADDLE-BOX BOATS.

Length, 30 ft. ; breadth, 8 ft. ; depth, 3 ft.

Capacity if used as a tank—24 ft. by 7 ft. by 2 ft. 6 ins.  
= 420 cubic feet.

Weight of water, about  $11\frac{1}{3}$  tons.

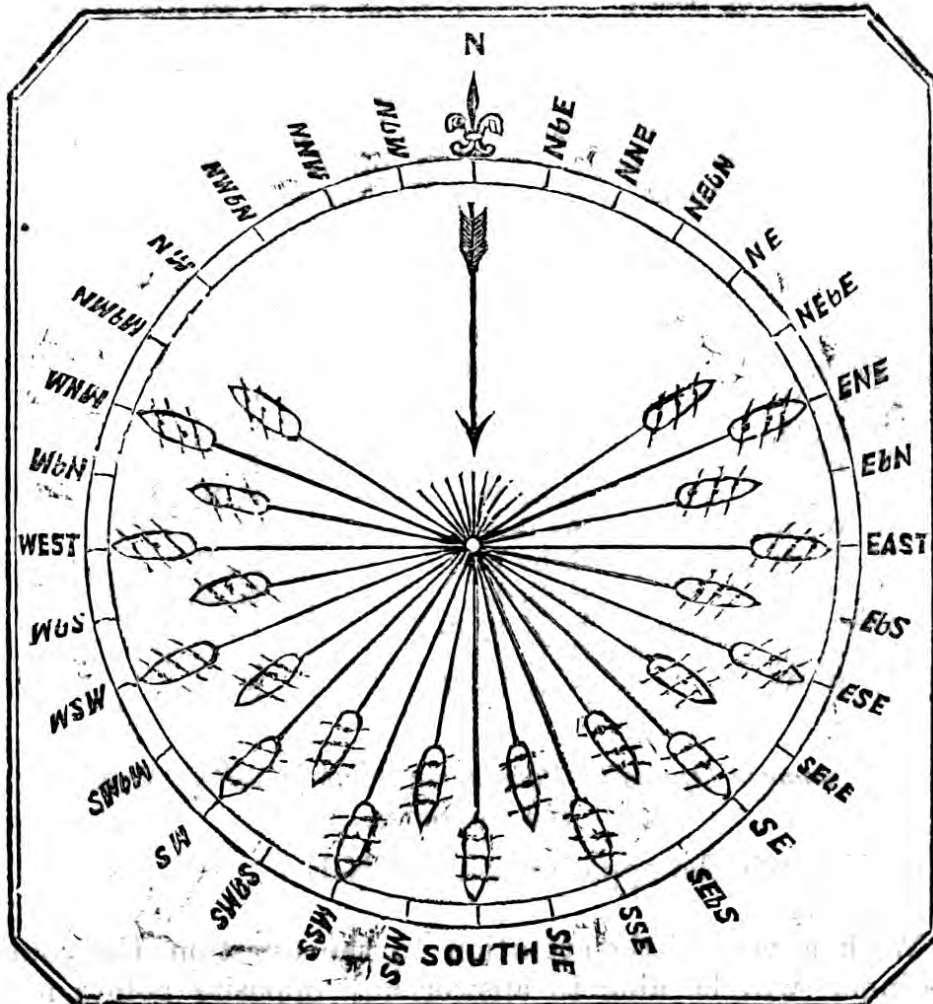
Draught of water, when light, about 6 ins.

## COMPASS INSTRUCTION.

### PART I.

Q. What is a compass card ?

A. A circular card, by which a ship's course is denoted : it is divided into 32 equal parts, called points ; again divided into 32 equal parts, called half-points ; and again divided into 64 equal parts, called quarter-points, each point being distinguished by a letter or letters.



Q. How are the points distinguished or known by letters



A. N. S. E. and W. stand for North, South, East, and West ; these are called the cardinal points ; any two or three of these letters, added together, represent the intermediate points, as in the following example :—

## REPEAT THE COMPASS.

N. stands for North.	S. by W., South by West.
N. by E., North by East.	S. S. W., South South-West.
N. N. E., North North-East.	S. W. by S., South-West by South.
N. E. by N., North-East by North.	S. W., South-West.
N. E., North-East.	S. W. by W., South-West by West.
N. E. by E., North-East by East.	W. S. W., West South-West.
E. N. E., East North-East.	W. by S., West by South.
E. by N., East by North.	W., West.
E., East.	W. by N., West by North.
E. by S., East by South.	W. N. W., West North-West.
E. S. E., East South-East.	N. W. by W., North-West by West
S. E. by E., South-East by East.	N. W., North-West.
S. E., South-East.	N. W. by N., North-West by North.
S. E. by S., South-East by South.	N. N. W., North North-West.
S. S. E., South South-East.	N. by W., North by West.
S. by E., South by East.	N., North.
S., South.	

*Repeat it the reverse way.*

North.	S. W. by W.	E. S. E.
N. by W.	S. W.	E. by S.
N. N. W.	S. W. by S.	East.
N. W. by N.	S. S. W.	E. by N.
N. W.	S. by W.	E. N. E.
N. W. by W.	South.	N. E. by E.
W. N. W.	S. by E.	N. E.
W. by N.	S. S. E.	N. E. by N.
West.	S. E. by S.	N. N. E.
W. by S.	S. E.	N. by E.
W. S. W.	S. E. by E.	North.

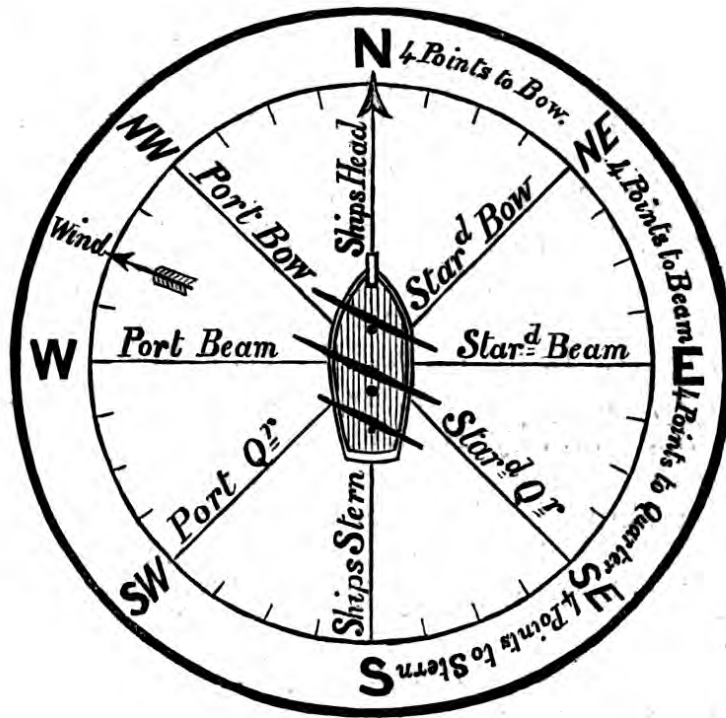
*To answer Opposite Points, or what is called Boxing the Compass.*

Q. What is the opposite point to N.E. ?

A. S.W.

With a very little attention to the question, the young beginner will be able to answer any opposite points most readily, always bearing in mind that the letter N. is opposite to S., and E. to W., and remembering that two or three of these letters added together represent all the points of the compass. For instance—E.N.E. is the opposite point to

W.S.W. | S.S.E. to N.N.W. | N.E. by E. to S.W. by W. |  
 N.W. by N. to S.E. by S. | N.E. by N  $\frac{1}{2}$  N. | S.W. by S.  $\frac{1}{2}$  S. |  
 W.  $\frac{1}{2}$  N. to E.  $\frac{1}{2}$  S. | N.  $\frac{1}{4}$  E. to S.  $\frac{1}{4}$  W., and so on, to any  
 point of the compass.



THE COMPASS MADE EASY.

*Cardinal Points.*

The compass is composed of four letters only—N. S. E. and W., which represent the four cardinal points—viz., North, South, East, and West.

*Half-Cardinal Points.*

So called because they come halfway between two cardinal points from which they derive their names. Thus, N.E. comes between North and East, and by adding the two letters together, N.E. is produced; in like manner the other half-cardinal points are formed—viz., N.W., S.E., and S.W. There are four half-cardinal points.

*False Points.*

So called because they borrow their names from the two points between which they come. Thus, N.N.E. comes between North and N.E., and by putting these two points together, taking care to put the letter of the nearest cardinal

point first, N.N.E. is produced ; in like manner are all the other false points formed : they are as follows :—E.N.E., E.S.E., S.S.E., S.S.W., W.S.W., W.N.W., and N.N.W. There are eight false points.

*The By-Points.*

So called because they derive their names from the nearest cardinal or half-cardinal points they are near or by. Thus, N. by E. is by or near North, and taking a direction towards East becomes N. by E.

N.E. by N. is by or near N.E., but being nearer North than East it becomes N.E. by N.; in like manner all the other by-points derive their name : they are the following:—N.E. by E., E. by N., E. by S., S.E. by E., S.E. by S., S. by E., S. by W., S.W. by S., S.W. by W., W. by S., W. by N., N.W. by W., N.W. by N., and N. by W.—16 in number.

Half-cardinal points are always four points from a cardinal point ; if a ship's head marks a cardinal point, such, for instance, as North, her stern and either beam will also mark a cardinal point: half-cardinal points marking the two bows and quarters.

*For Example.*

Ship's head is North, or stern is South, port-beam West, starboard-beam East, port-bow N.W., starboard bow N.E., port-quarter S.W., starboard quarter S.E.

---

PART II.

*Q.* How are the points of the compass reckoned ?

*A.* From North and South, to East and West.

N. by E. | N. by W. | S. by E. | S. by W.....One point.  
 N. N. E. | N. N. W. | S. S. E. | S. S. W.....Two points.  
 N.E.byN. | N.W.byN. | S.E.byS. | S.W.byS..Three points.  
 N. E. | N. W. | S. E. | S. W.....Four points.  
 N.E.byE. | N.W.byW. | S.E.byE. | S.W.byW...Five points.  
 E. N. E. | W. N. W. | E. S. E. | W. S. W.....Six points.  
 E. by N. | W. by S. | E. by S. | W. by S.....Seven points.  
 East and West.....Eight points.

Q. How close to the wind will a ship lay?

A. When the sails are well set, a ship is supposed to lay five points from the wind, but in most cases it is six points.

Q. Supposing a ship to lay five points from the wind, how many will she tack in?

A. Ten points.

Q. How many will she wear in?

A. Twenty-two points.

Q. What do you mean by tacking a ship?

A. Supposing a ship to be sailing close to the wind on the starboard tack, laying S. E. by E., the wind would be South. By manœuvring the helm and sails, she is brought head to wind, and paid off on the port tack, until the sails are again full, or her head is S. W. by W.; she would then lie on the port tack, supposing the wind to be steady, and the ship would work in ten points or lie five points from the wind.

Q. What is the meaning of a ship being on the port or starboard tack?

A. It is said a ship is on the port tack when she has her port tacks on board, or the wind is blowing five points on the port bow, which is called the weather bow.

Q. What do you mean by the weather and lee bow, and how are they distinguished?

A. The weather bow or side of a ship is the side on which the wind blows. The lee bow or side will, of course, be the opposite to that from which the wind blows. The sheets of fore and aft sails are hauled aft on the lee side.

Q. What is the meaning of wearing a ship?

A. To run her off before the wind, and bring her to the wind on the other tack.

Q. What do you mean by steering a ship?

A. To move her head in any particular direction, or keep her on any given course.

Q. How is a ship's head moved or kept in any particular direction?

A. By means of the helm, which is composed of the rudder, tiller, or yoke, tiller ropes, and wheel.

All ships are fitted with tillers, with the exception of screw ships, which are, according to the space abaft the screw chamber, fitted either with a tiller or yoke. A single block is seized on the foremost end of the tiller, when shipped before the rudder head, and on the after end of the tiller when shipped abaft the rudder head; yokes have generally two metal sheaves fitted at each end.

Tiller ropes are rove the same way in all ships, whether fitted with a tiller or yoke, so the movement of the wheel will be alike in all ships.

Q. How do you know in what direction a ship is steering?

A. By means of lubber's point and the compass card.

Q. What is lubber's point?

A. A black line drawn down the centre of the metal bowl in which the compass card is shipped, in a direct line with the ship's head, and as the ship's head moves to the right or the left, the compass card revolves past the line called lubber's point, whatever point of the compass cuts this line, denotes the course the ship is steering.

Q. What is the meaning of luff, or giving a ship lee helm, or putting the helm down?

A. To bring the ship's head nearer the wind.

Q. What is the meaning of "keep her away," or "give her weather helm," or "putting the helm up"?

A. To run the ship's head off the wind.

Q. What is the meaning of "very well thus," "thus and no higher"?

A. Her head is in a very good direction, but you are not to bring her any closer the wind.

### PART III.

Q. What is the meaning of "nothing off"?

A. To keep the ship's head as close to the wind as possible without shaking the sail.

Q. If a ship's head is S.E., and she is on the starboard tack, laying five points from the wind, how is the wind?

A. S. by W.

Q. If she was on the port tack, how would the wind be?

A. E. by N.

Q. If her head is East, and she is on the port tack, how is the wind?

A. N.E. by N.

Q. If she was on the starboard tack with her head East?

A. S.E. by S.

Q. If her head was W.S.W. on the port tack, and the ship was close to the wind, which would be S. by W., and you were on the look out at the masthead, and saw a ship

bearing West, or on any of the following bearings, how would you report her ?

A. If bearing W., two points on the lee bow.

If she bore W.N.W., four points on the lee bow.

If she bore S.S.E., on the weather beam.

If she bore N.E., on the lee quarter.

If she bore E.N.E., right astern.

If she bore S.E., two points abaft the weather beam.

If she bore S.S.W., four points on the weather bow.

Q. What do you call right abeam ?

A. Eight points from right ahead ; for instance, if a ship's head is North, East and West is right abeam.

Q. If a ship is lying N.W. on the starboard tack, and you are ordered to keep her away four points, how will her head be when kept away as ordered ?

A. West.

Q. Supposing a ship is steering West, or any of the following courses :—N.W. | E.N.E. | S.S.E. | N.E. by N. | S. by W.  $\frac{1}{2}$  W. | E.  $\frac{3}{4}$  N. | W.  $\frac{1}{4}$  S., how many points is she steering from North or South ?

A. If W., 8 points | N.W., 4 points | E.N.E., 6 points | S.S.E., 2 points | N.E. by N., 3 points | S. by W.  $\frac{1}{2}$  W.,  $1\frac{1}{2}$  points | E.  $\frac{3}{4}$  N.,  $7\frac{1}{4}$  points | W.  $\frac{1}{4}$  S.,  $7\frac{3}{4}$  points.

Q. You say a ship's course is denoted in any direction she may be steered by the compass, which is a circular card : explain how this is done ?

A. A compass card, mounted on a magnetic bar of steel, after being properly adjusted, is placed on a pivot in the centre of a metal bowl, the inside of which is painted white, a black line being marked down from top to bottom of the bowl, and exactly in the line of the ship's head or bows, which is called the lubber's points ; the card is supposed, when on the pivot, to point to the magnetic North and South, without it is attracted by any local cause, which is called deviation. The bowl containing the compass is hung on jimbles, in a wooden frame called a binnacle ; and by moving the rudder by means of the tiller or wheel, a ship's head is put in any direction desired.

TECHNICAL TERMS USED BY THE OFFICER OR QUARTER-  
MASTER OF THE WATCH IN DIRECTING THE  
CONNING OF THE SHIP.

*Conning.*

Any person directing the helmsman how to put the helm, is said to be conning the ship.

*Starboard Tack.*

A ship sailing with the wind blowing against the starboard side, with her starboard tacks hauled on board, and her port sheets hauled aft, is said to be on the starboard tack.

*Port Tack.*

Everything being the exact opposite to the starboard tack.

*Tacking. Staying. Going About.*

Is an evolution performed by manœuvring the sails and helm, by which means a ship is made to pass round head to wind from one tack to the other.

*Working or Beating to Windward. Tack and Half-Tack.  
Making a Long and Short Board. Making a Long and  
Short Leg.*

Signifies a vessel proceeding as nearly as possible in the direction from which the wind blows by constantly tacking.

*On a Wind. By a Wind. Close Hauled. Full and By.  
On a Bowline.*

Trimming the sails with the yards braced up sharp, and the bowlines hauled, to enable the ship to sail as close the wind as possible.

*Hauling to the Wind.*

Bringing a ship's head as close to the wind as possible, by bracing the yards up, &c., and giving her lee helm.

*Luff. Give her Lee Helm. Put the Helm down.*

To bring a ship's head close to the wind.

*To Weather or Weathered.*

An expression used when a ship has passed to windward of a ship or a point of land.

*Wearing*

Is an evolution performed by manœuvring the sails and helm, so as to cause a ship to pay off before the wind and come to the wind on the other tack.

*Off the Wind. Going Free. Sailing Large. Running.*

Sailing with the wind from two points before the beam to seven points abaft the beam.

*Wind Abeam.*

Sailing with the wind eight points from the bows, or at right angles with the keel.

*Running before the Wind.*

Sailing with the wind exactly aft.

*Scudding.*

A ship running before the wind with close reefed sails, or under bare poles, is said to be scudding.

*Keep her away. Give her Weather Helm. Put the Helm up. Bear up.*

These orders all apply to the same thing—viz., by so moving the helm that the ship's head is made to pay off from the wind.

*Casting from an Anchor.*

Bracing the head yards abox, so as to insure a ship's head paying off in any required direction.

*Boxing Off.*

Flattening in the head sails, or bracing the head yards round to pay a ship's head off, when she has been brought all in the wind by bad steering, or the wind has suddenly headed her.

*All in the Wind.*

An expression used when a ship, by bad steerage or a sudden shift of wind, comes so close the wind as to cause her head sails to shake or be aback.



*Flat Aback.*

The position of a ship when by a sudden shift of wind her sails are thrown flat aback, that is, their surface bearing against the mast forces the ship astern.

*Stern Way.*

Going through the water stern foremost.

*Lee Way.*

What a ship loses by dropping to leeward of her course. Under all plain sail, in smooth water, a ship makes no lee way. Under reefed sails, in a sea way, a ship makes lee way in proportion to her power of resistance, by being forced to leeward.

*Backing and Filling.*

By manœuvring the sails and helm a ship is brought nearly head to wind, giving her a stern-board and causing her to fall off and fill on her former tack, and again gathering head way, the tide taking her in the required direction : this is often done in a harbour or river where there is not room enough to tack or work a ship in or out.

*Going to Leeward, or Running to Leeward.*

An expression used when a ship or boat, not having been able to weather any particular object, runs to leeward of it.

*Steady. Very well Thus.*

To steady a ship's head in any given direction.

*Nothing Off*

Signifies that a ship requires a little lee-helm when she is falling off from the wind.

*No Higher*

Signifies that a ship requires a little weather-helm to prevent her sails from getting aback and shaking.

*Starboard the Helm.*

A man standing the starboard side of the wheel turns the wheel from him ; if standing the port side he hauls it towards him, the tiller to starboard, and the rudder to port : it causes a ship's head (supposing her to have headway) to pay off to port.

*Port the Helm.*

If standing the port side of the wheel, turn it from you; if on the starboard side, pull it towards you, the tiller going to port, the rudder to starboard, a ship with headway will pay off to starboard.

A ship having sternway the helm has the opposite effect to headway; therefore her head pays off in the same direction as the tiller, and a contrary direction to that in which the rudder is placed.

*Right the Helm. Put the Helm Amidships.*

Is an order given when the helm is either to starboard or port, and the rudder is required at once to be placed in a line with the ship's keel.

## LEAD LINE INSTRUCTION.

## PART I.

Q. What is a lead line?

A. A line to which a leaden weight is attached, for the purpose of ascertaining the depth of water a ship is in?

Q. How many descriptions of lead lines and leads are there?

A. Two, the hand lead and line, and the deep-sea lead and line.

Q. What is the use of the hand lead and line?

A. It is always used when a ship is approaching any anchorage, or is cruising in shoal water where the depths to be obtained are expected to be less than 20 fathoms.

Q. When is a deep-sea lead and line used?

A. On approaching the land, when the true position of the ship is not known for certain, and the depth of water is very great. The bottom of the deep-sea lead is hollowed out; when used, this hollow is filled with tallow (which is termed arming the lead), so when it comes in contact with the bottom, any small substance will stick to the bottom of the lead, such as

gravel, sand, small shells, &c. ; it will also denote a hard or soft bottom. On approaching the land, deep-sea soundings are taken at regular intervals ; and the depth of water and the nature of the bottom is entered in the ship's log-book, which enables the pilot to judge what coast the ship is on, also to tell how far she is from land.

*Q.* How do you know, by the hand lead and line, what depth of water you are in ?

*A.* The hand line is 20 fathoms in length, and is divided into 20 equal parts, called marks and deeps.

*Q.* How many marks and deeps are there ?

*A.* Nine marks and eleven deeps.

*Q.* Name the marks.

*A.* 2, 3, 5, 7, 10, 13, 15, 17, 20. 2, 3, and 10 are distinguished by pieces of leather. 2 has two ends to it ; 3 has three ends to it ; and 10 has a hole in it. 5 and 15 fathoms are distinguished by a piece of white buntin ; 7 and 17 by a piece of red buntin ; 13 by a piece of blue buntin ; and 20 by two knots.

---

#### PART II.

*Q.* Having learned the marks and deeps, how will you call them, supposing, for instance, you have 9 fathoms, or any of the following marks or deeps :—7,  $10\frac{1}{4}$ ,  $11\frac{3}{4}$ ,  $5\frac{1}{2}$  ?

*A.* If I had 9 fathoms, I should call by the deep 9.

If I had 7 fathoms, by the mark 7.

If I had  $10\frac{1}{4}$ , and a quarter ten.

If I had  $11\frac{3}{4}$ , a quarter less twelve.

If I had  $5\frac{1}{2}$ , and a half five.

---

#### PART III.

*Q.* What is the first thing to be done on going into the chains to heave the lead ?

*A.* See the breast ropes properly secured, the line clear, and the end of it fast in the chains ; measure the distance from the chain with the lead line to the water.

*Q.* Supposing it was a dark night, how would you know what sounding you had ?

*A.* If more than 15 fathoms, I should reckon from 20 fathoms or the two knots, the length of line that passes through my hand, also the number of pieces of buntin ; if

under 15 fathoms, I should reckon in a similar way from 10 fathoms, which I should readily know by a piece of leather with the hole in it ; if under five fathoms, the piece of leather at 2 and 3 would be my guide ; so I could always determine the real depth of water by reckoning the distance between either of these marks, and the depth obtained. For instance, if I obtained 13, it would be the next piece of buntin to 10, or the leather with the hole in it ; if 17, it would be the piece of buntin nearest 20, or the two knots ; if 5, it would be the nearest buntin to the piece of leather denoting 3 fathoms.

---

PART IV.

Q. What is the weight of a hand lead ?

A. From 7 to 14 pounds.

Q. What is the weight of a deep-sea lead ?

A. 28 pounds.

Q. How is a deep-sea line marked, and what length is it ?

A. It is usually 100 fathoms long, and is marked exactly the same as the hand line, up to 20 fathoms. At 25 fathoms, 1 knot ; at 30, 3 knots ; 35, 1 knot ; 40, 4 knots ; so on, up to 100, between every 10 fathoms 1 knot ; and at 50, 60, 70, 80, 90, and 100 fathoms, 5, 6, 7, 8, 9, and 10 knots.

Q. How are soundings obtained by the deep-sea lead ?

A. The deep-sea lead line is kept on a reel ready for use. When required, the reel is taken aft, and held by two men ; the end of the line is then passed out on the weather side, and taken forward on the weather bow outside, and clear of all rigging. The quartermaster having ascertained the lead is well armed, it is bent to the line, and a careful hand holds the lead ready for heaving ; a number of men are ranged along outside the weather side of the ship at certain intervals, each with a coil of the deep-sea line in hand. All being ready, the officer of the watch gives the order to stand by as a caution to all, and then to heave, when the man on the weather bow throws the lead as far forward as possible, and calls out "watch there, watch," which is repeated by each man as the last fake of the coil goes out of his hand. It then runs off the reel, which is held in a convenient position not to stop it until the lead is on the bottom, or sufficient line is run out to show there is no bottom, with the length of the line ordered. A quartermaster, or an experienced leadsman, always attends aft to ascertain when the lead touches the bottom, which he does

by allowing the line to run loosely through his hand. When the lead touches the bottom, the line is checked and brought up and down, to ascertain the correct depth, which is noted by the officer of the watch in the log. The line is then hauled in and reeled up ready for use again. When the lead is inboard, the arming is examined, and the nature of the bottom is also noted in the log, and the lead is re-armed ready for use. Before taking a cast of the deep-sea lead, the way of the ship through the water is checked as much as possible.

N.B.—There are two descriptions of deep-sea leads—the patent, and common deep-sea lead.

*Q.* How is lead bent to the hand or deep-sea line ?

*A.* In the end of the line there is always a long-eye spliced. In the upper end or top of the lead there is a hole, through which a becket is worked, the eye in the end of the line is passed through the becket, and over the bottom of the lead, and hauled taut up to the becket again.

*Q.* How is a deep-sea lead and line hauled in ?

*A.* A small snatch block, made for the purpose, and fitted with a tail, is attached to one of the quarter davits, or any other convenient place, the line is then placed in the snatch, and walked in by a portion of the watch.

---

## ADMIRALTY NOTICE RESPECTING LIGHTS AND FOG SIGNALS.

*To be carried and used by Seagoing Vessels to prevent Collision.*

### STEAM VESSELS.

All sea-going steam vessels, when under steam, shall, between sunset and sunrise, exhibit the following lights :—

1. A bright white light at the foremast head.

A green light on the starboard side.

A red light on the port side.

2. The masthead light shall be so constructed as to be visible on a dark night, with a clear atmosphere, at a distance of at least five miles, and shall show an uniform and unbroken light over an arc of the horizon of 20 points of the compass, and it shall be so fixed as to throw the light ten points on each side of the ship—viz., from right ahead to two points abaft the beam on either side.

3. The green light on the starboard side and the red light on the port side shall be so constructed as to be visible on a dark night, with a clear atmosphere, at a distance of at least two miles, and show an uniform and unbroken light over an arc of the horizon of ten points of the compass, and they shall be so fixed as to throw the light from right ahead to two points abaft the beam on the starboard, and on the port sides respectively.

4. The side lights are to be fitted with inboard screens, projecting at least 3 ft. forward from the light, so as to prevent the lights from being seen across the bow.

5. Steam vessels under sail only are not to carry their masthead light.

#### SAILING VESSELS.

1. All sea-going sailing vessels, when under weigh, or being towed, shall, between sunset and sunrise, exhibit a green light on the starboard side, and a red light on the port side of the vessel, and such lights shall be so constructed as to be visible on a dark night, with a clear atmosphere, at a distance of at least two miles, and shall show an uniform and unbroken light over an arc of the horizon of ten points of the compass, from right ahead to two points abaft the beam, on the starboard and on the port sides respectively.

“When you see three lights ahead,  
Port your helm, and show your red.”

2. The coloured lights shall be fixed, whenever it is practicable so to exhibit them, and shall be fitted with inboard screens projecting at least 3 ft. forward from the light, so as to prevent the lights being seen across the bow.

3. When the coloured lights cannot be fixed (as in the case of small vessels in bad weather), they shall be kept on deck between sunset and sunrise, and on their proper sides of the vessel, ready for instant exhibition, and shall be exhibited in such a manner as can be best seen on the approach of, or to any other vessel or vessels, in sufficient time to avoid collision, and so that the green light shall not be seen on the port side, nor the red light on the starboard side.

Sailing pilot vessels shall not carry the lights required for other sailing vessels, but shall carry a white light at the masthead, visible all round the horizon, and shall also exhibit a flare-up light every fifteen minutes.

Open fishing boats, and other open boats, shall not be required to carry the side lights required for other vessels,

but shall, if they do not carry such lights, carry a lantern having a green slide on the one side, and a red slide on the other side, and on the approach of, or to other vessels, such lantern shall be exhibited in sufficient time to prevent collision, so that the green light shall not be seen on the port side, nor the red light on the starboard side.

Fishing vessels and open boats when at anchor, or attached to their nets and stationary, shall exhibit a bright white light.

Fishing vessels and open boats shall, however, not be prevented from using a flare-up in addition, if considered expedient.

#### VESSELS AT ANCHOR.

All sea-going vessels, when at anchor in roadsteads or fairways, shall, between sunset and sunrise, exhibit where it can best be seen, but at a height not exceeding 20 ft. above the hull, a white light, in a globular lantern of 8 ins. in diameter, and so constructed as to show a clear, uniform, and unbroken light all round the horizon, at a distance of at least one mile.

#### FOG SIGNALS.

All sea-going steam vessels, whether propelled by paddles or screws, when their steam is up, and when under weigh, shall, in all cases of fog, use as a fog signal a steam whistle, placed before the funnel, at not less than 8 ft. from the deck, which shall be sounded once at least every five minutes, but when the steam is not up, they shall use a fog horn, or bell, as ordered for sailing ships.

All sea-going sailing vessels, when under weigh, shall, in all cases of fog, use, when on the starboard tack, a fog horn, and when on the port tack, shall ring a bell.

These signals shall be sounded once at least every five minutes.

Sailing pilot vessels are to carry only a white light at the masthead, and are to exhibit a flare-up light every 15 minutes, in accordance with the Trinity House regulations.

The annexed diagrams are intended to illustrate the use of the lights carried by vessels at sea, and the manner in which they indicate to the vessel which sees them the position and description of the vessel which carries them.

*First.* When both red and green lights are seen.

A sees a red and green light ahead ; A knows that a vessel

is approaching her on a course directly opposite to her own, as B.



If A sees a white masthead light above the other two, she knows that B is a steam vessel.

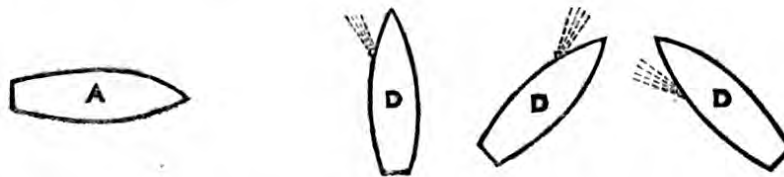
*Second.* When the red, and not the green light is seen.

A sees a red light ahead or on the bow; A knows that either,

1. A vessel is approaching her on her port bow, as B;



or 2, a vessel is crossing in some direction to port, as D D D.



If A sees a white masthead light above the red light, A knows that the vessel is a steam vessel, and is either approaching her in the same direction as B, or is crossing to port in some direction, as D D D.

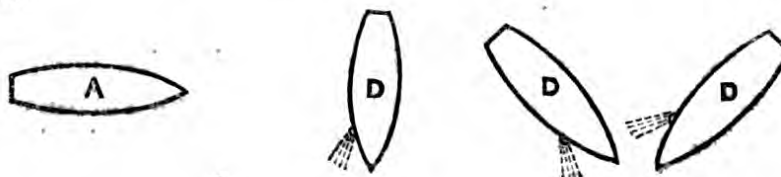
*Third.* When the green, and not the red light is seen.

A sees a green light ahead, or on the bow; A knows that either,

1. A vessel is approaching her on her starboard bow, as B;



or 2, a vessel is crossing in some direction to starboard, as D D D.





If A sees a white masthead light above the green light, A knows that a vessel is a steam vessel, and is either approaching her in the same direction as B, or is crossing to starboard in some direction, as D D D.

---

## BLOCKS.\*

There are two sorts of blocks—morticed blocks, and made or built blocks.

The largest morticed block made is 28 ins., and the smallest for ship use 3 ins. ; smaller blocks are made for boats. The 28-in. single blocks are double scored, and used for double-brace blocks in first-class ships.

A made or built block can be constructed to any size ; 50 ins. however is about the size of the largest used in any Government establishment. The number of pieces it is composed of depends upon the number of sheaves ; as the partition between each sheave is a separate piece, they are bolted together by four bolts, two at the top, and two at the bottom, and are always fitted with metal sheaves, and a shoulder to one side of the shell.

Large purchase or careening blocks are always built or made blocks.

Morticed blocks are used for all general purposes, as hereafter described.

The size of a block is denoted by the length, and its classification by the flatness or thickness of the shell, the number of sheaves, the number of scores, and the quality of the stropping.

For instance—if a shell of a block is 6 ins. in length, it is called a 6-in. block ; if it is 10 ins., 15 ins., or 20 ins., it is called a 10-in., 15-in., or 20-in. block, according to whatever length the shell might be.

A block, if one sheave, is called a single block ; two sheaves, a double block ; three sheaves, a treble ; four sheaves, a four-fold block, and so on, according to the number of sheaves.

If one score, it is termed a single score block ; if two scores, a double scored block.

There are rope strops and iron strop-blocks, both double and single. The rope stropping is fitted in various ways : for instance, single strops, double strops, and two single strops,

\* For Tables of Blocks, see pp. 29, 30.

according to the stand the block is required to have to establish a fair lead with any given point.

A block is supposed to carry a rope one-third its length in circumference : that is to say, a 6-in. block a 2-in. rope, an 8-in. block a 2½-in. rope, a 9-in. block a 3-in. rope, and so on.

Blocks, either morticed, made, or built, are composed of several parts, and are named as follows :—

*The Shell*

Is the outside case of a block, and is made of ash, elm, or iron.

*The Sheave*

Is the wheel on which the rope travels, and is made of metal, lignum-vitæ, or iron.

*The Bouch*

Is made of metal or leather, and is the centre piece of the sheave which travels on the pin.

*The Pin*

Is made of iron or lignum-vitæ, and has a head at one end : it passes through the centre of the shell, and the bouch of the sheave.

*The Head and Ass*

Of a block are the ends of the shell ; the latter is easily known, as it has a much deeper score than the former to receive the splice of the strop, and in most cases the standing part of the purchase : it is also called the crown or tail of a block.

*The Swallow*

Is the open part between the sheave and shell.

*The Score*

Is the groove in the outside part of the shell to take the strops either single or double scores, according to what the blocks are required for. Double-scored are always double-stropped.

*Blocks*

Are distinguished by the following names, viz. :—

Blocks Common, Double and Single.	Sister Blocks.
Clump Blocks.	Stropped Bored Blocks.
Brace Blocks, Single, Thin, and Double Score.	Shoe Blocks.
Shoulder Blocks.	Ninepin Blocks.
Fiddle Blocks.	Monkey Blocks.
	Iron Stropped Blocks.
	Snatch Blocks.

# PURCHASES.

THEIR NAMES—HOW FITTED—STRENGTH—THEIR USE.

NAME OF PURCHASE.	POWER GAINED.	HOW FITTED.	REMARKS. GENERAL USE.
Single whip.	None.	A rope rove through a single tail block, fixed in any position.	Is a purchase of least power in use ; it is used for all light work, discharging luggage from a boat, &c.
Double whip.	Twice.	A rope rove through two single blocks ; the upper block is a tail block, the lower one is a moveable hook block ; the standing part of fall is secured with a round turn and two half hitches round the yard close to the tail block.	Is used for all common purposes, for clearing boats of things, &c., too heavy for a single whip.
Runner.	Adds an additional power to the purchase it is used with.	Is a rope rove through any moveable blocks.	Is always used in connexion with another purchase, such as the runners, and tackle in staying lower mast, top-Burton and runners, &c., or setting up top-mast rigging.
Spanish Burton.	Three times.	Composed of two single blocks, one stationary, secured by a tail, the other is a moveable block.	Used for coal-ing ship.
Luff tackle.	Three times ; four times if used in connexion with a leading block.	Two hook blocks, one double, and one single. The standing part of the fall of this tackle is rove through a becket in the ass of the single block, and secured by being spliced round the strop at the neck of it.	Is used for all common purposes where a heavy pull is required, setting up rigging, &c.
Tail jigger.	Three times.	Composed of a double block, fitted with two tails or one, and a single hook block. Standing part of fall is secured in the strop of single block.	Used for setting up topgallant backstays, &c.
Up and down tackle.	Three times ; four times when used with a leading block.	A double and single block ; the double block is fitted with a thimble for lashing to the lower pendants ; the single block is a hook block, fitted with a long strop, the standing part of the fall is spliced in the strop of the single block.	Used for setting up lower rigging.

NAME OF PURCHASE.	POWER GAINED.	HOW FITTED.	REMARKS. GENERAL USE.
Gun tackle purchase, or double luff.	Four times.	Two double blocks, fitted with hooks; the double block intended for the standing part of fall has a score in the ass of the block under one of the sheaves, to form a fair lead in reeving the fall through the other block.	Used as side tackles of guns, and preventer tackles.
Gun tackle purchase for boats' guns.	Twice.	Two single hook blocks; the standing part of the fall is spliced in the strop of the block, forming the final lead of the fall.	Used for boats, guns.
Quarter tackle.	Twice	Two single blocks, each fitted with a long pendant and hook, the lower one with a tongue for stay to hook to.	Hoisting in stores, provisions, water, &c.
Sail tackle.	Three times.	Three single blocks; the strop of the upper block is fitted with a long and short leg, a thimble being spliced in the end of the long leg, and a hook in the end of the short leg; the third block is a leading block, stropped to the strop of the lower block, between the crown of the block and the hook; the standing part of the fall is rove through a becket in the ass and secured round the strop at the crown of the upper block.	Is used for shifting or bending topsails; when in use the long leg of the upper block goes round the topmast-head, and hooks to the short leg of the same block. For staying topmast; often used as a preventer lower brace in small ships, and sending topsail yards up and down.
Top Burton.	Three times.	Is composed of a double hook block, sometimes fitted with a long strop, and a single hook block fitted with a long strop, and with a long loose strop or tongue.	Used as preventer lifts on topsail yards, setting up topmast rigging, and for other purposes too heavy for whips.
Mizen Burton.	Three times.	A double and single hook block; the standing part of the fall is spliced in the strop of the single block.	Used for sending the cross jack yard up and down, staying mizen-masts, &c.
Runner and tackle.	Eight times.	Consists of three blocks, one double, and two single; one of	Used for staying lower masts,

## PURCHASES.

NAME OF PURCHASE.	POWER GAINED.	HOW FITTED.	REMARKS. GENERAL USE.
		<p>the single blocks is a clump fitted with a thimble as a lashing block, through which the runner is rove. The tackle is rove through the two other blocks. The double block of the tackle is turned in one end of the runner, and a hook and thimble in the other end of runner; the standing part of the tackle is spliced in the ass of the single block, which is fitted with a long strop and a hook.</p>	<p>and weighing anchor when the capstan is disabled.</p>
Yard tackle.	Three times.	<p>Two blocks; upper block is a fiddle block, turned in the end of the yard-tackle pendant, fitted with a long strop; the lower is a single hook block, fitted with a long strop, in the ass of which the standing part of the fall is spliced.</p>	<p>Used for hoisting heavy weights in or out, such as boats, &amp;c.</p>
Topgallant purchase.	Twice or thrice.	<p>Two single blocks; the topgallant shrouds are fitted with a long and short leg, a sennit eye in each leg; the long leg is rove through a thimble in the crown of the upper block, and toggled to the short leg. The standing part of the fall is spliced in the ass of the upper block; the lower block is a hook block.</p>	<p>This purchase is fitted for the purpose of setting topgallant rigging up smartly; the upper block in large ships is a double block.</p>
Topgallant hal-yard purchase.	Three times.	<p>Two single blocks; the lower block is a hook block; the upper block is fitted with a long strop, and when in use is toggled to a bight of the topgallant halyards or yard rope, a half hitch is formed with the yard-rope round the strop, and the bight put through the upper part of the long strop and toggled; sometimes a double and single block is used, the double block fitted with two tails; another plan is a runner and two single blocks.</p>	<p>Is used when the topgallant sails are set for mast-heading the sails.</p>

NAME OF PURCHASE.	POWER GAINED.	HOW FITTED.	REMARKS, GENERAL USE.
Lower lift purchase.	Three times.	Two blocks—a double and single block; the double is the lower block, and stropped to an eye-bolt in the deck close to the mast; the single block is turned in a half strop in the lift.	Used for squaring or topping lower yards.
Three-fold purchase.	Six times; seven times when used with a leading block.	Generally fitted with two three-fold metal blocks.	Used for raising the screw in screw ships.
Four-fold purchase.	Eight or nine times.	Generally rove through two four-fold metal blocks.	Used where any heavy purchase is required.
Launches purchases.	Eight times.	Consists of a runner and tackle.	Used for hoisting the launch in or out. When the launches purchase is in use, the pendant or runner is rove through a block at the yard-arm, led over the lower cap, and hooked to the opposite quarter of the yard. This purchase is seldom or never used.
Forestay tackle.	Three times.	Consists of a double and single block; the double block is the upper block, fitted with a span with a hook in each end. The lower or single block is a hook block; standing part of fall is spliced in the strop of lower block.	Used for hoisting boats, or any heavy weights in or out.
Mainstay tackle.	Three times.	Consists of two blocks; the double or upper block is fitted with a long pendant and hook; the single or lower block is a hook block, with standing part of fall spliced in strop.	Used for hoisting boats or heavy weights in or out.

## FITTINGS.

*Coamings.*

A framework of timber, raised round the openings forming the hatchways, to prevent the water from running below ; a rabbet is worked in their inside upper edge to receive gratings, hatches, or other fittings.

*Hatchways.*

Openings of various sizes, forming a communication, by means of ladders, from one deck to another. The top coverings to a hold of a ship are called hatchways.

*Gratings*

Are formed by pieces of wood being nailed across a framework at right angles, leaving open apertures of certain sizes to admit light and ventilation down the hatchways.

In stormy weather, tarpaulins are nailed over them, which is called battening down.

*Scuttles.*

Holes in a ship's side to admit light and give ventilation. Bull's-eyes in an iron framing are fitted, and can be screwed in or removed at pleasure.

*Scuppers.*

Holes in the water ways, cut through the ship's side, to free the deck of water.

*Scupper-Plugs.*

Pieces of rounded wood, fitted to the scupper-holes to keep the water from washing in and wetting the decks.

*Hawse-Plugs.*

Pieces of wood made round to fit to the hawse-holes, and keep the water out when at sea.

*Bucklers.*

Two pieces of wood, fitted together in the shape of a shutter, to keep the hawse-plugs in their place, and prevent their being washed out at sea.

*Manger.*

A portion of the deck, within the manger board in the bows of a ship, extending athwart from side to side.

*Manger Board.*

A coaming, or low partition, forming the manger, to prevent any water shipped through the hawse-holes from running aft.

*Chain Pipes.*

A large iron pipe, through which the chain cable passes from the chain-lockers to the deck above.

*Riding Bitts.*

Timber heads amidships, in the fore part of the deck, for biting or making fast the cable, for which purpose they are coated with iron.

*Compressor.*

An iron lever, one end being attached to the beams close to the chain pipes by a large iron bolt, on which it revolves, the other end being worked by a tackle, so as to stop or let the cable run out at pleasure.

*Bitts*

Are a strong framework of timber round the different masts, secured by being bolted to the beams, fitted with sheaves, for topsail sheets and other ropes to lead through and belay to.

*Fife Rail.*

A piece of timber, with a number of sheave-holes and belaying pins fitted to it, bolted to the ship's side or elsewhere, forming leads and securities for the running gear.

*Belaying Pins, Cleats, and Cavils,*

Are mostly of hard wood, placéd where required, as most convenient for belaying ropes. Cleats or cavils are mostly bolted to the ship's side. Belaying pins, fitted in holes in fife rails, &c.

*Bollard-Heads.*

They are timber heads, for securing the anchor, hawsers, &c., to. Bollards are also placed on a quay for attaching vessels alongside the pier.

*Cathead*

Is a projection on either bow; in large ships composed of stout timber curved like a knee, the stop or foot of it rests on the timbers, even with the water way, and passes through the deck, and is secured to the side timbers; outside it is strengthened by a large iron knee, called a cathead knee.



The upper part of the cathead stands above the level of the upper rail, and out from the ship's side, so the bower anchor can hang clear for being let go, or in catting the anchor, the cat-fall will bring it clear of the ship's side ; it is fitted with two or three sheaves in the head of it, according to the size of the ship.

An iron davit, mostly a movcable one, answers the purpose of a cathead in small vessels.

*Bumpkin.*

A spar, projecting from each bow, for hauling the fore tack down to.

*Goose Neck.*

The outer boom iron on the lower and topsail yards.

*Spider.*

An iron outrigger on the end of the gaff, for hoisting the ensign to, or a projection off a ship's side to keep blocks clear.

*Davits.*

Pieces of wood or iron projecting over a ship's side or stern, fitted with sheaves or blocks, for hoisting boats up and reeving falls.

*Fish Davit*

Is a large piece of timber, fitted with a double block over the head, for reeving the fish-fall through. It tends to keep the flukes of the anchor clear of the ship's side in fishing the anchor, the lower end rests in a shoe in the fore chains, the upper end is supported by topping lift and guys.

## PARTS OF A CAPSTAN, ETC.

*A Capstan*

Is a mechanical arrangement of several pieces of timber and iron, and so constructed as to possess great power ; it is used for all heavy purchases, such as weighing an anchor, or sending topmasts up.

*Q.* Name the parts of a capstan ?

*A.* Barrel-whelps, bed, paul rim, sprocket wheel, spindle, drum-head, chocks.

*Barrel*

Is the principal piece of the capstan, and has a hole through its centre, in which the spindle ships.

*Whelps*

Are strengthening pieces of hard wood bolted to the barrel, rounded off for hawsers or any purchase to work smoothly on.

*Chocks*

Are pieces of wood let in at the top and bottom of the barrel to keep the whelps in place.

*Bed.*

The part of the deck prepared for the capstan to stand on by placing additional pieces of oak.

*Pauls*

Are square pieces of iron, bolted to a metal band round the lower part of the barrel, below the whelps, and are easily let down and taken up as required in working the capstan.

*Paul Rim.*

An iron fitment, fitted with cogs, on the deck, bolted with partners at the foot of the barrel. When the pauls are down in place, they keep the capstan from moving.

*Sprocket Wheel*

Is an iron band fitted with teeth round the lower part of the barrel, which enters the long links of the chain messenger in weighing anchor.

*Spindle*

Is an iron bar pivoted in a socket on the deck below that on which the capstan stands, passes through a metal bushed hole in the partners, up through the centre of the barrel. It is to the barrel what an axle is to a cart-wheel.

*Drum Head.*

A round wooden fitment on the top of the barrel, with a number of square holes at regular intervals for shipping the capstan bars in, by which means the capstan is worked. It is strengthened by two metal bands round it on top and below the holes.

## PARTS OF AN ANCHOR.

*Q.* Name the parts of an anchor ?

*A.* The ring, shank, stock, arms, crown, fluke or palm, bill or pee.

*The Ring, or Shackle,*

Is attached to the upper part of the shank, to which the cable is attached.

*Shank.*

The perpendicular or middle piece of an anchor.

*Stock*

Is made of wood or iron ; if iron, it reeves through the lower hole in the upper end of the shank ; if wood, it is built round the shank, at the same place, and hooped and bolted together ; it stands at right angles to the arms, and being much longer, cants the anchor with one fluke down, which causes it to hook to the ground.

*Arms.*

The two triangular pieces at the lower end of the shank, forming hooks, one of which is always hooked or buried in the ground when the anchor is let go, so as to hold the ship in a stationary position.

*Crown.*

The lower end of the shank, where the arms or flukes are joined.

*Fluke, or Palm.*

The broad triangular piece within the extreme end or bill of the arms. It is so constructed as to have a greater hold of the ground.

*Bill, or Pee.*

The extreme point of the arms and flukes.

*Q.* How is a wooden stock constructed ?

*A.* It is made of oak, in two pieces, much broader in the middle than at the ends, and left a little apart in the middle, to admit of the hoops being driven up, when the wood shrinks, to bind it together. A wooden stock, in breadth and depth, is one-twelfth in the middle and one-twenty-fourth at the ends of its entire length.

The length of the stock is equal to that of the shank.

An iron stock is about one-fifth the weight of the anchor. It is curved at one end, the other is straight, to reeve through the lower hole in the upper part of the shank. A shoulder is fitted in the centre to act as a stop against the side of the shank; it is secured in place by a forelock through the end on the opposite side of the shank, to the shoulder. It is easily disengaged, and laid up and down the shank, for convenience of stowage inboard.

*Q.* What anchors are supplied to a ship of war?

*A.* Two bowers—viz., best and small bower; two sheet or waist anchors, one stream, one kedge.

*Bowers.*

The best and small bower; the starboard anchor being termed the best bower, and the port anchor the small bower.

*Sheet Anchors.*

They are called waist anchors, from being stowed in the waist abaft the fore rigging. One of these anchors is always got ready when lying at anchor in a gale, in the event of the bower anchors not holding or parting.

The bower and sheet anchors are about the same weight.

*Stream.*

In weight about two-thirds of the bowers; used for warping or anchoring, in a tideway or calm, when it is not intended to remain at anchor.

*Kedge.*

Used for light work; warping a ship from one part of the harbour to the other, or keeping her clear of her anchor in a tideway.

## DESCRIPTION OF CHAIN CABLES.

*Cables Supplied to a First Class-Frigate.*

Name of Cable.	Circumference.	No. Supplied.	Length.
Chain Cable—Bower ...	$2\frac{1}{8}$ ins.	4	100 fathoms.
Fore Gangers .....	$2\frac{1}{8}$ ins.	2	$37\frac{1}{2}$ „
Stream .....	$1\frac{1}{2}$ ins.	1	100 „
Messenger .....	1 in.	1	— „
Hemp Cable .....	17 ins.	1	101 „
Stream .....	$13\frac{1}{4}$ ins.	1	101 „

Ships are supplied according to their size and class.

*Q.* How long is a length of cable ?

*A.* Twelve and a half fathoms.

*Q.* How many lengths are there supplied to a ship of war in each cable ?

*A.* Eight lengths, or 100 fathoms.

*Q.* How many swivels are there in a cable ?

*A.* Two. One in the first, and one in the last length.

*Q.* How many shackles ?

*A.* One to every length.

*Q.* How is a shackle or length of cable marked ?

*A.* The first length or shackle has a piece of wire or tin round the stud or stay-pin of the first link abaft the shackle ; the second round the second link, and so on, generally up to ten, when you commence at the first link again.

*Q.* What is the use of a swivel ?

*A.* To keep a cable clear of turns when lying at single anchor. If there were no swivels, as a ship swung constantly round to the tide, she would twist her cable full of turns, and bring an unfair strain on some of the links.

*Q.* What is the use of shackles ?

*A.* To join the cable, and transpose the lengths, as required.

*Q.* Which end of the shackle is forward or outward ?

*A.* The crown or round end; the pins or lugs aft.

*Q.* Why ?

*A.* If the pins or lugs of the shackles were forward, they would be liable to catch against the bitts, hawse-pipes, or elsewhere, and check or stop the cable running out.

*Q.* What is the use of the cross pins or stud in the links of a chain cable ?

*A.* To give support to the links, and prevent them from closing when any heavy strain is brought on the cable ; they also keep the cable from twisting and getting full of kinks.

*Q.* If sent in charge of a lighter to the dockyard, to bring the chain cables off, how would you stow them in the lighter ?

*A.* I would stow the anchor end in the lighter first, because it would be the last to go out when alongside the ship.

*Q.* How would you know the anchor end ?

*A.* By the swivels. The cup of the swivel is always aft, to prevent it catching anywhere as the cable runs out.

*Q.* How are the swivels kept in a state of preservation ?

*A.* By pouring a mixture of white lead and tallow into the cup.

*Q.* What is the difference between a joining shackle and an anchor shackle ?

A. In a joining shackle the bolt or pin of the shackle does not project beyond the lugs of the shackle, and is secured in place by a pin passing through a hole in the shackle and bolt. This pin is made to sink into the shackle, and is secured in place by a leaden pellet well beaten down over it.

In an anchor shackle the bolt projects beyond the lugs of the shackle, and is secured by a fore lock.

Q. How does a leaden pellet keep the pin in place ?

A. When beaten down into the groove or hole it expands on the inside, thus making the pin a fixture.

Q. What precaution ought to be taken when it is necessary to replace the pellets ?

A. All lead remaining on the groove should be scraped off, which is termed reaming ; should this be neglected, the new pellet will not hold, and the pin will in time work out, also the bolt of the shackle.

Q. Where are the chain cables stowed ?

A. In the chain lockers.

Q. How many chain lockers are there ?

A. Four ; two each side of the main mast, three for the bower cables, and the fourth for the chain, stream, and messenger.

Q. What hawse-hole would you take the bower cables in at ?

A. The two nearest the stem or inner one on each bow, termed the standing hawse-hole.

Q. What are the outer or spare hawse-holes for ?

A. For the sheet cables.

Q. How are the cables got inboard out of the lighter ?

A. By double whips, led along the deck outside the bitts.

Q. Where and how is the inner end of a cable secured ?

A. In a sailing ship, to slips secured round the main mast, and in steamers to ring bolts in the sleepers on either side. The slips are shackled to necklaces round the main mast, and long enough to reach the top of the chain locker, so a cable can easily be slipped.

Q. How do you bend a cable to an anchor ?

A. By a ring rope and the fore bowline.

The ring rope is rove through the ring of the anchor, from aft forward, outside, and under all the head gear, in through the hawse-hole, and bent to the fifth or sixth link of the cable and stopped to the first link ; the fore bowline is bent inside, to assist in lighting the cable out ; also to take the weight off the ring-rope. When sufficient slack is outside the hawse-hole, clap on the ring rope, and rouse the cable up to the

ring of the anchor, cut the stop on the first link, and shackle it.

N.B.—Ships with long bows require a second ring rope.

Q. Where are the hemp cables stowed ?

A. In the tiers, coiled down right-handed.

Q. How is the inboard end of hemp sheet cable secured ?

A. Shackled to a chain stropped round a beam in the heart of the tiers, and lashed down also to one of the adjoining beams.

Q. Which side is the sheet cable coiled ?

A. On the same side as the chain sheet is stowed.

Q. Why should both chain and hemp-sheet cables be stowed the same side ?

A. There being a difficulty in bending a rope so large as the sheet cable, it therefore has to be led across the opposite side of the ship when required for use.

Q. Which tier is the stream hemp cable coiled in ?

A. The opposite tier to which the sheet cable is stowed.

Q. How is a hemp sheet cable bent to the sheet anchor ?

A. Shackled to the ganger.

Q. What is a ganger ?

A. Three lengths of chain cable, the same size chain as the bower cable, shackled to the sheet anchor ; it keeps the hemp cable from being chafed against the ground.

Q. How is a hemp sheet cable fitted ?

A. By an Elliott's eye in the outer or outboard end, and a ropemaker's eye in the inboard end.

Q. What precaution is taken to preserve the eye in the hemp cable ?

A. It is keekled over, which is merely serving over the eye with rope to prevent the cable being chafed on the ground. It is also keekled in the wake of the hawse-hole and cutwater.

Q. What are hemp, sheet, and stream cables principally supplied for ?

A. For laying out the sheet and stream anchors in the event of the ship being on shore, to assist in heaving her off.

Q. How many messengers are there supplied to a ship of war ?

A. Only one : a chain one.

#### *Working the Capstan.*

Q. Who rigs the capstan ?

A. The carpenter and his crew.

Q. What do you mean by rigging the capstan ?

A. The bars being shipped, pinned, and swifted in place.

Q. How are they secured in place ?

A. By passing pins up through holes in the drum-head, and corresponding holes in the heel of the bars, the pins are kept in place by a catch, which they fit into, by giving them a half turn.

Q. What do you mean by swifting them to ?

A. In each end of the bars there is a notch ; a piece of rope called the swifter is passed round in each notch, and swab-hitched to the end of each bar, each turn being hauled well taut, and the ends of the finish well set up together ; for this purpose a thimble is spliced in one end of the swifter for the other end to reeve through. While rigging the capstan, the pauls are kept down to steady it.

Q. Who reeves the messenger ?

A. The main and fore-top men of the watch below : gunner's mate sees it clear of turns, passed round the capstan, and placed with the long links on the teeth of the sprocket wheel ; the armourer shackles it.

Q. How is a messenger rove ?

A. A hook rope is passed down the chain locker, bent to the end of the messenger, and run up on the deck the cables are worked on—viz., on the lower deck of a line-of-battle ship, main deck of a frigate, and upper deck of a corvette or smaller vessel, forward round the rollers ; the ends are adjusted as to length, hove taut, and joined together by a long or short shackle, as required, in order that it might fit the sprocket wheel of the capstan, thus forming an endless chain, passing round and round the capstan and the roller forward, the teeth of the sprocket wheel taking the long links of the messenger at each turn.

Q. How is it hove taut for shackling ?

A. One end is secured by a strand or rope's-end being rove through the third or fourth links from the end, to a ring-bolt in the deck, the capstan is hove round to tauten the messenger sufficiently to bring the end links together for shackling.

Q. How is a hemp messenger fitted ?

A. A long lashing eye is spliced in each end, which is grafted over, the messenger is passed round the rollers in a similar way to a chain messenger, and four turns round the barrel of the capstan ; in lashing the eyes together, a drift of from four to five feet is allowed between the eyes, so as they will lay fair on the capstan, the heaving-in part being the



lowermost. The gunners are stationed by the capstan with commanders to give the messenger a tap up if it should work too low down on the barrel of the capstan.

*Q.* What is done in the event of the messenger carrying away?

*A.* Bouse to the compressor, and stopper the cable at once. Join the messenger together again with a long or short span shackle, according whether it be a long or short link that is carried away.

*Q.* If it is necessary to bring the opposite cable to, what is done?

*A.* The ends must be unlashd and passed the contrary way; this is readily done by heaving round until the eyes are close to the capstan; then cast off the lashing, slacken the turns, pass the end of the short leg of the messenger inside between them and the barrel of the capstan, render all parts until the lower turn is brought on the opposite side, re-lash the eyes, and it is ready for heaving in the other cable.

*N.B.*—Hemp messengers are not now supplied to ships of war.

*Q.* How is a hawser brought to a capstan?

*A.* With three round turns round the barrel of the capstan, the inboard part always being the upper turn.

*Preparing to Anchor.*

*Q.* Who clears the anchors away ready for letting go?

*A.* The forecastle men.

*Q.* What precautions are taken when a ship is going to anchor?

*A.* The carpenters remove the bucklers and take the hawse-plugs out. Fore and main-top men range the cables; according to the depth of water the ship is likely to anchor in, sufficient cable is ranged on the deck abaft the bitts, to allow the anchor to reach the bottom without a check, the running part outside. A bar of iron, called the bitt-pin, is shipped in the outer part of the cross piece, to prevent the chain coming off as it runs round the bitts.

*Q.* How is an anchor hung from the bows ready for letting go?

*A.* The inner fluke is eased off the bill-board clear, the ring is hung by the cathead-stopper, and the shank by the shank-painter; the inboard end of both being secured to bollard heads or large-size cavils in the ship's side.

*Q.* How is an anchor let go?

*A.* The cathead-stopper and shank-painter, being fitted to

go over tumblers, at a given signal are slipped together, and the anchor falls clear of the ship's side into the water.

Q. Who gives the signal ?

A. The boatswain, who stands on the knight-heads when the order is given by the Commanding Officer, "stream the buoy," "stand clear of the cable," "let go the best or small bower anchor," whichever it might be. The boatswain gives the order—"one, two, three ; let go," when the fore-castle men pull together on the jigger (if so fitted), which releases the cathead-stopper and shank-painter together.

First part of fore-castle men attend the cathead-stopper, and the second part the shank-painter, which are hauled inboard directly the anchor is gone.

Q. What precaution is taken at the order—"stream the buoy, stand clear of the cable" ?

A. The compressor having been thrown back clear of the cable, the chock of the tumbler is taken out, but the pins are kept in place till the order is given—"let go the anchor," when they are taken out, the lever being kept back by hand till the boatswain gives the word—"one, two, three ; let go." At the word "let go," the anchor is freed by a smart pull on the monkey tails, which are lanyards, attached to the end of the lever ; the man attending the cathead-stopper taking care he does not let go before the man attending the shank-painter does, so as to insure the anchor falling flukes down.

*Another plan of letting go the Anchor.*

A span is fitted with one end secured to the lever of the cathead-stopper, and the other to the lever of the shank-painter ; a small jigger is hooked to the span, and at the word "let go," the hands attending it give a smart pull, having received the signal that the pins are out, both levers flying back, disengage the cathead-stopper and shank-painter together.

Q. What do you mean by an anchor being a cockbill ?

A. The shank-painter being eased down and the anchor allowed to hang from the cathead secured by the cathead-stopper only. Merchant ships generally cockbill their anchor when about to come to.

Q. To what part of the anchor, and how is the buoy-rope bent ?

A. To the arms or flukes, by half-hitching it round the inner fluke, forming a clove-hitch on the crown, and securing the end by a running-eye, or clinching it over the outer fluke

A piece of chain, three or four fathoms long, is frequently attached to the end of the buoy-rope, for bending it to the anchor, as it saves the buoy-rope from being chafed on the ground.

*Q.* Who streams the buoy ?

*A.* The gunners, and next number from the after part of the fore chains, having previously seen the buoy-rope properly bent, and coiled down in the fore chains, clear for running.

*Q.* Is there any particular name given to the buoy that is bent to the anchor ?

*A.* Yes, the nun or can buoy : those used in the Navy are made of iron.

*Q.* How is a buoy-rope bent to a nun buoy ?

*A.* There are two or three ways of bending it.

First, pass the buoy-rope through both upper and lower rings of the buoy, half-hitch and seize the end back, or else secure it with an inside clinch.

Another way of securing it is to pass it through the underneath ring, swab-hitch it over the ring and seize the end back.

*Q.* What precaution is taken before slipping a cable ?

*A.* A buoy-rope is passed in through the hawse-hole, and as soon as the armourer has unshackled the cable, the buoy-rope is bent to the end of it and paid out through the hawse-hole again ; the buoy is then streamed, the cable paid out through the hawse-hole as far as the slip-stopper ; when all is clear and the ship's head has taken the right way, the slip is knocked off.

The buoy marking the end of the cable should have a distinguishing mark from the one marking the anchor.

*Q.* What is the use of a buoy to an anchor ?

*A.* It marks the position of the anchor, and prevents other ships fouling it ; it is also very useful in case of a ship being obliged to slip her cable ; it enables her to pick her anchor up again ; or in the event of one of the flukes hooking a mooring chain, or in any way becoming entangled with the bottom, by hauling on the buoy-rope, it will capsize the anchor and in all probability clear it.

*Q.* How is the cable checked when running out ?

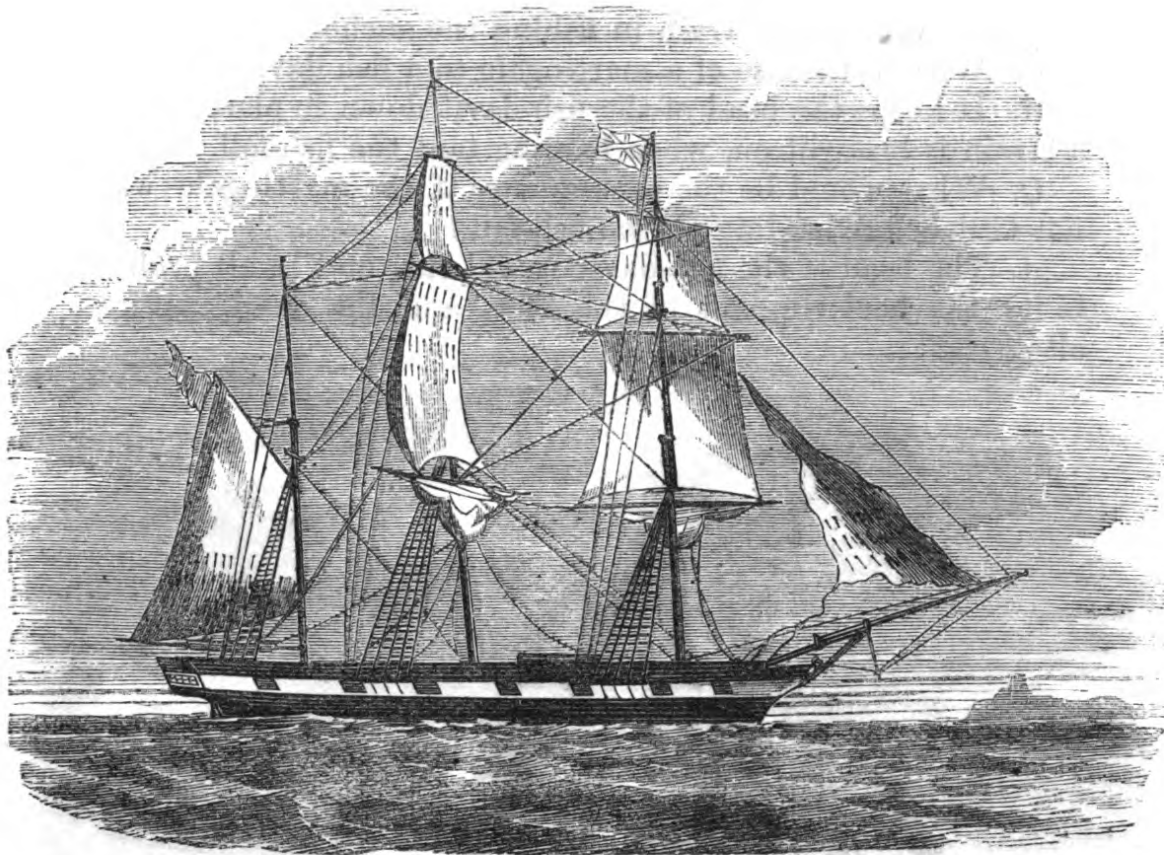
*A.* By the compressor being boused to, which binds it against the chain pipes.

*Q.* Who attends the compressor tackle ?

*A.* The idlers on the lower deck.

*Q.* When there is sufficient cable out, how is it secured ?

*A.* By being bitted, and by means of deck stoppers.



BARQUE.

*Weighing Anchor.*

*Q.* What preparations are made for weighing anchor ?

*A.* The slip-stopper is put on before all, and the cable is unbitted ready for bringing-to ; the forecastle men reeve and overhaul the cat-fall down ; when sufficient is overhauled to allow the cat-block to reach the hawse-holes, it is hauled forward by the cat-back, ready for hooking ; they also see the martingale of the fish-davit hooked in place.

Foretopmen trice up the up and down tackle by the inner lower studdingsail halyards, and lash it to the short leg of the lower pendant, and hook the single block to the head of the fish-davit, to act as a topping-lift.

The gunners rig the fish-davit, and reeve the fish-fall when it is hauled forward in place by the fish-back, ready for hooking.

*Q.* Where is the fish-davit shipped, and how is it secured in place ?

*A.* It is shipped in a shoe, in the fore part of the fore chains, and kept in place by fore and after guys, topping-lifts,

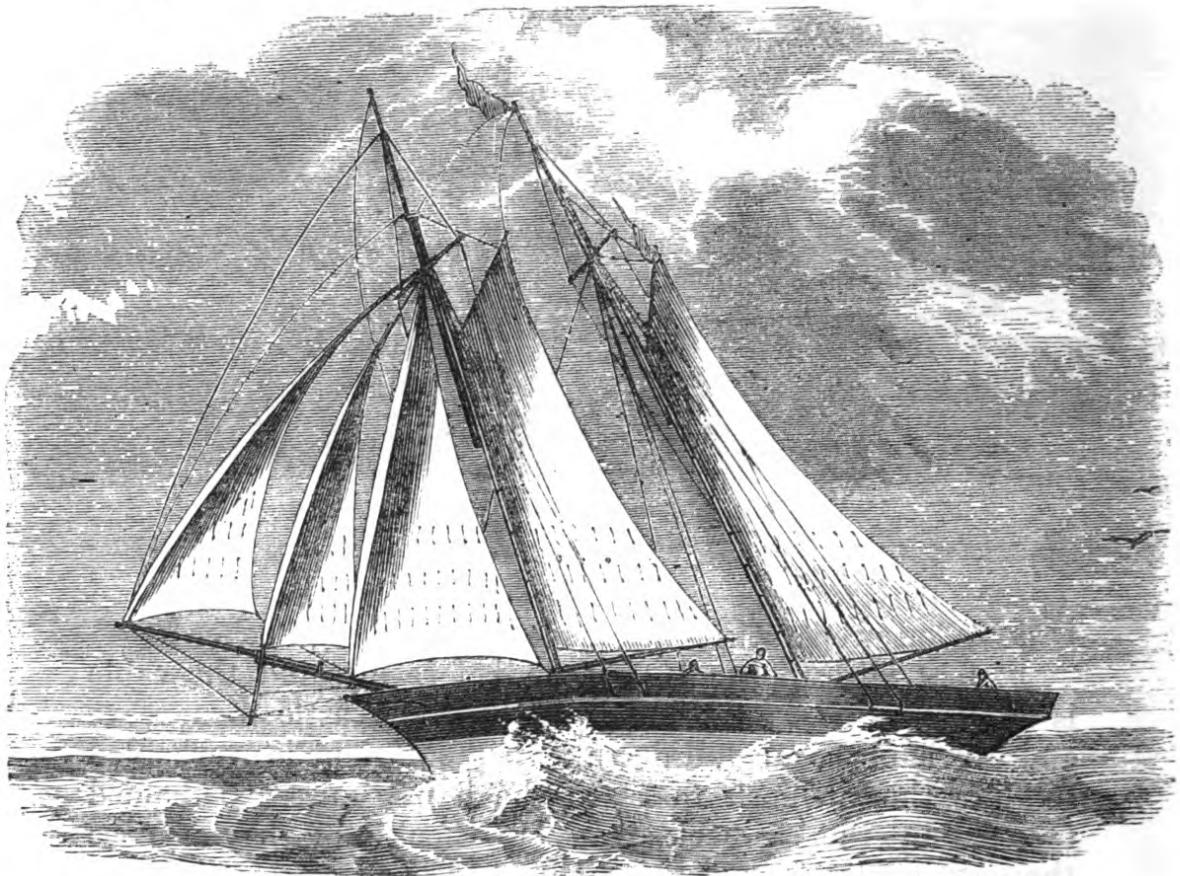
and a martingale. The after guy is the largest guy, as it has to bear a very great strain in fishing the anchor.

*Q.* What is the use of a martingale to a fish-davit ?

*A.* It keeps the head of the fish-davit down in place, when a strain is brought on, when hauling taut the fish-fall.

*Q.* What would be the consequence if the martingale was not taut before hauling on the fish-fall ?

*A.* The head of the fish-davit would rise, and in all probability the heel slip out of the shoe, and the davit capsize altogether.



A FORE AND AFT SCHOONER ON A WIND.

*Q.* What is the use of the topping-lift to the fish-davit ?

*A.* After the fish-fall has brought the fluke level with the bill-board, pull up on the topping-lift, at the same time easing away the martingale ; when in position, lower the fish-fall, and place the bill of the anchor on the bill-board, where it is secured by the shank-painter.

*Q.* How is the cable secured to the messenger for heaving in ?

*A.* By rope or iron nippers.

*Q.* How is a rope nipper passed ?

*A.* The messenger is brought to a cable, as a cable cannot be brought to a messenger. This is done by taking two round turns with the after or inboard end of a nipper round the messenger by one of the inside hands ; the coil or remaining part of the nipper is then passed over the cable to one of the outside hands, who, facing aft, passes it round the messenger and cable, with the sun on the port side, and against the sun on the starboard side, rousing each turn taut, keeping the messenger on top of the cable, dogging the end round the cable and round the end of the next nipper, to prevent it from slipping ; it is held by one of the topmen, who walks aft with it. When far enough aft, and the cable is secured by other nippers following in a similar way, he starts the nipper he is holding and passes it forward again: the nippers are constantly being passed in this way as the cable comes in at the hawse-holes. When there is much sea on, or a great strain, racking turns are passed.

*Q.* Who passes the nippers ?

*A.* Main and foretop men ; foretop men working before, and maintop men abaft the bits.

*Q.* What is meant by heaving through all ?

*A.* When the cable is covered with mud it slips through the nippers ; to prevent this, buckets of sand are kept close at hand, and the hands passing the nippers keep on throwing sand over the cable as it comes in, and the turns of the nippers are passed thicker ; if this is not sufficient, a round turn is taken round the messenger, then another round turn round the cable, with racking turns between.

*Q.* How is an iron nipper secured to the cable ?

*A.* A shackle, fitted with a hinge at one end, and a slip at the other, holds the messenger and cable together ; one of these is only used at a time, the second one being put on as the first gets well aft.

*Q.* When the anchor is hove up to the bows, what is done ?

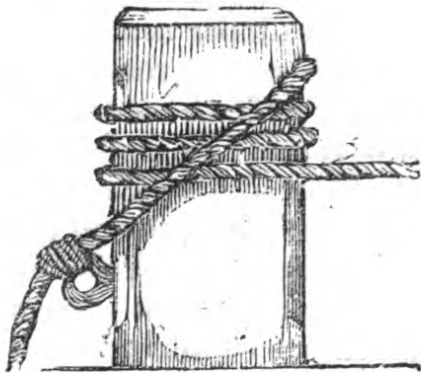
*A.* Pipe (avast heaving) when the slip-stopper is put on before all, walk back the capstan until the slip has the weight of the anchor ; then off nippers, and bitt the cable.

*Q.* Why is the cable bitted ?

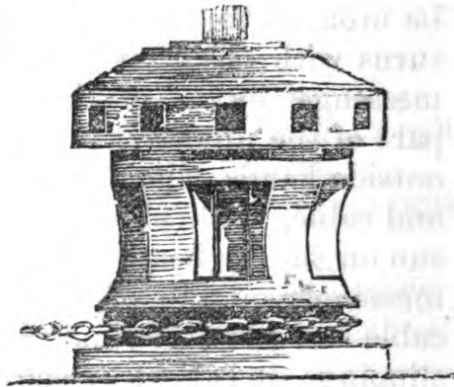
*A.* To prevent the cable running out too freely when the slip is taken off for catting the anchor.

*Q.* When is the slip knocked off ?

*A.* When the cat is hooked, and all parts of the cat-fall are taut, the boatswain pipes veer, or surge the cable ; when sufficient is out to allow the anchor to reach the cathead,



**BOLLARD HEAD**



**CAPSTAN**

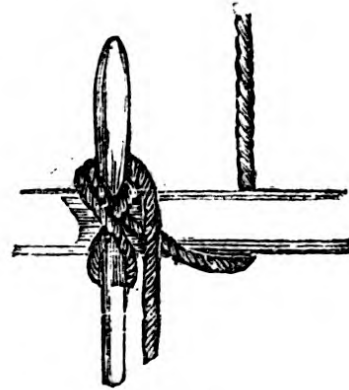
**BELAYING A ROPE.**



**FOUL**

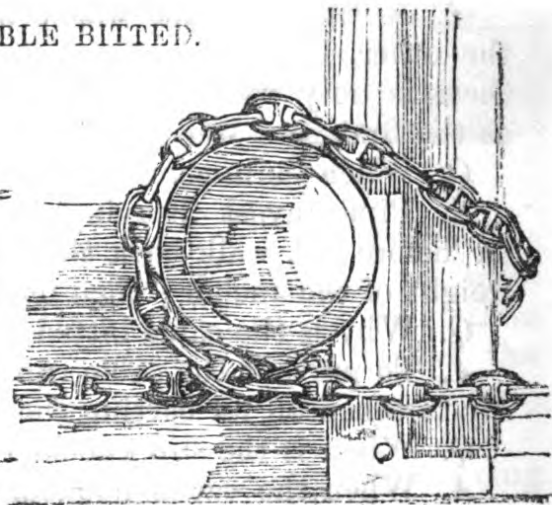
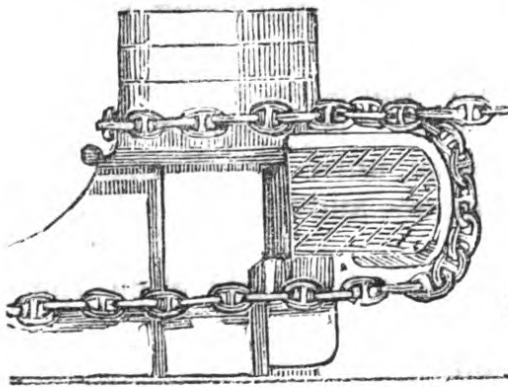


**RIGHT WAY**



**OVER A PIN**

**PORT CABLE BITTED.**



the slip is again put on to prevent the cable from running out.

*Q.* Who hooks the cat-block, and how is it hooked?

*A.* The forecastle men. It is hooked with the bill of the hook in or towards the ship's side. When all is ready, walk away with the cat.

*Q.* Where do the men stand to hook the cat?

*A.* They are slung in bowline knots, and stand on the stock of the anchor; the block having been roused forward by the first cat-back, the second cat-back is rove through the thimble in the bridle of the cat-block, and led up through the head gratings on to the forecastle, where the standing part is made fast; it takes the weight of the block while the men on the stock guide the hook in the ring of the anchor; the bridle is a piece of rope spliced into two small eyebolts on the fore part of the shell of the block, with a thimble seized in it for reeving the cat-back through; when the cat is hooked, and the cable surged, the small cat-back is unrove. The large one is always kept in place for tricing the block up to the cathead after the cathead-stopper is passed.

*Q.* Who hooks the fish?

*A.* The captain of the forecastle; the fish-hook is hauled forward by the fish-back, and when in a fair way of catching the inner fluke it is eased up; when hooked, the fish-fall is steadied taut.

*Q.* What prevents the fish from unhooking?

*A.* The shoulder of the fluke.

*Q.* What is a fish-back?

*A.* A rope bent to the fish-hook to rouse it forward in place for dropping it over the fluke of the anchor; it is half-hitched round the hook, just below the eye, and seized down on the back part of the shoulder of the hook.

*Q.* How do you reeve a fish-fall?

*A.* Through the single block in the fish-davit head down through the foremost sheave of the lower fish-block, up through the foremost sheave in the double block, over the davit heads, and so on to the finish; the standing part is secured round the neck of the lower block; the hauling part is rove through a single block lashed to the long leg of the lower pendant.

*Q.* Why are the cat and fish-falls rove through the foremost sheaves?

*A.* Because they are the first to tauten, therefore will not jamb the after parts.



*Q.* How do you reeve a cat-fall ?

*A.* Reeve it through the foremost sheave in the cathead, through the foremost sheave in the cat-block, and so on until it is rove in full ; the standing part is clinched to the eyebolt under the cathead, or secured with a round turn round the cathead, and timber-hitched.

*Q.* Where are the hauling parts of the cat and fish-falls led ?

*A.* Through leading-blocks hooked to the eyebolts on the opposite side of the deck.

*Q.* What is done when the anchor is up to the cathead ?

*A.* The cathead-stopper is passed and secured. The stock pendant is put over the outer part of the stock, the stock tackle hooked and steadied taut ; the fish is hooked to the inner fluke of the anchor.

*Q.* What precaution do you take before walking away with the fish-fall ?

*A.* Unhook the cat-block, and attend the stock-tackle ; when all is ready, walk away with the fish-tackle, attending the martingale and topping-lift ; when the inner fluke is landed on the bill-board, pass the shank-painter.

*Q.* Why is the cat-block unhooked before walking up the fish ?

*A.* To prevent it being split between the cathead and anchor as the fish brings the anchor up.

*Q.* How is a stock pendant and tackle fitted, and what is its use ?

*A.* The pendant is fitted with a running eye in one end to go over the anchor stock, and a thimble in the other for the tackle to hook to ; a luff is generally used for the tackle ; when in place, and steadied taut, it prevents the inner or lower arm of the stock from scraping the ship's side in fishing the anchor ; it is also used when stowing the anchor for sea after the second catting, to bring the stock close into the bill-board.

*Q.* How is an anchor cleared when hove up to the bows foul ?

*A.* We will suppose, for example, the anchor comes up flukes uppermost.

Clap the foul-anchor strop on the fluke most convenient, or the crown, hook the cat, and walk the anchor up to the cathead, then hang the anchor by passing an hawser equal to the weight over the thumb-cleat round the fluke, and hitching it to the cathead.

Haul taut the hawser and belay it, ease up and unhook the cat or strop. Overhaul the cat, and hook it to the ring of the anchor.

Ease away the hawser, and walk up the cat at the same time. Clear the cable with ring ropes.

Slue ropes on the stock will be found a great assistance.

Should the anchor come up with the cable round the stock, and the ring turned down so that it is impossible to hook the cat to it, put a strop round the stock in such a way as to insure its not slipping.

Hook the cat to the strop, and walk the anchor up to the cathead, when the cable can be readily cleared, either by ring ropes, or hanging the cable, unshackling it, dipping it round the stock till clear, and shackling it on again.

Hang the anchor, unhook the cat, off strop, and hook the cat to the ring, and cat the anchor.

## TECHNICAL TERMS RELATING TO ANCHORS AND CABLES.

*Shorten in Cable*—Is to heave a certain portion of it in.

*Cable a long Stay*.—An expression used in shortening in cable when the anchor is a short distance ahead, and the cable only forming a small angle with the anchor.

*Cable a short Stay*.—The cable is said to be a short stay when it grows in a line with the forestay.

*Cable Grows*.—A cable is said to grow when it leads in any particular direction. As the cable grows on the port or starboard bow right ahead, astern, under her bottom, &c.

*Cable short Apeek*.—A cable is called short apeek when it is nearly up and down. It is up and down when the ship is directly over it.

*Cable under Foot*.—The cable is said to be under foot when it is veered quickly before the ship has had time to drop astern clear of her anchor.

*Anchor Away*.—The anchor is said to be away directly it is broken out of the ground.

*Anchor heaving in Sight*.—An anchor is said to be heaving in sight directly any one can see it from the bows; it is reported foul or clear, as the case may be; it is clear anchor

when it hangs fairly by the ring from the end of the cable ; and a foul anchor if the cable has a turn over one of the arms of the stock or fluke.

*Anchor coming Home.*—An anchor is said to be coming home, or dragging, when it will not hold. It is said to bite well when the lower fluke has a good hold on the ground.

*Drop an Anchor under Foot.*—To drop an anchor under foot is to let go a second anchor without veering cable on it.

*Back the Anchor.*—To back an anchor is to lash another anchor or pigs of ballast to it.

*Nun Buoy watches well.*—A nun buoy is said to watch well when it floats lightly over the anchor.

*Bleeding a Buoy.*—When a buoy leaks, and you are obliged to make a hole to let the water out, it is called bleeding a buoy.

*The Buoy watches.*—A buoy watches when it is not carried under the surface by the strength of the tide or other causes.

*Single Anchor.*—A ship with one anchor down is lying at single anchor.

*Moored.*—When a ship has two anchors down.

*Moorings.*—Two or more anchors laid down with large chains, ready for a ship to secure to.

*Veering Cable*—Is to light it along the deck and pay it out of the hawse-holes.

*Surging.*—Veering cable suddenly ; or a hawser slipping up the barrel of a capstan is said to surge.

*A Spring.*—Leading a hawser from aft, and making it fast to the cable the ship is riding by, so as to bring her broadside, by heaving on the hawser, in any required position.

*Adrift.*—Slipping or breaking away from moorings.

*Warping.*—Transporting a ship from one part of a harbour to another by means of hawsers.

*Kedging*—Is hauling a ship about a harbour or anchorage by means of small anchors and hawsers.

---

## LIFE BUOYS, AND THEIR USE.

There are two descriptions of life buoys supplied to Her Majesty's ships.

### *Kisbie's Life Buoy*

Is a small circular buoy, fitted with beckets round it, to hang on by when there is more than one person floating by it.

These buoys are distributed round the upper deck of a ship, hung in conspicuous places, ready for use at the shortest notice.

At the alarm being given of a man overboard, one of these buoys is immediately thrown to his relief.

Care should be taken not to throw it at random, or in a wild way, merely for the sake of pitching it overboard, without any regard to the position of the man in the water.

First ascertain where the man is, and then throw it as near him as possible. If he has fallen from forward, by running aft you will, in all probability, be able to throw it in advance of the man in the water, and be the means of saving him.

The best position for one man to keep himself afloat by a Kisbie's life buoy, is to slip it over his head, and rest his arms over it on either side : in this position, by keeping himself perfectly steady, he will float for any length of time, until a boat can be sent to pick him up.

#### *The Service Life Buoy*

Is floated by two large copper balls, and is supposed to be capable of keeping four men afloat.

It is attached to a ship's stern by means of a slip, which is disconnected by pulling a trigger, when the buoy is immediately freed, and falls into the water, clear.

At night, the same trigger fires a friction tube, which ignites a fuse that exhibits a blue light, and burns from fifteen to twenty minutes, thus marking the position of the buoy.

The buoy is primed every night at sunset, the tube being removed again at sunrise.

Great coolness and caution is required to float on this buoy. As soon as you get hold of the buoy, place your feet on the balancing plate, grasping the buoy above the balls with your left hand, and the up and down rod above again with your right hand, to keep it from striking you on your head by the quick motion the sea invariably gives one of these buoys.

In this position you will float with your head well out of the water.

Some men get frightened, and endeavour to raise themselves higher up the buoy, which is certain to overbalance it, and throw them headlong into the water again.

A sentry is constantly stationed by this buoy at sea.

## LOG LINE.—LOG SHIP.

*Q.* Describe a log line ?

*A.* The first part of the line is called stray line ; a piece of buntin marks the end of the stray line ; the marking of the line commences from the piece of buntin, and is equally divided into parts, called knots and half-knots, and is marked thus :—47 ft. 3 ins. from the buntin which terminates the stray line, a piece of leather is put, which denotes the first knot or mile ; thus at every 47 ft. 3 ins., knots are put to denote the number of miles or knots, from two knots up to the required number, the line being marked according to the highest rate of speed the ship is expected to go ; between every knot there is what is termed a half-knot, which is a single knot.

*Q.* How does the log line so marked denote the speed of a ship ?

*A.* Two log glasses are used in conjunction with the log line, called the long and short log glasses. The long glass is a 28-sec. and the short one a 14-sec. glass.

The long glass is used when the ship is supposed to be going less than five knots through the water, and the short glass when her speed is greater.

The division of knots on the log line bears the same proportion to a nautical mile as the log glasses do to an hour.

*For example*—If the long glass is being used, and three knots run out, the ship is going at the rate of three knots an hour ; if the short glass is being used, she is going six knots an hour ; if the one knot between the three and four knots, with the short glass, it will denote that the ship is going seven knots ; if the long glass, three and a half knots.

*Q.* What is the use of stray line, and what length ought it to be ?

*A.* It takes the log ship out of the influence of the eddy water in the ship's wake, and also allows it to get a good hold of the water, before the whole of the stray line is out, and the marking of the ship's way through the water is begun.

The length of the line should be rather more than the length of the ship.

*Q.* How is a log ship attached to a log line ?

*A.* By three pieces of line called legs, two being spliced into the log line, the end of the log line forming the third.

There are three holes in the log ship ; one in the upper or pointed part, the other two at the opposite extremes of the log ship, just above the circular part ; through one of these, and the hole in the upper part, two of the legs are rove and knotted to keep them in place, the other leg has a peg of hard wood or bone spliced in it, and when the log ship is in use, it is put into the remaining hole of the log ship. When the log ship is thrown into the water, being slung in this way, it swims in an upright position, the lower, or arc part, being weighted, catches the water and remains stationary, and as the ship moves ahead away from it, the line which is kept on a reel runs out, the reel being held in a position to facilitate its movements.

A knot is divided into ten parts, but not so marked on the line, the person heaving the log judging according to the length of line out. For instance, a ship is said to be going 4 and 2, 4 and 6, 4 and 8, according to the length of line run out between the knot and half-knot.

*Q.* How is the log hove ?

*A.* The person that heaves the log stands as near the lee quarter as possible, inserts the peg in the hole of the log ship, takes several fakes of the line in one hand, to insure sufficient slack line to allow the log ship to fall clear into the water, holding the log ship in the other, sees the reel is held in a good position, and then asks the question, "Is the glass clear?" which is answered by the person holding the glass (which is generally the quartermaster of the watch), "a clear glass."

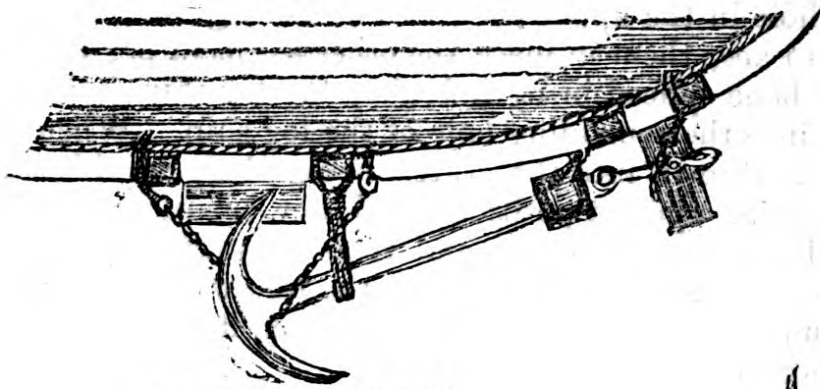
The log ship is then dropped into the water and floats astern, care being taken that the line is not checked ; when the piece of buntin marking the stray line passes through the hand of the person heaving the log, or over the quarter, he calls out "turn," which is answered by the person holding the glass saying "turn," attending the line that it runs out freely, occasionally assisting it by a slight tug.

The person holding the glass, when all the sand has run out, calls out "stop," when the line is instantly checked, and the nearest knot is looked for, which denotes the rate the ship is going.

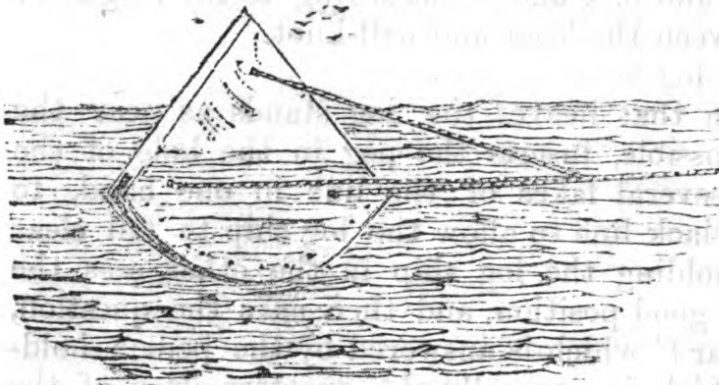
Directly a strain is brought on the line, the peg slips out, and the log ship floats on its flat in the water, in which position it offers no resistance, and is easily hauled in.

Should the peg stick fast in the hole, it is very difficult to haul the log ship in, and it often carries the line away ;

A BOWER ANCHOR.



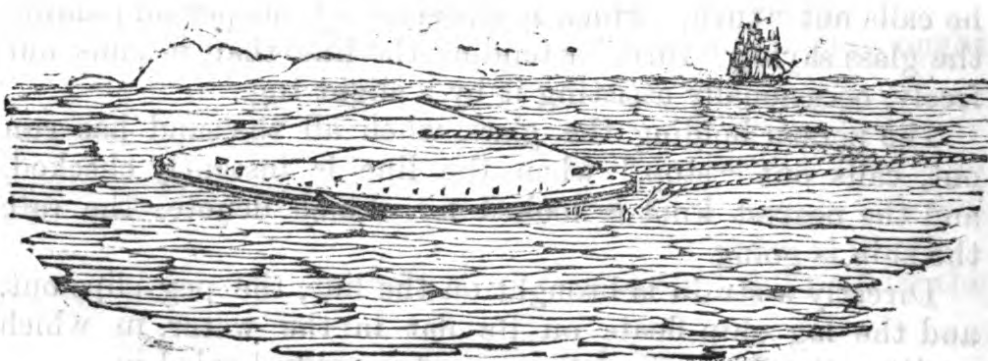
SECURED FOR SEA.



LOG SHIP (PEG IN).



SOUNDING LEAD.



LOG SHIP (PEG OUT) BEING HAULED IN BOARD.

therefore care should be taken not to jamb the peg in too tightly.

*Q.* Who heaves the log?

*A.* The midshipman of the watch.

*Q.* How often is it hove?

*A.* Every hour, and the result noted in the log book.

*Q.* What difference is there between a nautical and a land mile?

*A.* A nautical mile contains 2027 yards, whereas a land mile is only 1760 yards.

*Q.* What is the cause of this difference?

*A.* A land mile is measured without any reference to the size of the earth.

A nautical mile is the number of yards contained in the circumference of the earth at the equator, divided by 21·600 ( $360^\circ \times 60$ ), the number of minutes in a circle, or the sixtieth part of a degree on the equator.

#### *Patent Log.*

*Q.* Is there any other mode of finding out the speed of a ship, or the distance run by her in any given time?

*A.* Yes; Massey's patent log, which is considered the most accurate way of measuring the distance run by a ship.

*Q.* How is it used?

*A.* It is bent to the end of a deep-sea lead line, and veered about forty or fifty fathoms astern, generally from one of the weather quarter boats, which takes it to windward, and well out of the influence of the eddy water in the ship's wake.

*Q.* What does it consist of?

*A.* An indicator, with three dials, one marked in divisions of 10 up to 100 miles, the second marked in divisions of miles up to 10 miles, and the third marked in four quarters of a mile.

Thus the last dial denotes the quarters; the second dial, the miles up to 10; and the first shows the 10; that is, whether it is  $47\frac{1}{2}$  or  $56\frac{3}{4}$  miles.

*For example*—If the ship has run  $47\frac{1}{2}$  miles, one dial will mark 40, the next dial 7, and the next dial half a mile, which, by adding the three together, gives the distance run as  $47\frac{1}{2}$  miles, so on up to any distance under 110 miles.

The log is usually hauled in at the end of each watch, and the result registered in the ship's log book.

A fan is attached by a piece of cord to the after end



of the indicator, and as the ship moves through the water, the fan is turned by the action of the water, which motion is communicated to the wheel, worked by means of the piece of cord which connects the face to the indicator.

On the fore end of the indicator a piece of iron rod is attached also by means of a piece of cord; just abaft the hole for the cord are two iron studs through the iron rod, crossing each other at right angles.

In the after end of the rod is a hole for bending the end of the deep-sea lead line to, which is bent in a similar way that it is bent to the becket of a lead.

*Q.* What advantage has the patent log over the common log?

*A.* Very often the wind is uncertain: at one part of the hour blowing a fresh breeze, at another nearly a calm; the common log merely shows what the ship is going at the time it is hove, and the officer of the watch judges what in his opinion the ship has really made, which of course is liable to error, whereas the patent log shows the exact distance the ship has run, whether it has blown fresh one part, and the ship has gone at the rate of ten knots, and at another part of the watch it has been nearly a calm, and she has scarcely moved through the water, still the true result is shown.

---

## GUNNERY EXERCISE.

---

### QUESTIONS ON NAVAL GUNNERY.

The following practical questions in Gunnery will be found useful to boys when passing through a Training Ship:—

*Q.* What is the use of the priming wire?

*A.* To prick the cartridge and to ascertain that the vent is clear.

*Q.* Why do you prick the cartridge?

*A.* To ascertain that the charge is home.

*Q.* Would the charge ignite if it was not pricked?

*A.* Yes, the strength of the tube being sufficient to penetrate three or four thicknesses of the cartridge bag.

*Q.* Why would you enter the cartridge seam sideways and bottom first?

---

A. To prevent the seam or tye of the cartridge getting under the vent, in which case the gun would miss fire.

Q. What is the cause of a gun missing fire ?

A. In the first instance, the charge not being home ; secondly, being entered tye first ; lastly, the tubes being old or damp.

Q. Why do you enter the cartridge to the full extent of the arm ?

A. To give sufficient room for the projectile ; also to protect it from the fire of other guns, and from getting wet from a spray of the sea entering the ports.

Q. What is the use of the vent bitt ?

A. To clear the vent when it is choked, taking care to use it between the two left forefingers and thumb, being the safest way.

Q. What is the use of the sponge ?

A. To extinguish any fire left in the gun.

Q. What is the particular duty of Nos. 3 and 4 when sponging and loading ?

A. To see that No. 1 serves the vent, for if the vent was not served, the lives of Nos. 3 and 4 would be in great danger, as the charge may ignite from any burning fragment that may be left in the gun.

Q. What is the use of the rammer ?

A. To ram home the charge and projectile.

Q. Supposing the rammer was broken, or lost overboard, and no spare one at hand, what would you do ?

A. Ram home with the sponge.

Q. Why is the sponge tapped under the muzzle after sponging ?

A. To knock off any burning or fouling fragments.

Q. Supposing any fire came out of the gun after sponging, what would you do ?

A. No. 1 would direct No. 3 to extinguish it with a wet swab, which would be taken off the tompion in action, and wetted for the purpose.

Q. What is the use of the worm ?

A. To search the gun ; that is, to withdraw projectile, charge, or anything else that may be left in the gun.

Q. Suppose the rammer jammed in the gun, what would you do ?

A. Run the gun out till the muzzle is square with the outer port sill, place a handspike across the port outside, and lash the staff of the rammer to the handspike with the con-

verging line, man the preventer tackle or preventer ropes, and run the gun gently in.

*Q.* Suppose the rammer-head is left in the gun, what would you do then ?

*A.* First try a boarding pike to get it out with ; if that failed, drown the charge by pouring water or vinegar down the vent and muzzle, introduce a small quantity of powder down the vent, see the range clear, and blow it out ; if the range be not clear run the gun close in, depress the muzzle in the waterways, place the wet swab in the waterways to receive the fire and rammer-head, and blow it out.

*Q.* Suppose the priming wire was jammed in the vent, what would you do ?

*A.* Place a handspike across the gun, lash the bow of the priming wire to the handspike with the spare tube lanyard, and direct the handspike men to draw it out.

*Q.* What is the use of serving the vent ?

*A.* To stop any current of air passing through the gun when sponging and loading. This is one of the most important duties of the captain of a gun, which, if not strictly attended to, places the lives of the whole of the gun's crew in danger, should the charge ignite while being rammed home.

*Q.* If firing with extreme elevation and you require more, what would you do ?

*A.* List or roll the ship.

*Q.* If the ship is rolling, would you fire with a rising or falling motion ?

*A.* With a rising motion, looking out to fire just before the sights are brought on.

*Q.* How would you lay a gun horizontally in harbour ?

*A.* By pointing with the sights close down at an object, the same height above the water as the gun is.

*Q.* How would you lay a gun horizontally at sea ?

*A.* By pointing with sights close down at the horizon.

*Q.* What is the meaning of spiking a gun ?

*A.* Insert a spike made for the purpose, or a nail, in the vent-hole.

*Q.* How would you clear a gun spiked with a spring spike ?

*A.* Turn the spring of the spike towards the muzzle by the notch in the head, press the rammer-head gently against the spring, and pull the spike out.

*Q.* How would you clear a gun spiked with a common spike ?

A. Load the gun with a reduced charge and shot, lay a train of powder along the bore of the gun, place a piece of Bickford's fuze or match in the muzzle of the gun, and set fire to the outer end of the match.

---

PART I.

QUARTERS.

The guns are to be arranged in divisions, distinguished as 1st, 2nd, 3rd, &c., divisions of quarters, and a Lieutenant appointed to command each. In all cases where the armament on a deck consists of heavy guns, each division of quarters is to be composed of a certain number of guns on the same side of the deck, as in action the guns on each side would be working independently, and delivering their fire on objects at different bearings and distances, and consequently could not be directed by the same word of command.

NOTE.—Guns of six tons weight and upwards are "heavy" guns, and of less weight, "light" guns.

*Numbering the Guns.*

Heavy guns are to be numbered, odd starboard, and even port, commencing from forward; but with light guns, each gun and its opposite should bear the same number, beginning from forward with No. 1 on each deck; the odd-numbered guns the starboard side, and the even-numbered guns the port side, being known as the left guns, and the others as the right guns.

To every two guns on each side of less than six tons, a crew will be allotted—viz., to a

64-pr.	M. L. R. Gun	...	...	...	14 Men.
7-inch	B. L. R. Gun	...	...	...	18 Men.
40-pr.	B. L. R. Gun	...	...	...	12 Men.
68-pr.	S. B. Gun	...	...	...	18 Men.
10-inch	S. B. Gun	...	...	...	18 Men.
8-inch	S. B. Gun	...	...	...	14 Men.

The crews will be known as the first, second, third, &c. gun's crew. When all the guns require to be manned, the odd-numbered guns' crews will man the starboard guns, and the even-numbered guns' crews the port guns. The odd

numbers manning the left, and the even numbers the right guns.

#### STATIONING THE MEN AT QUARTERS.

##### *Gunnery Instructors and Seamen-Gunners.*

In large vessels the Gunnery Instructors should not be stationed at the guns. The captains of the guns are *always* to be seamen-gunners, and the other more important numbers will also be filled by them, as far as possible.

A proper proportion of the seamen-gunners should be reserved for the principal duties in the magazines and shell-rooms.

##### *Remainder of the Guns' Crews.*

The remainder of the guns' crews should be formed of men taken, as much as possible, in equal proportions from the different parts of the watch bill, avoiding stationing Petty Officers at guns of which the Captains are their subordinates. All the leading numbers in the watch bill and the upper yard men should be stationed near their work. No. 8 at heavy guns has the important duty of attending the compressor, and as so much depends on its proper working, care should be taken in his selection.

#### RIGGERS.

The riggers, who will be under the command of the boatswain, should consist of good seamen taken from the different parts of the watch bill, but are on no account to include a seaman-gunner, unless he holds the rating of chief boatswain's mate.

#### MAGAZINE MEN.

The gunner will superintend the supply of powder from the principal magazine, and the chief gunner's mate that from the after magazines. A seaman-gunner is to be stationed in each section of the magazine, his duty being to supply from the powder cases. The remaining men required in the magazines and handing-rooms, and on the different decks, are to be taken from the idlers, the best men being stationed in the handing-rooms.

#### POWDERMEN.

No fixed rules can be given for the distribution of the powdermen, as in some ships the supply of powder to the guns can be carried on from the deck below.

As a rule, each gun of six tons weight and over will require two powdermen, and guns below that weight two stationary and one extra powderman to every four guns. For heavy guns, men are to be stationed to supply powder, the charges being too large for boys. The marines will take the duty of powdermen at their own guns.

#### SHELLMEN.

A sufficient number of men, according to the fittings of the ship, are to be stationed to supply the shells to the gun deck. This party should be formed from the idlers. With heavy guns extra men will be required to supply the shell from the shell hatch to the guns; with light guns this duty will devolve on the left rear men. If shell barrows are supplied, fewer men will be required than if the projectiles had to be carried. A gunner's mate will be in charge of the shell-room. The fitting of fuzes (when necessary) is to be performed by a gunner's mate, or first-class seaman-gunner, under the superintendence of an efficient officer.

#### FIRE BRIGADE.

The carpenters, and a portion of the stokers, will form the fire brigade, under the command of either a Lieutenant or Sub-lieutenant.

#### STORE-ROOMS, SIGNALS, WHEEL AND RELIEVING TACKLES, ATTENDING THE SURGEON.

In addition to the above stations, men will be required to attend in the store-rooms, also for signals, wheel and relieving tackles, and to attend the Surgeon.

#### ARRANGEMENTS FOR CONCENTRATING AND DIRECTING THE FIRE OF THE GUNS.

With truck guns, the beams or deck overhead will be marked at a convenient distance in rear of the guns, so as to admit of their being converged on the several bearings of abeam,  $1\frac{1}{2}$  point and 3 points before and abaft the beam, at a distance of 500 yards. Although the guns are converged at only one distance, it would be evident that the fire would under ordinary circumstances be effective at all distances up to 1000 yards.

Whenever a ship's broadside consists of both slide and

truck guns, the converging should be arranged for the same bearings.

The directing instrument should be fitted in each ship as nearly over the directing gun as convenient, on battens parallel to the keel and to the plane of the deck.

#### PREPARATION FOR BATTLE.

On the call for action being sounded, the guns should be at once loaded and run out, but they should never be fired without distinct orders from the Captain. If the Captain desires the guns to be loaded otherwise than with full charges and common shell, or if he wishes any description of firing to be immediately commenced, he will direct the "Still" to be sounded, and will communicate the necessary orders by the voice-tubes.

Careful officers should be stationed at the voice-tubes on the different decks to convey the Captain's orders to the Divisions of quarters and the magazines. The officers stationed at the director, and to ascertain the varying distance of the enemy, should be ready under the directions of the Captain to communicate the necessary information to the divisional Officers.

The gunner will obtain the keys of the magazines and shell-rooms from the commanding Officer.

The fire brigade are to rig all the pumps and see hoses clear; any handles which interfere with the working of the guns, &c., should not be shipped until required.

A supply of small arm ammunition, and spare cases of friction tubes, should be placed in convenient positions on the gun deck, ready for instant issue, by men specially stationed for this duty.

It will be the duty of the fire brigade to extinguish all fires below the gun deck, and should they not be able to do so, the guns' crews in the immediate vicinity will be directed to secure their guns and assist the fire brigade. Should a fire occur on a gun deck, the nearest guns' crews will extinguish it; and for this purpose all guns' crews should be instructed in the duties of working the pumps and screwing on hoses and branch pipes at their respective quarters.

## HEAVY RIFLED GUN EXERCISE.

### PART I.

#### PRELIMINARY DRILL.

In the Preliminary Drill are explained the particular duties to be performed by each of the gun's crew in the several evolutions comprised in the heavy rifled gun drill. Too much attention cannot be paid to the thorough instruction of the men in these duties; upon this depends in a very great measure the accuracy and rapidity of the fire, which are the two great objects of all the training of the gun's crew.

The Preliminary Drill contains each particular number's duty under ordinary circumstances; the Practice (Part II.) being nothing more than a combination of the minor evolutions to be described in this part.

The following drill is laid down for the 8-in. and 9-in. guns, with endless chains for running in, tackles being used for training; and for 7-in. guns without winches.

The alterations in the drill consequent on the adoption of any other fitting will be given at the end of Part II.

The crew will fall in two deep in rear of their gun, as under:—

Rear Rank	10 . 12 . 14 .	15 . 13 . 11 . 9.
Front Rank	8 . 6 . 4 . 2 .	1 . 3 . 5 . 7.

#### *Close up.*

The gun's crew will place themselves as follows:—

No. 1 the captain, on the slide, facing the port; 2 the second captain, on the right of 1, clear of the recoil; 3 close to the ship's side, on the left of the gun; 4 close to the ship's side, on the right of the gun; 5 in rear of 3; 6 in rear of 4; and so on in succession.

NOTE.—When desirable for drill purposes to change duties; at the order "CHANGE ROUNDS," No. 3 becomes 4, and the remaining Nos. move round one place to the left.

#### *Number.*

No. 1 calls 1, and the remainder of the crew call their Nos. in succession.



*Cast Loose.*

Nos. 1 and 2 take the levers and knock off the slips; 3 and 4 then place securing chains in waterways; 5 and left rearman provide projectile; 7 and 8 clear away training tackles; 9 and 10 receive the levers from 1 and 2, and lay the gun for loading, then clear away side tackles; 11 and 12 attend clamps, clear away side tackles, then ship winch handles; 3 and 13 clear away and hook on shell burton, right rearman the preventer rope.

NOTE.—No. 2 removes the housing block.

If the ports are to be triced up before "Casting loose," Nos. 3 and 4 receive the levers from 1 and 2 after they have slipped securing chains, and bear out; 2, 8, 10, 12, and 14 tricing up the port, 2 belays the fall, the Nos. then proceed as above.

If ships are fitted with bucklers, thus allowing the guns when laid square to be run out over them, the bucklers are not to be let down unless depression is required.

When fitted with half ports 3 and 4 bear them out.

The gun is always to be wormed and the vent bored down before loading after casting loose.

When the gun is loaded and run out, 3 takes up the front, and 2 the rear flap.

*Sponge.*

No. 1 serves the vent, 3 and 4 step in towards the muzzle, 6 gives the sponge to 4, who, assisted by 3, forces it hard home to the bottom of the bore, giving it a round turn; he then withdraws it, and 6 gets the rammer.

NOTE.—The gun is not to be sponged until No. 1 has his thumb on the vent, which is to be kept there until the loading is completed.

While the gun is being sponged, 5 and left rearman bring up and hook on projectile, 13 clearing away the shell burton.

When the gun is trained so much to the left, as to prevent 4 using the sponge, 3 will take that duty, 4 assisting as much as possible.

The movements of the hands and feet should not be considered of any importance. The only points to be insisted on in sponging are that the sponge shall go hard home to the bottom of the bore, and be kept there while the round turn is being given to it, the vent carefully served.

*Load.*

The powderman gives the cartridge to 3, who enters it to the full extent of his arm, 4 rams it home; the projectile is then triced up, entered by 3 and 4, the wad placed, and both rammed home together, 4 springs the rammer, 6 returns it, 3 and 4 step out, 1 then pricks the cartridge.

NOTE.—5 attends the guy, 7, 9, 11, 13 and 15 trice up the projectile.

The mark on the rammer staff will indicate when the full charge and common shell are home; and allowance is to be made when other charges are used.

Whilst loading, 2 hooks on a tube and half-cocks, when necessary 3 shifts the shell burton.

With 7-in. guns 3 enters the cartridge, 5 and left rearman place the projectile on the slide, 3 and 4 enter it and force all home together.

In loading, 3 and 4 should be cautioned not to place themselves in front of the muzzle more than necessary.

### *Up Ports.*

Nos. 9 and 10 pass the levers to 3 and 4, who bear out, 5 and 6 attend port lanyards, 2, 8, 10, 12, and 14 trice up the port.

NOTE.—When the port is up, 9 and 10 replace the levers in the carriage sockets, and 2 belays the port tackle fall.

### *Run Out.*

Nos. 1 and 2 throw gun on rollers and attend levers, 8 the compressor, rearman the preventer ropes, the remaining numbers run the gun out by the side tackles.

NOTE.—When the gun is out, 5 and 6 coil down the side tackle falls.

It will frequently occur that the side tackles need not be used.

In running out, care should be taken to prevent the carriage from striking heavily against the buffer, as the projectile is thereby liable to be displaced.

The preventer ropes are always to be eased with a turn round the bollards.

In heavy weather, the levers should not be used in running out.

### — *Yards (name the object). Point.*

No. 1 adjusts the sight, gets on the direction of the object, and then retires to the extent of the tube lanyard, 2 places a tube in the vent, and keeps his hand on the guide plate while 1 is going to the rear, 9 and 10 ship levers for training; the remaining Nos., except 3 and 4, man the training tackles.

This method of laying the guns for direction will be the one used when the object is in sight, and no doubt can exist as to its position.

### *Object Obscured. — Yards (name the bearing of the object). Point.*

As above, except that No. 1, after adjusting the sight, retires to the extent of the tube lanyard, and gets on the bearing by the marks on the deck.

This method will be applied when the object cannot be seen from the gun deck.

— *Yards (name the bearing—name the object). Point.*

As just above, and then No. 1 will look over his sights for the object named, and lay carefully for it.

This method (to be used when the object is in sight) possesses the advantage of removing all doubt as to the position of the named object.

NOTE.—The position of the Nos. on the training tackles will be rear-men outside ; remaining Nos. inside.

When no deflection is required, the top sight should be used as far as its length permits, otherwise both side sights, 2 adjusting the right one.

No. 1 should see that there is sufficient slack of tube lanyard when at half-cock between the guide plate and the vent.

To train the gun, No. 1 will give the order "*Right*" (or "*Left*"), according as he wishes the muzzle to be moved to the right or left ; when it is necessary to double man either of the training tackles he will give the order "*Right* (or "*Left*") *tackle*," when all the Nos. man that tackle, except 3 and 4 who attend breeching and side tackles, and 7 (or 8) who remains at the opposite training tackle : at "*Well*" the Nos. resume their former places.

When No. 1 is at the extent of the tube lanyard he should stand directly in rear of the sights he may be using, with his feet separated and his weight equally on both legs.

The order "*Point*" is not to be given except when the gun is to be laid for firing ; should it require to be trained for any other purpose the order "*Right*" (or "*Left*") will be given as necessary, when 9 and 10 ship the levers and the Nos. man the training tackles, at "*Well*," the levers to be returned to the carriage sockets, training tackles hitched and the Nos. close up.

#### *Elevate.*

Nos. 9 and 10 place the levers in the drums, 3 and 4 attend the clamps, No. 1 (when the object is in sight) lays the gun carefully, getting the top of the front sight in line with the object through the notch in the rear sight.

When the object is obscured, No. 1 will give the order "*Rest*," 2 gets the scale ready for laying the gun, 3, 4, 9, and 10 as above.

— *Degrees towards (or from).*

No. 1 gives distance and heel to 2, who adjusts the scale and lays the gun by it.

NOTE.—When the ship is rolling, the alignment of the sights should so pass above and below the object as to cause them to come on at the most favourable period of the roll.

When elevating with the gun in, 11 and 12 attend the clamps.

It is necessary to leave the clamps slackened (a quoin being used if required) when the gun has more elevation than the port will admit of, care being taken to secure the quoin lanyard.

When teaching men to aim, each time the gun is laid by the sights the instructor will look along them, and should he discover any error, he is to call No. 2, who is to look along the sights and state the defects; when the instructor will explain what the consequence would be if actually firing at an object, and cause No. 1 to aim again—this method will have the effect of sharpening the attention of No. 2, and of inducing him to avoid (when aiming himself) the errors he may have witnessed in No. 1's aim.

### *Ready.*

No. 1 slacks the tube lanyard, and brings his left hand over the right, 2 cocks the gun, 9 and 10 unship the levers, rearmen attend preventer ropes.

NOTE.—When necessary to train the gun after the word “*Ready*” the levers will be used, and withdrawn immediately the order “*Well*” is given.

If at the “*Ready*,” before altering the sights or giving the word “*Elevate*,” 1 will always give the order “*Half-cock*.”

### *Fire.*

No. 1 will pull the tube lanyard downwards with a jerk, bringing his left hand smartly on the right, still keeping his eye steadfastly fixed upon the object.

NOTE.—Should the gun miss fire, 2 half-cocks, clears the vent if necessary, and places a fresh tube in it.

### *Run In.*

No. 1 makes up the tube lanyard, 9 and 10 place the levers in the carriage sockets, 1 and 2 attend them, 7 and 8 hitch the training tackles, and attend nipping and compressor levers, 9, 10, 11, and 12 man the winches, rearmen attend preventer ropes.

NOTE.—With 7-in. guns, all the Nos. man the preventer rope, except 1, 2, and 8.

When necessary, 3 and 4 attend breeching and side tackles, and 4 the tripper.

When the gun is in, 1 and 2 ease up the levers, 8 sets up compressor, rearmen secure preventer rope, 2, 9, 10, 11, and 12 lay the gun for loading.

### *Inboard Secure (the Gun being out).*

Nos. 9 and 10 ship the levers for training, the remaining Nos. man the training tackles, except 1 who superintends; 3 who attends the front, and 2 the rear flap; when both flaps are down, the gun is run in; when far enough in, housed (2 placing the housing block), and then run up without being put on the rollers; the securing chains and tackles are then secured by the Nos. who cleared them away. The

side tackles are to be hitched to their own parts about 2 feet from the horns of the carriage, and the falls expended in frapping the breeching; the training tackles are to be hitched to their own parts, close in front of the horns of the carriage, and the falls expended in frapping turns round their own parts.

NOTE.—If the gun is loaded the charge is to be drawn before housing (unless ordered to the contrary).

When everything is finished, 1 gives the order "*Fall out.*"

---

## PART II.

### PRACTICE.

In this part will be taught and practised the different modes of firing, together with other matters connected with the general working of a battery of heavy guns.

No definite rules can be laid down with respect to the application of the various modes of firing; the commanding officer must use his discretion on this point, being guided in his decision by the defensive and offensive power of the enemy, the distance of the object, the amount of motion of his ship, whether the captains of the guns have a distinct view of the object, &c.

When one gun's crew is being worked by itself, the drill should be carried on as if it formed part of a division of guns.

It should be impressed upon the men that the pointing cannot be too carefully performed, 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 crew or gun be compromised.

After the guns' crews have been well trained using the words of command, they should be carefully instructed in working their guns without them, and also with diminished crews.

As the details of each No.'s duty have been fully explained, it will not be necessary to repeat them in this part; but any deviation from (or addition to) them will be distinctly specified.

## CLEARING FOR ACTION.

*Action. (Bugle Call, "Quarters.")*

The guns will be cast loose, wormed, loaded, with full charges and shell, and run out. (See Preparation for Battle, page 214.)

*For Exercise—Action. (Bugle Call, "Quarters," preceded and followed by one G.)*

As above, without powder being provided. Motions of loading to be performed.

On the guns being run out the first time, or in any change of circumstances which may render it necessary; the captains of the guns should be careful to remember the proper setting of the adjusting lever, directing No. 7 to key it to the required degree of compression, which will depend on the charge, and, if the ship has motion, the degree of roll on firing.

## INDEPENDENT FIRING.

In this firing, the several captains of the guns seize the most favourable opportunity for delivering their fire.

To be effective, it is requisite that the Nos. 1 should experience no difficulty in laying the guns by sight, as soon as they are out; therefore, this firing should not be practised when only occasional glimpses of the object can be obtained, owing to the smoke hanging about the ship, darkness, &c.

When there is a slight air across the range, or a steady, continuous fire is desired, it will be found of advantage to fire the guns in succession, as then the smoke of one gun will not delay the firing of the next.

The ports may be lowered on recoil for several reasons, amongst which may be named the following:—

1. To protect the loading Nos. from the fire of musketry.
2. To shut in the lights at night as much as possible.
3. To enable the loading to be carried on with greater facility, when the water occasionally enters the port.

As the success of the firing depends so much on No. 1, his attention should be directed to the following points:—

When the ship is rolling, the gun should be fired a little before the sights come on with the object.

When the object is moving, the alignment should be taken a little in advance; and when the ship is moving past an

object, a little in rear, according to the rapidity of movement and distance of the object.

The deflection scale may be used for the above purpose by adjusting it for the rate at which the ship is passing the object, or *vice versa*, and then taking aim straight upon it.

#### *Independent Firing.*

A caution to indicate what description of firing is about to be practised.

*Close Alongside ; or — Yards (give bearing if necessary).  
Name the Object.*

No. 1 gives the order "Point," and when the direction is on "Elevate," lays the gun for the object, and gives the word "Ready."

#### *Commence.*

No. 1 will fire at his own discretion. When the gun has recoiled, 9, 10, 11, and 12, lay the gun for loading ; the levers are then returned into the carriage sockets, and the gun sponged and loaded without orders ; 1 then gives the order "Run out," and when out, "Point," and proceeds with the firing until further orders.

#### *Cease Firing.*

If, at the "Ready," 2 half-cocks and takes out the tube, 1 closes up and puts down the sight, 7 and 8 secure the training tackles, 9 and 10 return the levers into the carriage sockets, and the Nos. close up. If the gun is in, it should be loaded and run out.

NOTE.—If the distance is likely to remain the same, the officer in command will direct the drums to be chalked when the elevation is correct, which will be done by 2 (and in this case the levers will be left in the drums after laying the guns for loading), so that when it is completed the drums may be replaced to the chalk mark, 2 directing and being responsible.

If the gun is to be loaded with the port down, the caution will be "INDEPENDENT FIRING, LOWERING THE PORT:" when the gun is in, 2 lowers the port, 3 and 4 haul taut and hitch the lanyards : when the loading is completed, 9 and 10 pass the levers to 3 and 4 who bear out the port, 5 and 6 slip the hitches of the lanyards, 2, 8, 10, 12, and 14 trice up the port (the fall always being led to the right of the gun) ; when it is up, 9 and 10 place the levers in the carriage sockets, 1 gives the order "Run out," and when out, "Point," and proceeds to lay the gun.

Nos. 3 and 4 keep the port lanyards clear of the muzzle and sights.

When the drum is chalked, 9 and 10 pass the levers to 3 and 4 after relaying the gun to chalk mark.

If fitted with half-ports, 9 and 11 haul up the lower, before 2 lowers the upper, half port.

#### BROADSIDE FIRING.

In this firing, the guns having been previously laid for exactly the same point, are fired simultaneously by order.

There are three descriptions of broadside firing ; two to be used in ordinary weather, one when the object is visible to the captains of the guns, and the other when the object is not visible from the guns but can be seen from some other part of the ship. The third is only intended to be practised in a heavy sea way.

The first would probably be found effective against iron-clad ships or forts within a moderate distance, and when there is not much motion ; also when the smoke hangs about the ship, only affording an occasional view of the object.

The second is the only method that can be used when the object is entirely obscured from the guns, unless a pendulum is fitted to every gun, in which case it is possible for independent firing to be practised under these circumstances.

In this, as in independent firing, the ports may be lowered on recoil.

#### *Broadside Firing. Gun Directing.*

A caution to indicate what description of firing is about to be practised.

— *Yards (give bearing if necessary). Name the object.*

Nos. 1 give the order "Point," and when the direction is on "Elevate Rest," Nos. 2 attending the elevating scales.

No. 1 of the directing gun gives the order "Elevate," and lays carefully for the object ; at "Well," 2, by the scale, ascertains the elevation, informs 1, who repeats it to the officer of the quarters, and gives the order "Ready."

#### — *Degrees, Elevation (or Depression).*

The remaining guns are given the elevation of the directing gun and come to the "Ready."

#### *Stand by. Fire.*

At the order "Stand by," No. 1 of directing gun raises his left arm perpendicularly, and as the sights are coming on, brings



it smartly down as the signal to the officer of the quarters to give the order "Fire." When the guns have recoiled, they are loaded and run out as in Independent Firing; and when out, the Nos. 1 give the order "Point," and proceed as before.

*Cease Firing.*

As in Independent Firing.

When there is sufficient motion and the ship rolls past an even keel, the Officer in charge may direct *all* the guns to be at *once* given the same elevation by scale as the sights are raised for, and in this case the words "By scale," will immediately follow the order "— yards."

When the ship is quite steady, all the guns are to be laid as in Independent Firing, and will wait for the order "Stand by," "Fire," each time. The caution will be, "Broadside Firing, ship steady."

*Broadside Firing, Object Obscured.*

A caution to indicate what description of firing is about to be practised.

— *Yards (give the bearing).*

Nos. 1 give the order "Point," and when the bearing is on, "Elevate," "Rest."

— *Degrees towards (or from, or upright).*

Nos. 2 lay the guns for distance and heel by scale, and Nos. 1 give the order "Ready."

*Stand by. Fire.*

The caution "Stand by," should be passed down to the battery from the director a few seconds before the order "Fire."

*Cease Firing.*

As in independent firing.

NOTE.—The drums will be chalked in these firings under similar circumstances to those mentioned in independent firing, each No. performing the same duties when the gun is in as are there laid down.

BROADSIDE FIRING ON BOTH BOLTS.

Broadside firing on both bolts is only intended to be practised in a heavy sea way; the ports being triced up for delivering the fire as the object comes on the beam; taking advantage of the roll, so that the ports may be up as the ship comes on an even keel.

The guns are kept on both bolts for greater security, and to enable more attention to be given to the working of the ports and compressors.

The order "Trice up," should be passed down to the gun deck, similarly to the orders "Stand by," "Fire," in "Broad-side Firing, object obscured."

This firing should not be practised at a greater distance than 600 yards, for when the ship has such motion as to render it necessary to fight the guns on both bolts, it is not probable that the fire would be at all accurate at a greater distance.

*With Closed Ports. Action.*

The guns are to be cast loose, loaded, and run out close to the ports, the securing flaps being kept down.

With single plate carriages, the compressor lever (as soon as the gun is close to the port) should be put down past the catch, and then the adjusting lever set hard taut and keyed.

With double plate carriages, the adjusting lever should be so keyed as just to allow of the compressor lever being put down past the catch.

The captains of the guns should be very careful to see that the muzzles of the guns are as close as possible to the ports without touching the scuttles, as it has been found that the effect of the explosion on the crew is very much greater when the muzzle is even an inch inside the port.

If ports are fitted with buffers and outside scuttles, the muzzles of the guns should touch the buffers.

It may be found of advantage to chalk the carriage and slide the first time the gun is out in the correct position, as a guide for No. 8 to set taut the compressor by afterwards.

When it is desired to cast loose the guns in such weather as will not admit of their being run out in the usual manner, "Still" will be sounded immediately after the call "Quarters," and the order given, "With closed ports."

Should the guns be out, and it is considered inadvisable to keep the ports open any longer, the order will be given to "Close the ports," upon which the guns will be first trained on both bolts and flaps put down, and then run in until the muzzles are just inside the ports, which should be lowered and the lanyards secured.

If the guns are in, the ports should be at once lowered, and when the loading is completed, the guns should be run out close to them and then trained on both bolts and the flaps put down.

*Broadside Firing on both Bolts. Gun Directing.*

A caution to indicate what description of firing is about to be practised.

— *Yards.*

No. 1 adjusts the sight, and retires to the extent of the tube lanyard; 2 places a tube in the vent; 1 gives the order "Elevate;" 2 lays the gun horizontal by scale, and chalks the drum; 8, 12, and 14 man the port tackle fall; 5 and 6 attend the port lanyards; at "Well," from No. 2, the levers are passed to 3 and 4; and 2 and 10 man the port tackle fall.

*Trice Up.*

At the order "Trice," Nos. 5 and 6 slip the hitches of the port lanyards, and at "Up," 3 and 4 bear out, and 2, 8, 10, 12, and 14 trice up the port; when the port is quite up, 8 takes a turn and attends the fall, 1 gives "Ready," and 2 cocks the gun; the captain of directing gun raises his left hand, and as the sights are brought on by the downward motion, brings it smartly down as a signal to the officer in charge to give the order "Fire."

*Fire.*

Directly the guns have been fired, No. 8 lowers the port, 5 and 6 haul in on the port lanyards and hitch them; 9 and 10 receive the levers from 3 and 4, and replace the guns to the chalk mark, under the direction of No. 2. When the loading is completed, 1 gives the order "Run out," and when the muzzle is close to the port, "Well," upon which the Nos. prepare for "Trice up."

*Cease Firing.*

The guns when loaded should be placed with the muzzles close to the port and the Nos. close up.

NOTE.—The officer at the director will pass down the order "TRICE UP," when the object is on the beam and as the ship is rolling towards it:—The officer in charge of the guns will then give *his* order as the ship commences the upward roll, so allowing time for the port to be triced up and the gun to be cocked, before the sights are brought on by the downward motion.

The order "Ready" is on no account to be given by the Nos. 1 until the port is quite up.

Although the order "FIRE" is given by the officer in charge of the guns, the Nos. 1 are not to do so unless everything is quite clear at their respective guns.

The compressor must be very carefully attended in running out. Nos.

3, 4, 5, and 6 should fall back in line with 7 at "*Ready*," in order to escape the effects of the explosion as much as possible.

Should a miss fire or any other delay occur, No. 1 will order "*Half-cock*"—"Down port," the Nos. will then resume the positions for tricing up.

If fitted with half ports, the guns should be given sufficient elevation to allow them to be fired over the lower half ports; the sights as above being raised for the distance of the object, and the guns fired as they are brought on by the motion.

#### EXERCISE BY SIGNALS.

After the guns' crews have been well trained in the different firings, they should be exercised without allowing any orders to be given, except by the officer in charge. This method possesses the great advantage of enforcing *silence*, and compels the crews to fix their attention on the captains of their guns.

The men having been once made thoroughly conversant with this system of signals, should never be allowed to revert to giving the orders for which they stand, during general exercise at quarters, unless they are rendered necessary by smoke or darkness.

The caution will first be given "*Exercise by signals*," and then the description of firing having been given, together with distance of object, &c., the men will at once get into position.

Signal for "*Right*" (or "*Left*") :—If in rear of the gun, No. 1 will extend his arm to the rear, in a line with the shoulder, the palm of the hand turned in the direction towards which the slide is required to be moved. If at the extent of the tube-lanyard, the left arm is to be extended to the front above the right, the palm of the hand as above.

Signal for "*Elevate* :"—The arm extended as before, the palm of the hand up or down, according as the breech is to be raised or lowered.

Signal for "*Rest* :"—With the upper arm extended in a line with the shoulder, raise the fore-arm perpendicularly, the palm of the hand to the front.

Signal for "*Well* :"—Drop the hand smartly.

Signal for "*Ready* :"—No. 1 slacks the tube-lanyard quickly.

Signal for "*Half cock* :"—No. 1 shakes the tube-lanyard.

Signal for "*Right*" (or "*Left*") "*Tackle* :"—No. 1's hand as in training, but moved quickly in the required direction.

## EXERCISE WITH DIMINISHED CREWS.

When casualties occur, the captain of the gun will direct the highest Nos. to fill the vacancies, excepting in the case of No. 1 or 2 being removed, when the vacancy should be filled by the lowest original No. remaining at the gun.

*Examples.*

1. With a full gun's crew :—"Fall out No. 1." 2 will take 1 ; then direct 3 to take 2, and the highest No. at the gun to take 3.

2. With a full gun's crew :—"Fall out Nos. 1 and 2." 3 will take 1 ; then direct 4 to take 2 ; the highest No. to take 3, and the next highest to take 4.

3. (continuing 2) :—"Fall out No. 1." 2 will take 1 ; then direct 5 to take 2 (the original Nos. 3 and 4 having been removed), and the highest No. to take 5.

In all cases of exercise with diminished crews, whatever additional work they may have to perform, the Nos. will continue their duties as if with a full gun's crew, unless otherwise specified.

With 14 men :—No. 13 brings up projectile and attends preventer rope.

With 13 men :—As with 14, except,—No. 2 attends right clamp (if necessary) when the gun is in ; 12 attends preventer rope.

With 12 men :—As with 13, except,—No. 11 brings up projectile, attends shell Burton and preventer rope, 9 attends left clamp (if necessary) when the gun is in.

With 11 men :—As with 12, except,—Nos. 9, 10, 5, and 6 man winches ; 5 and 6 attend training tackles ; 3 and 4 man training tackles ; 7 and 8 attend levers ; 10 attends preventer rope ; 6 mans port-tackle-fall.

With 10 men :—As with 11, except,—No. 3 assists to whip up projectile ; 7 attends left clamp (if necessary) when the gun is in ; 9 brings up projectile, attends shell Burton and preventer rope.

With 9 men :—As with 10, except,—No. 1 attends both levers in running in and out ; 2 mans right winch, and attends preventer rope.

With 7-in. guns, the changes in duties will be as above, omitting all mention of winches and shell Burton.

## SHIFTING BREECHINGS.

*Shift Breechings.*

The gun having been loaded and run out, and if necessary trained clear of the breeching bolts, No. 1 will give the order "Shift breechings," and superintend; 7 and 8 hitch training tackles; 3, 4, 5, and 6 cast off the old and secure the new breeching; rearmen bring up the spare breeching on the left of the gun, 14 gives his end to 3, and then goes to the right of the gun to return the old breeching; 15 hitches the seizing of the old breeching to the becket in the end of the spare one, the Nos. on the right haul it through; when the hitches are formed, 1 gives the order "Point," and proceeds to lay the gun.

NOTE.—Should the breeching be found stranded when the gun is out, No. 1 will order "*Half-cock*" (if necessary), and when the gun is clear of the breeching bolts, "*Shift breeching*;" 2 takes out the tube, and the numbers proceed as above.

The breeching should be marked to indicate the proper position of the hitches to 3 and 4, also in the centre, which mark should be in the breeching bouche when the gun is trained on the bow or quarter.

The breechings should be rove through the bolts from right to left.

No. 1 is not to come to the "Ready" until 3 and 4 have held up their hands, as a signal that the breeching is secured.

In broadside firing on both bolts:—When the breeching is secured, 1 retires to the extent of the tube-lanyard, upon which the remaining Nos. prepare for "Trice up."

## TRANSPORTING.

*Transport.*

If the gun is in, No. 1 gives the order "Run out," then "Ship axletree and trucks," using the quoins in rear; 2 unscrews rear bolt; 3 and 4 take out the drop bolt, unship pivoting bars, ship roller handspike bracket, cast off the breeching; and lay the ends on the slide; 2, 5, and 6 prepare the transporting tackle, 2 attends the single, 5 and 6 the double block; 7 and 8 provide axletree, and unhook training tackles; 11, 12, 13, and 14 provide two lifting jacks, and raise the rear part of the slide; 9 and 10 provide and ship the trucks. When the trucks are on, 1 gives the order "Run in," the gun is run in till the weight rests chiefly on the trucks; 8 sets taut the compressor, 1 gives the order "Transport," 3 and 4 attend roller handspike, and when the centre of the gun is on with the centre of the port, 1 gives the order "With side tackles place the gun." The gun is first

pivotted on the front securing bolt, and when the trucks are unshipped on the drop bolt.

NOTE.—The slide is not to be raised until the pivotting bars are unshipped.

#### DISMOUNTING.

##### *Dismount.*

The gun should be in, placed fair under the dismounting bolts, and given extreme depression, in order that the elevating arcs may be taken off, then placed in the housing position ; 3 and 4 hook muzzle runner ; 5 and 6 take off cap squares and hook muzzle tackle ; 7, 8, 9, 10, 11, and 12 hook breech runners ; 2, 13, 14, and 15 hook breech tackles.

NOTE.—The gun should never be dismounted with the elevating arcs attached.

The muzzle tackle should be first manned, hauled well taut, and secured by 5 and 6 ; then the breech tackles manned, and the gun lifted by them clear of the carriage.

The same stations for removing the slide and carriage as for transporting ; except the axletree and trucks are not shipped until the slide and carriage are clear from under the gun.

The above are only the stations for preparing the gun for dismounting ; the crew will never be found sufficient to dismount the gun with the present fittings ; consequently more men in proportion to the size of the gun will be required.

#### MOUNTING.

The slide should be pivotted, and the trunnion plates placed fair under the trunnions ; Nos. 2, 13, 14, and 15 attend the breech tackles ; the remaining Nos., except 1, who directs, and 9 and 10, who attend levers, man the training tackles.

Care should be taken, in lowering, that the trunnion shoulders do not take the trunnion plates.

#### REAR WINCHES.

At guns fitted with rear winches for running in and out and training, the following alterations in the drill will be necessary.

With 12 men and upwards :—5 and 6 attend running in ropes. 3 and 4 (if necessary) attend side ropes at carriage bollards. For training, 5, 6, 11, and 12 man the winches ; 7 and 8 attend training ropes.

With 10 or 11 men :—3 and 4 attend running in ropes. For training, 3, 4, 9, and 10 man the winches ; 5 and 6 attend training ropes.

With 9 men :—For training, 2 mans the winch instead of 10.

#### TRAINING WINCH WITH COGGED RACERS.

The following alterations in the drill will be necessary :—

With 12 men and upwards :—8, 11, and 12 will man the training winch ; 8 attending the break and paul.

With 11 and 10 men :—6, 9, and 10 will man the training winch ; 6 attending the break and paul.

With 9 men :—2 mans the training winch instead of 10.

It may be found more convenient when firing on the bow or quarter to train the gun roughly on the beam after each round for loading.

With 12 men and upwards the training and loading can be carried on at the same time ; but with less than 12 men it will be necessary to train the gun before loading.

---

## TRUCK GUN EXERCISE.

---

### PART I.

#### PRELIMINARY DRILL.

The following drill is laid down for the 64-Pr. M. L. R. gun, mounted on the common truck carriage with elevating screw ; but can be easily adapted to any other gun mounted on a similar (or rear chock) carriage with elevating screw or quoin.

The crew will fall in as laid down in the Heavy Gun Exercise.

#### *Close up.*

The gun's crew will place themselves as follows :—

No. 1, the captain, in rear of the gun facing the port. The remaining numbers as laid down in the Heavy Gun Exercise.

#### *Number.*

No. 1 calls *one*, and the remainder of the crew their Nos. in succession.

#### *Man both Sides.*

The crew take up their places as follows :—The odd



numbers at the left, and the even numbers at the right guns.

No. 1	remains	1	No. 2	becomes	1
3	becomes	2	4	„	2
5	„	3	6	„	3
7	„	4	8	„	4
9	„	5	10	„	5
11	„	6	12	„	6
13	„	7	14	„	7

NOTE.—When both sides are manned, the crew will fall out in single rank.

The following details are given for a full gun's crew, with the exception of casting loose and securing; the duties, both sides manned, will be simply cases of working with diminished crews, to be detailed in Part II.

#### *Cast Loose (when secured out-board).*

Nos. 1 and 2 place handspikes, and trice back the upper half port; 1 runs the screw down; 5 provides projectile; 2 and 7 clear away and hook on preventer tackle, 2 mousing the hook of outer block; 3, 4, 5, and 6 clear away breeching and side tackles. The gun is then run in, and when in, 2 chokes the luff of the preventer tackle, 3 and 4 put down lower half port, 3 takes out the tompion.

NOTE.—The gun is always to be wormed and the vent bored down before loading after casting loose. The inner blocks of the side tackles should be shifted to the training loops.

#### *Sponge.*

As laid down in the Heavy Gun Exercise.

#### *Load.*

The powderman gives the cartridge to 3, who enters it to the full extent of his arm, then receives the projectile and wad from 5 and enters them; 4, assisted by 3, forces all home together, 4 springs the rammer, 6 returns it; 3 and 4 step out; 1 then pricks the cartridge.

NOTE.—The mark on the rammer staff will indicate when the full charge and common shell are home, and allowance is to be made when other charges are used.

Whilst loading, 2 hooks on a tube and half-cocks.

In loading, 3 and 4 should be cautioned not to place themselves in front of the muzzle more than necessary.

If the gun is trained so much to the right as not to admit of 3 entering the projectile, 4 will do so before receiving the rammer.

*Run Out.*

Right rearman attends the preventer tackle ; the remaining Nos., except 1, run the gun out by the side tackles.

NOTE.—When the gun is out, 3 and 4 coil down the side tackle falls.

In running out care should be taken to prevent the carriage from striking heavily against the sweep piece, as the projectile is thereby liable to be displaced.

When there is much motion, the preventer tackle is always to be rove through a ring bolt and the gun eased out, and if necessary the left rearman should assist.

It is to be understood that the guns when cast loose are always to be left with the falls bracketed : the Nos. nearest the ship's side will bracket the falls, and the Nos. who coil down will unbracket them when necessary.

If the gun is left whilst in, the preventer tackle is to be hitched.

— *Yards (name the object). Point.*

No. 1 adjusts the sight, gets on the direction of the object, and then retires to the extent of the tube-lanyard ; 2 places a tube in the vent and keeps his hand on the guide plate while 1 is going to the rear ; 9 and 10 pick up the handspikes, turning outwards from the gun ; 11 and 2 man them ; right rearman attends preventer tackle ; the remaining Nos. man the side tackles.

This method of laying the guns for direction will be the one used when the object is in sight.

*Object Obscured — Yards (name the bearing of the object). Point.*

As above, except that No. 1, after adjusting the sight, takes the converging line and gets on the bearing by it and the marks over head.

This method will be applied when the object cannot be seen from the gun deck.

NOTE.—The position of the Nos. on the side tackles will be :— Nos. above the handspikemen inside ; the other Nos. outside.

When no deflection is required, the top sight should be used as far as its length permits, otherwise both side sights, 2 adjusting the right one.

No. 1 should see that there is sufficient slack of tube lanyard when at half-cock between the guide plate and the vent.

To train the gun, No. 1 will give the order "*Right*" (or "*Left*"), according as he wishes the muzzle to be moved to the right or left.

If it is necessary to use both handspikes, No. 1 will order "*Two handspikes*," place the tube-lanyard on the neck ring, and fall to the rear ; 9 (or 10) will assist with his handspike inside the bracket, 11 (or 2) manning the side tackle fall.

If it is necessary to double man either of the side tackles, the order will be "*Right* (or "*Left*") *tackle*," when 4 (or 3), assisted by the other Nos. will shift the tackle, and all the Nos. man it, except 3 (or 4) who attends breeching and side tackle, 9, 10, 11 (or 2) at the handspikes, and right rearman who shifts preventer tackle; at "*Well*" the numbers resume their former positions.

When No. 1 is at the extent of the tube-lanyard, he should stand directly in rear of the sights he may be using, with his feet separated and his weight equally on both legs; but if there is not sufficient room in rear of the guns to allow of his using a tube-lanyard of the proper length, he should stand so as to be able to spring off to the left on firing.

The order "*Point*," is not to be given, except when the gun is to be laid for firing; should it require to be trained for any other purpose, the order "*Right*" (or "*Left*") will be given as necessary, when 9 and 10 pick up their handspikes, and the Nos. man the side tackles; at "*Well*," handspikes to be returned, and the Nos. resume their former positions.

### *Elevate.*

No. 2 attends the elevating lever; No. 1, when the object is in sight, lays the gun carefully, getting the top of the front sight in line with the object, through the notch in the rear sight.

### *Elevate — Degrees towards (or from).*

When the object is obscured, No. 1 will give the order "*Rest*:" 2 gets the scale ready for laying the gun.

No. 1 gives distance and heel to 2, who adjusts the scale and lays the gun.

NOTE.—When necessary to alter the position of the elevating screw or depression chock, or when a considerable change in the elevation is required, No. 1 will order "*Handspikes*," 2 will make the necessary alteration and give the order "*Down*."

When the ship is rolling the alignment of the sights should so pass above and below the object as to cause them to come on at the most favourable period of the roll.

Guns fitted with elevating screws are never to be fired with more depression than the port will admit.

When the elevation is correct, No. 2 will place the lever close to the right bracket to prevent the screw running down.

### *Ready.*

No. 1 slacks the tube-lanyard and brings his left hand on the right, 2 cocks the gun.

NOTE.—The Nos. let go the side tackle falls, unless the ship is rolling, when they are to be kept in hand until the moment of firing, No. 1 throwing up his left hand as a signal for them to be let go.

When necessary to train the gun, after the word "*Ready*" the handspikes only will be used.

If at the "*Ready*," before altering the sights or giving the order "*Elevate*," "*Two handspikes*," or "*Right* (or *Left*) *tackle*," No. 1 will always give the order "*Half-cock*," No. 10 will withdraw his

right foot and handspike to allow 2 to pass inside for the purpose of half-cocking.

*Fire.*

As laid down in the Heavy Gun Exercise.

*Run In.*

No. 1 makes up the tube-lanyard ; 9 and 10 ground the handspikes ; all the Nos. man the preventer tackle, except 1, and 3 and 4, who overhaul the side tackles ; No. 1 holds up his hand when the gun is in ; right rearman chokes the luff of preventer tackle.

NOTE.—No. 1 sees the gun laid for loading ; the Nos. man the side tackle falls for running out.

If the trucks require shifting it would, as a rule, be after the recoil, and would be carried out whilst loading ; but if the gun should be out no alteration is necessary in the manner of doing it, except in the case of a fore truck, when the gun should be run in a little.

*Shift Truck.*

If a rear truck, 9 (or 10) will use his handspike under the rear axletree cleat, and 7 (or 8) will provide and shift the truck. If a fore truck, the opposite rear truck will be taken off by 7 (or 8), and 9 (or 10) will withdraw his handspike and stand on the arm of the axletree ; 10 (or 9) will use his handspike under the fore axletree, the spare truck forming a glut, the Nos. on that side of the gun assisting ; 8 (or 7) will provide and shift the truck, using the small quoin to keep the weight of the gun off it.

It may be required to take off the rear trucks after the gun is out to diminish the recoil.

*Take off the Rear Trucks.*

If at the "Ready," No. 1 will order "Half-cock," and the trucks will be taken off as before.

*Outboard Secure.*

No. 1 runs the screw down ; 2 and 7 unhook the preventer tackle, and place it on the right of the gun ; 3, 4, 5, and 6 secure breeching, then 3 and 4 haul up and secure lower half port, and 5, 6, 2, and 7 the side tackles ; the Nos. on the right of the gun secure preventer tackle, and No. 1 squares the gun.

NOTE.—No. 3 returns the converging line, and 5 the projectile ; 2 squares the upper half port ; 5 and 6 return the handspikes under the gun.

The breeching and tackles should be secured as follows :—

The bights of the breeching hauled back and secured to the bracket

loops. The side tackle falls rove through the side tackle bolts and training loops, and frapped; the preventer tackle hooked to the training loop and bolt on the ship's side on right of gun.

When there is much motion the preventer tackle should be passed under the rear of both brackets, hooked to the bolts in the ship's side, hauled well taut, and secured.

## PART II.

### PRACTICE.

The remarks at the commencement of Part II. of the Heavy Gun Exercise, and the observations on the different firings being, with but few exceptions, applicable to the Truck Gun Exercise, will not be repeated.

Lowering the ports on recoil is not as a rule adapted to this exercise, therefore no mention is made of it.

### INDEPENDENT FIRING.

#### *Independent Firing.*

A caution to indicate what description of firing is about to be practised.

*Close alongside (or — yards.) (Name object.)*

No. 1 gives the order "Point," and when the direction is on, "Elevate," lays the gun for the object, and gives the order "Ready."

#### *Commence.*

No. 1 will fire at his own discretion; when the gun has recoiled, the proper numbers will man the preventer tackle, and run the gun into a taut breeching. The gun will be sponged and loaded without orders; 1 then gives the order "Run out," and when out, "Point," and proceeds with the firing until further orders.

#### *Cease Firing.*

If at the "Ready," 2 half-cocks and takes out the tube; 1 closes up and puts down the sight, 9 and 10 ground the handspikes, and the numbers close up. If the gun is in, it should be loaded and run out.

NOTE.—It should be impressed on the Nos. 1, that they are not to relay the guns for elevation on an alteration in the distance, unless the motion is not sufficient to bring on the alignment after the sight has been altered.

## BROADSIDE FIRING.

This firing will be carried on precisely as laid down in the Heavy Gun Exercise, of course omitting "Broadside Firing on both Bolts."

## EXERCISE BY SIGNALS.

As laid down in the Heavy Gun Exercise, with the following exceptions:—

Signal for "Right" (or "Left") :—The arm to be always extended to the front.

Signal for "Two Handspikes."—No. 1 makes the signal "Right" (or "Left"), and drops to the rear without the tube-lanyard.

## EXERCISE WITH DIMINISHED CREWS.

When casualties occur, the captain of the gun will direct the highest numbers to fill the vacancies, except in the case of 1 or 2 being removed, when the vacancy should be filled by the lowest original number remaining at the gun. In all cases of exercise with diminished crews, whatever additional work they may have to perform, the Nos. will continue their duties as if with a full gun's crew, unless otherwise specified.

With 13 men.—No. 12 attends preventer tackle.

With 12 men.—As with 13 men.

With 11 men.—As with 13 men, except Nos. 7, 8, 9; and 2 attend handspikes, 10 attends preventer tackle, 9 and 2 attend the trucks.

With 10 men.—As with 11 men.

With 9 men.—As with 11 men, except Nos. 1, 3, and 4 assist to run in, 2 attends preventer tackle after cocking the gun.

If the gun is about to be trained so much as to require the preventer tackle to be shifted, No. 2 will overhaul it, and after the training is completed will shift it, assisted by 1, before he drops to the rear.

With 8 men.—As with 9 men, except No. 2 attends trucks.

With 7 men.—As with 9 men, except Nos. 3 and 4 coil down side tackles, 5, 6, 7, and 2 attend handspikes, 7 and 2 trucks.

With 6 men.—As with seven men, except No. 2 attends trucks.

## SHIFTING BREECHINGS.

The gun having been loaded and run out, and, if necessary, trained clear of the breeching-bolts, No. 1 will give the

order, "Shift breechings," and superintend; 9 and 10 hitch side tackles; 3, 4, 5, and 6 cast off the whole and secure the new breeching; rear men bring up the spare breeching on the left of the gun; 14 gives his end to 3, and then goes to the right of the gun to return the old breeching; 13 hitches the seizing of the old breeching to the becket in the end of the spare one, the Nos. on the right haul it through; when the hitches are formed, 1 gives the order, "Point," and proceeds to lay the gun.

#### DISMOUNTING.

##### *Dismount.*

The gun should be placed fair under the dismounting bolts; 1 gives the order "Elevate handspikes," takes out the elevating screw (and depression chock if necessary), and sees the gun housed; 2 and 11 provide dismounting tackle, hook it to the runner and attend it; 3 and 4 provide muzzle tompon (if necessary), and pass the muzzle lashing; 5 and 6 throw back the cap squares; rearmen provide and hook the runner. When the muzzle lashing is passed, No. 1 gives the order "Dismount," all the Nos. man the dismounting tackle except 9 and 10, who assist with their handspikes until of no further use; when high enough, 1 gives the order "Well," the Nos. close up in their places, except 2 and 11, who attend the fall; 1 replaces depression chock and elevating screw.

##### *Shift Carriage.*

Nos. 4 and 6 cast off the breeching, 9 and 10 unhook the side tackles, rearmen the preventer tackle; all the Nos. on the left of the gun haul the breeching through; when clear, 1 gives the order "Carriage back." The new carriage will be brought up and placed fair under the trunnions; the gun is then lowered into it by 2 and 11 on a signal from 1; 3 and 4 cast off the muzzle lashing, 2 and 11 return the dismounting tackle, and left rearman the runner. The gun is then run out, the breeching secured, and the Nos. close up.

NOTE.—If the gun is to be replaced in the same carriage, the order will be "REMOUNT."

## EXERCISE WITH BREECH-LOADING GUNS.

Breech-loading guns of the larger calibres are being gradually withdrawn from the Service, but as long as any remain the following alterations in the exercise laid down for M. L. R. guns will be necessary. No sponging is required with B. L. R. guns.

### *20-Pr. B. L. R. Gun.*

The exercise for this gun, which will be mounted in the bow and stern of vessels of the "Dwarf" class, is precisely similar to that laid down for boats' guns, with the addition of shifting pivots, which will be carried out on the same principles as laid down in the Revolving Gun Exercise.

NOTE.—Before the gun is loaded, after casting loose, the vent-piece should be secured in its place ready for firing, the breech and screw should then be chalked; if this is attended to and every round the chalk marks brought into contact, and the vent-piece tried after the tube is put in the vent, there can be no escape of gas. The burrs on the face of the vent-piece, or on the ring in the chamber, should be hammered down, and care should be taken that the breech screw takes fair against the vent-piece. If the vent is in the vent-piece, 3 places a primer in it. With high elevations the gun must be laid for loading, being kept on the handspikes until the breech is screwed up; the handspikes are worked as laid down in the Truck Gun Exercise, but 3 and 4 will assist in raising the gun. It is most important in ramming home the projectile that the whole weight of the body should be brought on the rammer and the projector run up into its place: if this is not attended to the shot will strip.

Elevate.—As laid down in Truck Gun Exercise.

## EXERCISE WITH BOATS' GUNS.

### *12 or 9-Pr. B. L. R. Gun.*

The gun's crew will consist of 5 men—viz., the captain of the gun, 2 and 3 (the bowmen), 4 and 5 (the men on the 2nd thwart). In loading, No. 1 attends the breech screw, 2 the vent-piece, 3 the rammer, 4 enters the projectile and cartridge, 5 serves the ammunition to 4. In training, 2 and 4 man the right, 3 and 5 the left tackle. In elevating, 2 attends the screw. No. 4 attends the compressor, and 3



the adjusting lever. All the Nos. assist to run out before loading. The gun can be fought either forward or aft. To transport the gun, the runners should be used : if the masts are not up, they should be got up for this purpose.

---

## MUSKETRY INSTRUCTION.

Parts IV. and V. of the Musketry Instruction Book for the Army are to be used for the instruction of the seamen of the Fleet.

When circumstances permit, the instruction of men who have not previously gone through the course will be as laid down in the table, Part II., and that for men who have done so will be carried on as in Part III.

If, however, it should not be found possible to devote the necessary time to enable the above course to be carried out, then the following substitution is to be made :—

For men who have not previously been instructed, the course will occupy seven working days ; four days to be devoted to the preliminary drills, and three days to the practice.

The men to be put through by parties of not more than 40 in number.

### PRELIMINARY DRILL.

#### *First Day.*

A.M. 1 lesson cleaning arms, 2 position drills (1st practice), 1 lecture (when practicable). P.M. 1 aiming drill, 2 position drills (1st practice).

#### *Second Day.*

A.M. 1 lesson cleaning arms, 2 position drills (1st practice), 1 lecture. P.M. 1 aiming drill, 2 position drills (1st practice).

#### *Third Day.*

A.M. 1 lesson cleaning arms, 2 position drills (2nd practice), 1 lecture. P.M. 1 aiming drill, 2 position drills (2nd practice).

#### *Fourth Day.*

A.M. 1 lesson cleaning arms, 2 position drills (3rd practice), 1 lecture. P.M. 1 aiming drill, 2 position drills (3rd practice). Each lesson, lecture, or drill to last half an hour. The

position drills are not to follow one another ; half of them are to be carried on standing and half kneeling.

## PRACTICE.

*Fifth Day.*

Blank firing (10 rounds). Preliminary ball firing, 10 rounds at 100 yards (standing).

*Sixth Day.*

A.M. 10 rounds at 200 yards (standing). P.M. 10 rounds at 300 yards (kneeling).

*Seventh Day.*

10 rounds at 400 yards (kneeling).

For men who have been instructed before, the course will occupy five working days ; two days' preliminary drill, and three days' practice.

## PRELIMINARY DRILL.

*First Day.*

A.M. 2 position drills (1st practice), 1 aiming drill. P.M. 2 position drills (1st practice), 1 aiming drill.

*Second Day.*

A.M. 2 position drills (2nd and 3rd practices), 1 aiming drill. P.M. 2 position drills (2nd and 3rd practices), 1 aiming drill.

Each drill to last half an hour. The position drills are not to follow one another.

## PRACTICE.

The same as laid down above, omitting the blank firing.

*Aiming Drill.*

Q. What is the seaman taught in aiming drill ?

A. To aim and to adjust the back-sight of the rifle.

Q. How is his progress tested ?

A. By making him aim at different distances from a rest.

Q. What do you require to enable you to proceed with aiming drill ?

A. If traversing rests are not available, a tripod formed of three stakes tied or looped near the top, or piled arms with swords fixed (sheathed), supporting a bag of sand about  $4\frac{1}{2}$  feet from the ground, will answer the purpose, and a target.

Q. What should the instructor first proceed to explain.

A. The principles of aligning the sights on an object, and the rules for aiming drill.

Q. How many rules are there for aiming drill?

A. Four.

Q. What is the first?

A. To see that the sights do not incline to the right or left.

Q. What is the second?

A. That the line of sight should be taken along the centre of the notch of the back-sight and the top of the fore-sight, which should cover the middle of the mark aimed at.

Q. What is the third?

A. That the eye should be fixed steadfastly on the mark to be aimed at, and not on the barrel or fore-sight, which latter will be easily brought into the alignment if the eye be fixed as directed.

NOTE.—Particular attention is to be paid to this rule, for beginners are apt to fix the eye on the fore-sight instead of the mark; in which case the latter can never be distinctly seen, and the difficulty is greatly increased.

Q. What is the fourth?

A. That in aiming the left eye should be closed.

NOTE.—If a seaman be not able to do this at the outset, he will soon succeed by tying a handkerchief over the left eye.

Q. What should the instructor next proceed to explain?

A. The difference between fine, full, and half-sight in aiming.

Q. What do you understand by a fine-sight?

A. When the line of sight is taken along the bottom of the notch of the back-sight, the fine point of the fore-sight being brought up into the alignment; as A, fig. 1.

Q. What do you understand by a full-sight?

A. When the line of sight is taken even with the shoulders of the back-sight, the point of the fore-sight being brought up into the alignment; as B, fig. 2.

Q. What do you understand by a half-sight?

A. When the line of sight is taken halfway up the notch of the back-sight, the point of the fore-sight being brought up into the alignment; as C, fig. 3.

Fine-sight.

A



FIG. 1.

Full-sight.

B



FIG. 2.

Half-sight.

C



FIG. 3.

NOTE.—The ordinary rules for aiming are intended to apply to the half-sight. As full-sight and fine-sight cause a slight difference in the angle of elevation, the full-sight is to be used when the rifle is found to carry low, the fine when it carries high.

Q. After the foregoing rules have been clearly explained, what is the next thing done?

A. The instructor will cause one of the class to align his rifle with the sight for 100 yards, on a mark that distance from him; having done so he will leave his rifle on the rest and step aside, in order that the instructor may look along the sights to see if the aim is correctly taken.

Q. Should the instructor discover any error in the aim, does he correct it?

A. No; he will call another of the class to look along the sights and state the defects; when the instructor will explain what the consequence would be if actually firing at an object, and cause the same person to aim again.

Q. Why does he (the instructor) not correct the error himself?

A. Because this method will have the effect of fixing the attention of the seaman, and of inducing him to avoid, when aiming himself, the errors he may have witnessed in his comrade's aim.

The foregoing process is to be carried out, at every distance of 50 yards, from 100 to 900 yards, or to the extent the rifle is sighted, at bull's-eyes, six inches square for all distances to 300 yards inclusive, and 18 inches square for all distances beyond 300 yards, in order that the seaman may acquire a knowledge of his sights, and become expert in aiming; for it must be borne in mind that the difficulty of aligning the fore-sight accurately increases with the distance. The instructor is thus enabled to ascertain the progress of the seaman, and if he has any defect in his eyesight.

Aiming strengthens the vision of the eye; and it cannot be too strongly impressed on the seaman's mind, that to shoot well at long ranges he must train and strengthen his eye by looking at small objects at distances beyond those at which he will have to fire in practice.

It will be well to remember, that if the sights of the rifle are inclined to the right, the shot will go to the right, and short, and *vice versâ*.

## SNIDER RIFLE DRILL.

### THE PLATOON EXERCISE FOR THE SHORT SNIDER BREECH-LOADING RIFLE.

The seamen, having acquired a thorough knowledge of the several motions of the rifle as detailed in the Manual Exercise, will next be taught the Platoon Exercise. The squad to fall in at "the order." The muzzle stoppers to be removed.

The seamen will be instructed :—

Firstly. To load and fire standing.

Secondly. To fire and load kneeling.

Each of these exercises will be taught :—

Firstly. By numbers.

Secondly. In quick time.

Squads are not to be instructed in the Platoon Exercise by numbers, either standing or kneeling, otherwise than in single rank.

#### 1. *To Load and Fire Standing, by Numbers.*

CAUTION.—Firing Exercise, by numbers, as a front (or rear) rank standing.

Ready.—Turn on both heels to the half-right turn, carrying the rifle round with the body. The right foot to point to the right, the left to the front, eyes to look to the front.

Two.—Advance the left foot, moving the body with it, 10 in. to the left front (viz., six to the front, and eight to the left), toes to point to the front ; at the same time, bring the rifle to a horizontal position at the right side, with the small of the butt just in front of the right hip, grasping the stock with the left hand between the lower band and the projection in front of the lock plate, thumb between stock and barrel, and half-cock with the thumb of the right hand, fingers behind the trigger-guard. The left elbow to be kept close to the body as a support for the rifle,—the right hand to hold the small of the butt lightly, with the elbow to the rear, thumb resting on the comb of the hammer. As a rear rank, the left foot to be advanced six inches, the body moving with it, and the butt to be four inches above the hip.

Three.—Open the breech by a sharp turn of the right hand from left to right, then carry the hand to the pouch and take hold of a cartridge at the rim with the forefinger and thumb.

Put the cartridge into the barrel, pressing it well home with the thumb, and close the breech firmly by canting the breech-block to the left with the fingers; then carry the hand to the small of the butt, and hold it lightly with the fingers behind the trigger-guard, thumb pointing to the muzzle.

NOTE.—To open the breech, place the thumb on the thumb-piece of the breech-block, and the forefinger along the nipple-lump, the remaining fingers to be closed in the hand.

When the feet are at right angles, as detailed in the second motion, care must be taken not to increase the angle by turning the toes of the right foot to the rear, which would tend to alter the proper position of the right shoulder in firing.

Four.—Adjust the back-sight; full-cock with the thumb of the right hand, fingers behind the trigger-guard; and fix the eyes steadfastly on some object in front. Thumb to point to the muzzle after cocking.

The back-sight will be adjusted as follows:—With the forefinger and thumb of the right hand move the sliding bar until the top is even with the line, or at the place on the flanges showing the distance named; then, if necessary, raise the flap carefully, preventing it from springing up with a jerk, and afterwards carry the hand back to the small of the butt.

Present.—Bring the rifle smartly to the shoulder, pointing the muzzle a few inches below the object on which the right eye is fixed, and place the forefinger round the trigger like a hook, but without pressing it, that part between the first and second joint to rest on it.

The centre of the butt to be pressed firmly to the shoulder with the left hand; the top of the butt to be even with the top of the shoulder; the left elbow to be under the rifle as a support; the right elbow to be raised nearly square with (but not too high), and well in front of, the right shoulder, to form a bed for the butt; the right hand to hold the small of the butt lightly, thumb pointing to the muzzle; the left eye to be closed. This motion is to be performed without moving the left hand from its grasp, or bending the body, or raising the heels.

Two.—Raise the muzzle steadily, until the top of the fore-sight is brought in a line with the object through the notch of the back-sight, pressing the trigger at the same time without the least motion of the hand, eye, or arm, until the hammer falls, still keeping the eye fixed on the object.

Three.—Bring the rifle to a horizontal position at the right side ; shut down the flap of the back-sight, if raised, without moving the sliding bar ; half-cock ; open the breech ; and, holding the breech-block firmly with the forefinger and thumb, by means of the thumb-piece and nipple-lump, draw it back as far as possible by a jerk, raising the muzzle of the rifle slightly in doing so, to remove the empty cartridge case ; at the same time cant the rifle sharply over to the right to allow the case to fall out, bringing it again to the horizontal position, close the breech, then carry the right hand to the small of the butt, as in the "Ready" position.

As the first motion of the "Present" will not be learned without practice and much care, the instructor will frequently give the command, "As you were," when the seaman will bring the rifle to the right side without moving any part of his body but his arms, or his eyes from the object to be aimed at. The instructor will then point out the defects observed. By this means the seaman will soon be accustomed to get into the position readily, and will acquire a full command of his rifle with the left hand.

The squad will also be brought back to the "Ready," by the command, "As you were," after the first and second motions of the "Present," for the instructor to explain that which follows next in order ; the seamen maintaining the erect position of the body, and keeping the eyes fixed on the object they are to aim at.

Particular attention is to be given to the following points in the "Present." The body is to be firm and upright ; the butt to be pressed firmly into the hollow of the shoulder, so as to avoid the kick which will otherwise take place from the recoil on the explosion of the powder ; the rifle to rest solidly on the left hand, and to be firmly grasped, but without rigidity of muscle ; the back-sight to be upright. In aiming and pressing the trigger, the breathing to be restrained. The right eye to continue fixed on the object after snapping, to ascertain if the aim has been deranged by the movement of the trigger or body. The position of the head with reference to the butt, when taking aim, must depend entirely on the elevation used. With small elevation the butt must be brought to the head by raising the shoulder, or the cheek must be so placed on the butt by bending the head a little forward (not sideways), as to get the eye fixed on the object through the notch of the back-sight ; as the distances increase the head must be raised or the shoulder lowered.

When giving the command "Ready," some distance should always be named ; if, however, the distance be omitted, the seaman must judge it for himself, and adjust his sight accordingly.

Too much pains cannot be taken to insure that the seaman takes a deliberate aim at some object whenever he brings the rifle to the "Present ;" for this purpose small bull's-eyes are to be marked.

2. *To "Shoulder" or "Order" Arms by Numbers, from the Position of "Ready" Standing.*

SHORT RIFLE.

By Numbers, Shoulder—Arms.—On the word "Arms," turn on the right heel to the front ; at the same time bring the left foot back to the right, and raise the rifle to a perpendicular position at the right side with the left hand, seizing it with the forefinger and thumb of the right hand round the trigger-guard, the remaining fingers under the hammer ; the left hand to hold the rifle under the lower band.

Two.—Drop the left hand smartly to the side.

*To Order.*

On the word "Arms," turn on the right heel to the front ; at the same time bring the left foot back to the right, and with the right hand, which is to seize the rifle close in front of the left, place the butt quietly on the ground, at the right side, as detailed in the Manual Exercise.

3. *To come to the "Ready" Standing by Numbers, from "The Shoulder," "Slope," or "The Order."*

SHORT RIFLE.

From "The Shoulder." By Numbers, As a Front (or Rear) Rank. At — yards. Ready.—Turn on both heels to the half-right turn, and at the same time seize the rifle with the left hand under the lower band, bending the right arm slightly to do so.

To advance the left foot, moving the body with it ; at the same time bring the rifle to a horizontal position at the right side, as detailed in the 2nd motion of "Ready" (No. 1) ; adjust the back-sight, full cock, and fix the eyes on some object in front.

From "The Order." By Numbers, As a Front (or Rear) Rank. At — yards. Ready.—Proceed as directed in the 1st motion of the "Ready" (No. 1).



Two.—Proceed as directed in the 2nd motion of the “Ready” from “The Shoulder.”

4. *To Fire a Volley and Shoulder by Numbers, from the Position of “Ready” when it is not intended to re-load.*

CAUTION.—By Numbers, Fire a Volley and Shoulder.

At — yards. Ready.—Proceed as detailed in 3rd and 4th motions of “Ready.”

Present. Two.—As before detailed.

Three.—As before detailed; and after throwing out the empty cartridge-case, shut the breech; ease springs; then rest a pause of the slow time, and, taking the time from the right, turn on the right heel to the front, and shoulder at the same time, waiting a pause of slow time before quitting the hand.

5. *To make “Ready” Standing by Numbers, from “The Shoulder.”*

CAUTION.—Firing Exercise by Numbers, as a Front (or Rear) Rank standing.

At — yards. Ready.—Proceed as directed for the 1st motion of the “Ready” from “The Shoulder” (No. 3).

Two—Three—Four.—Proceed as directed in the 2nd, 3rd, and 4th motions of the “Ready” from the “Order” (No. 1).

6. *To Half-cock Arms if at “The Ready.”*

Half-cock—Arms.—Place the thumb of the right hand on the comb of the hammer, and the forefinger on the trigger, and draw both back until the sear is disengaged from the full bent of the tumbler; then let the hammer gently down (removing the forefinger from the trigger) on the nipple, and carry the right hand to the small of the butt, fingers behind the trigger-guard, thumb pointing to the muzzle.

7. *To Ease Springs when at the Half-cock.*

Ease Springs.—Place the thumb of the right hand on the comb of the hammer, and the forefinger on the trigger, and draw both back until the sear is disengaged from the half bent of the tumbler; then let the hammer gently down (removing the forefinger from the trigger), draw it back to the half bent again, shut down the flap of the back-sight if raised, and carry the right hand to the small of the butt, fingers behind the trigger-guard, thumb pointing to the muzzle.

8. *To Unload when it is not required to Fire off the Charge.*

Unload—Rifles.—When at the position of “Load,” open the breech, draw the breech-block back as far as possible by a jerk, raising the muzzle of the rifle slightly in doing so to withdraw the cartridge; let the breech-block go back, and at the same time cant the rifle sharply over to the right to allow the cartridge to fall into the hand: then shut the breech with the fingers, bringing the rifle again to the horizontal position; return the cartridge to the pouch, and ease springs.

9. *To Load and Fire Standing, in Quick Time.*

The seaman having been thoroughly instructed in the Platoon Exercise by Numbers standing, will next be taught to perform it in Quick Time by the following words of command, which are to be executed as before detailed, resting a pause of quick time between each motion:—

CAUTION.—Firing Exercise as a Front (or Rear) Rank standing.

At — yards. Ready.—In four motions.

Present.—In three motions.

Shoulder—Arms.—In two motions.

Fire a Volley, and Shoulder. At — yards. Ready.—In four motions.

Present.—In three motions; and having closed the breech, eased springs, &c., turn to the front and shoulder.

10. *To Fire and Load Kneeling, by Numbers.*

The squad having loaded standing, and being at shouldered arms, will be instructed as follows:—

CAUTION.—By Numbers, as a Front (or Rear) Rank kneeling, Fire a Volley.

At — yards. Ready.—Proceed as detailed for the 1st motion of the “Ready” from the “Shoulder” (No. 3).

Two.—Bring the rifle to a horizontal position at the right side as in the second motion of the “Ready” from the “Order” (No. 1); at the same time, sink on the right knee twelve inches to the rear and six to the right of the left heel, and square with the right foot, bringing the weight of the body at once on the right heel, and place the left forearm six inches behind, and nearly square with, the left knee, the butt to rest against the right side; then proceed with the 3rd and 4th motions of “Ready,” and fix the eyes on some object in front.

The right knee of the rear rank to be twelve inches to the right when on the ground ; the left forearm on, and nearly square with, the left knee.

As the length of the leg in very tall men is greater than the breadth of the body, it will be impossible, in close order, to get the knee square with the foot ; in such cases, therefore, the knee is to be inclined to the front, but not beyond the inside of the right foot of the man on the right.

Present.—As detailed when firing standing, placing the left elbow at once over the left knee as a support. The body is not to be raised off the heel in bringing the rifle to the shoulder.

Two.—As detailed when firing standing.

Three.—As detailed when firing standing, bringing the left forearm on the left leg as directed in the 2nd motion of the "Ready" kneeling.

The instructions which follow the "Present" standing are applicable to this position when on the knee.

When required to come to the "Ready" kneeling, from the position of "Load" standing, the left foot will be brought back to the right before sinking on the knee.

11. *To "Shoulder" or "Order" Arms by Numbers, from the Position of "Ready" Kneeling.*

By Numbers, Shoulder—Arms.—On the word "Arms" spring to "Attention," turning on the left heel to the front, and shoulder at the same time, as before detailed.

Two.—Drop the hand smartly to the side.

Order—Arms.—On the word "Arms" spring to "Attention," turning on the left heel to the front, and order at the same time, as before detailed.

12. *To Fire a Volley and Shoulder from the Knee by Numbers, when it is not intended to re-load.*

CAUTION.—By Numbers, Fire a Volley, and Shoulder.

At—yards. Ready.—Proceed with the 3rd and 4th motion of "Ready," and fix the eyes on some object in front.

Present. Two.—As before detailed.

Three.—As before detailed ; and after throwing out the empty cartridge-case, shut the breech ; ease springs ; then rest a pause of slow time, and, taking the time from the right, spring to "Attention" to the front, and shoulder at the same time, waiting a pause of slow time before quitting the hand.

13. *To Fire and Load Kneeling, in Quick Time.*

The seaman having been thoroughly instructed in the motions of firing and loading on the knee by numbers, will next be taught to perform them in quick time by the following words of command, which are to be executed as before detailed, resting a pause of quick time between each motion:—

CAUTION.—As a Front (or Rear) Rank kneeling, Fire a Volley.

At — yards. Ready.—In four motions.

Present.—In three motions.

Shoulder—Arms.—In two motions.

As a Front (or Rear) Rank kneeling, Fire a Volley and Shoulder. At — yards. Ready.—In two motions.

Present.—In three motions, and having closed the breech, eased springs, &c., spring to “Attention” to the front, and shoulder at the same time.

14. *Loading and Firing in two Ranks.*

When the seaman has learned all the motions of the Platoon Exercise, standing and kneeling in single rank, he will practise them in two ranks; also the following modes of firing:—

1. Volleys, front rank kneeling.
2. Independent firing, both ranks standing.
3. Independent firing, both ranks kneeling.
4. Independent firing, front rank kneeling.

With the short rifle, volley firing is invariably to take place front rank kneeling, that rank sinking on the knee on the word “Ready.”

15. *Independent Firing, Standing or Kneeling.*

CAUTION.—Independent Firing. If required to be in the kneeling position, add—Both Ranks Kneeling.

At — yards. Ready.—As before detailed.

Commence—Firing.—Each man of the front rank will come to the “Present,” independently of his right or left hand man, and when he returns to the position of “Ready” his rear rank man will come to the “Present,” and so continue alternately until the “Cease firing” is ordered. The flap of the back-sight, if raised, is not to be put down until after the last round is fired.

It is to be observed that the two men of a file are not to be unloaded at the same time. When the front rank man is at the position of “Ready,” the rear rank man is to come

to the "Present," and *vice versa*, to keep up a continuous fire.

Cease—Firing.—Each file, when it completes its loading, will order arms. Files that may have made ready when this command is given will half-cock their rifles before they order arms.

When firing independently, as before detailed, the commands "Commence firing," and "Cease firing" are to be given on the drum or bugle.

NOTE.—The officer commanding the company's place, is three paces in rear of its centre, except on the march, in which case he will place himself in the best position to superintend.

#### PREPARING FOR CAVALRY.

The seamen, having a thorough knowledge of the different modes of firing in the ranks, will now be formed into four ranks, and practised to receive cavalry, as in square, four deep.

Men armed with the short rifle will commence the practice on the march with trailed arms, and will be taught to fix swords on the command "Halt," or "Halt, right-about, turn." The leading company of a column thus armed, if halted, will fix swords on the command "Quick march" being given to the remaining companies; the men who halt without word of command will fix swords as they halt.

Prepare for—Cavalry.—On this caution, the second and fourth ranks will take a pace of nine inches to the front, and the first and second ranks will sink at once upon the right knee, as a front and rear rank, and at the same time place the butts of their rifles (which are not to be full-cocked) on the ground against the inside of their right knees, locks inwards, with the muzzles slanting upwards, so that the point of the sword may be about the height of a horse's nose; the left hand to grasp the rifle firmly immediately above the lower band, the right hand to hold the small of the butt, the left arm to rest upon the leg about six inches from the knee.

Ready.—The third and fourth ranks will come to the "Ready" (the muzzles of their rifles slightly inclined upwards), adjust the back-sight, full-cock, and fix their eyes on some object in front.

Independent Firing—commence.—All four ranks will proceed with the independent firing, as before detailed.

Cease—Firing.—As before detailed.

NOTE.—If the bugle have previously sounded the "Commence Fire," the kneeling ranks at the caution "Prepare for Cavalry" will make

“Ready,” and wait for the order “Commence Fire” from the officer commanding the company.

*Kneeling Ranks (or Kneeling Ranks of the — face).*

Fire a Volley.—This caution is to be given should it be deemed necessary to fire a volley.

At — yards. Ready.—As before detailed.

Present.—As before detailed, and after loading, should there be time, bring the rifle at once to resist cavalry; if there is not time to load before coming down, the loading is to take place on the knee, by word of command.

Order—Arms.—As before directed.

In squares of two deep, the front rank only will kneel to resist cavalry.

REVIEW EXERCISE WITH THE SHORT RIFLE.

*Words of Command.*

CAUTION.—Manual and Firing Exercises.

- |                   |                    |
|-------------------|--------------------|
| 1. Present arms.  | 9. Charge swords.  |
| 2. Shoulder arms. | 10. Shoulder arms. |
| 3. Support arms.  | 11. Slope arms.    |
| 4. Shoulder arms. | 12. Shoulder arms. |
| 5. Order arms.    | 13. Order arms.    |
| 6. Fix swords.    | 14. Unfix swords.  |
| 7. Shoulder arms. | Close order.       |
| 8. Port arms.     | March.             |

Fire a volley at 300 yards.

Ready. Present.

Fire a volley and order at 300 yards.

Ready. Present.

Stand at ease.

TO FIRE A FEU DE JOIE.

For this mode of firing the men will be drawn up in line at open order, with shouldered arms, and unfixed swords.

With Blank Cartridge. Ready.—Muzzles of rifles to slant upwards when loading.

Present.—Rifles to be elevated at an angle of 45°.

The right-hand man of the front rank commences the fire, which will run down the front and up the rear as quickly as possible. When the right-hand man of the rear-rank has fired, the whole will glance their eyes to the right, to bring the rifle to the ready position, and load and remain steady, waiting for the word—

Present.—As before directed.

The same to be repeated a third time.

After the third fire, having removed the empty cartridge-case, &c., the whole will remain steady at the loading position.

Shoulder—Arms.

Present—Arms.

Shoulder—Arms.

Order—Arms.

Three cheers.

When artillery are present, and are ordered to fire twenty-one guns, seven will be fired before each round of the *feu de joie*.

#### MANNER OF INSPECTING A COMPANY ON PARADE.

The company to fall in at "The Order." The muzzle-stoppers to be removed.

Fix—Swords.

Open order—March.

The inspecting officer will now pass down the ranks to ascertain that the appointments, clothing, &c., are clean, and in good order.

Unfix—Swords.

Shoulder—Arms.

For Inspection. Port—Arms.—When at "The Port," half-cock the rifle, and open the breech, holding the block between the forefinger and thumb of the right hand by means of the thumb-piece and nipple-lump.

The officer will again go down the ranks to see that the breech-shoe and breech-block are free from rust, and otherwise clean; also to see that the breech-block is free in its action. Each soldier, as the officer approaches within one file of him, will turn the barrel of his rifle full to the front with his left hand, lock downwards, and draw back the breech-block with his right hand.

Close order—March.

Examine—Arms.—Both ranks will come to the position of "Charge swords:" the rear rank men, in turning to the right, will raise their rifles perpendicularly, so as to clear the front-rank men when coming down to the charge.

The officer will now proceed to look through each barrel, to see that it is clean and free from dust. The seaman, when the officer passes the file nearest to him, will close the breech; ease springs; order arms; and stand at ease.

## INSTRUCTIONS FOR CLEANING THE SNIDER BREECH-LOADING RIFLE.

1. Half-cock the rifle, and open the breech.
2. Put a piece of rag into the jag of the cleaning rod, twisting it round so as to cover it, and rub the barrel carefully up and down with it, to remove the fouling. No water to be used, but after firing blank cartridge the following mode of proceeding is to be adhered to :---  
The rifle to be held muzzle downwards at a convenient angle, with the breech-block open, and water poured through the barrel. This will moisten the fouling, and enable it to be removed by a rag at the end of the cleaning rod. This method of pouring the water is not liable to wet the breech-block or other parts of the breech arrangements of the rifle. The rag, which may be wetted, should then be placed over the muzzle and pressed into the bore with the head of the rammer, care being taken that the rammer head is equally covered all round ; the barrel is then to be wiped out with rag or tow until it is perfectly dry, and afterwards with an oiled rag.
3. Replace the afore-mentioned rag by an oil rag, woollen if possible, and pass the latter up and down the barrel.
4. Wipe the breech-shoe and breech-block all over with an oil rag, to remove dirt, and to prevent rust.
5. Close the breech and ease springs.

---

 NAVAL CUTLASS EXERCISE.

This exercise is formed on the following principles :—

I.—That the “First Guard” is the most advantageous position which a man armed with a cutlass can assume for the purpose of “Attack” or “Defence.”

II.—That as a point can be returned with far greater rapidity and with much more deadly effect than a cut, a point is invariably to be returned instantly after having guarded a cut, or parried a point delivered by an opponent.

III.—That after delivering a cut or point, the “First Guard” is to be immediately resumed, ready for instant “Defence” or “Attack.”

It consists of two diagonal “Cuts,” one “Point,” and three “Guards.”



The division will fall in two deep in close order with swords sheathed. If with drill swords, without scabbards, the swords are to be held in the left hand as if sheathed.

“Attention.”—Body erect ; shoulders square to the front, and heels closed.

NOTE.—The instructor will himself perform each movement before the class, taking care that it is correctly performed before passing on to the next.

“Draw Swords.”—At the word “Draw,” grasp the hilt with the right hand and the scabbard with the left, the rear rank stepping back one pace at the same instant ; and at “Swords,” draw out smartly, and rest the sword on the right shoulder in a sloping position, keeping the fore-arm horizontal ; this being the position of “Slope swords.”

“Return Swords.”—At the word “Return” grasp the scabbard with the left hand, and enter the point one inch ; at “Swords,” return the sword smartly, and then drop the hands by the side, the rear rank taking a pace to the front at the same instant.

NOTE.—The front rank will be marched across the deck, or single rank will be formed in the usual manner, after the class has been practised in drawing and returning swords.

“Prepare for Exercise.”—A caution.

“—— March.”—The centre file remains steady, the remainder face outwards and step off, each man glancing over the inner shoulder towards the centre file ; and when at three paces from the position in which the man in his rear has halted he will halt, and dress up or back, as necessary, to give room for cutting.

NOTE.—The instructor will direct the class to face towards him, in order to observe their manner of cutting, and to afford them a target to aim at. If necessary, the class will be closed in again when extended in two ranks as follows :—“Close on the centre.” “—— March.” Upon which the front rank will close on the rear rank, and then both ranks will close on the centre file. When extended in single rank, after closing on the centre, two deep will be re-formed in the usual manner.

#### “THE CUTTING PRACTICE.”

##### *A Caution.*

“Guard.”—Step back with the left foot, bend both knees, and at the same time drop the point quickly to the front, raising the arm fully as high as the shoulder, and keeping it loose and free, with the elbow slightly bent, hilt in line with and covering the elbow ; the left arm behind the back.

“Cut One.”—Step smartly out one short pace with the right foot, keep the left foot firm, the body upright, and straighten the left knee; at the same instant cut diagonally downwards from right to left, from the position of “Guard.”

“Guard.”—Step back smartly one short pace, and form “Guard,” as before detailed.

“Cut Two.”—As in “Cut one,” but delivered from left to right.

“Guard.”—As before detailed.

“Slope Swords.”—Come to the position of “Attention” (bringing the left foot up to the right), and “Slope” as before.

NOTE.—The instructor will here and ALWAYS at the end of each section (that is, after “Slope swords”) direct any (or each) file to “Prove,” upon which the named file will come to the position of “Guard,” go through what has just been taught, and “Slope” without further orders. The instructor will then give the order “CHANGE ARMS,” and go through the section with the left hand in the same manner, and again prove.

#### “THE GUARDING PRACTICE.”

##### *A Caution.*

“Guard.”—As before detailed.

“Second.”—The hilt should be just above the crown of the head, the point of the sword to the left front, and slightly drooped, the edge upwards to the front.

NOTE.—The instructor will, as often as may be necessary, bring the class back to *the* “Guard,” by giving the order “First.”

“Third.”—The hilt should be off to the right, and midway between the elbow and the shoulder, elbow close to the body, the blade with the point raised and bearing away to the left front.

NOTE.—The instructor will, as often as may be necessary, bring the class back to the “Second” Guard. Always return to the “Guard” before “Slope swords.”

“Slope Swords.”—As before detailed.

NOTE.—The instructor will explain to the class that the 1st Guard defends the right side from the elbow downwards; that the 2nd Guard defends crown of the head and whole of the left side; and that the 3rd Guard defends the right side above the elbow.

#### “THE POINTING PRACTICE.”

##### *A Caution.*

“Guard.”—As before detailed.

“Point.”—Step smartly out as in “Cut one,” and deliver

point as quickly as possible for centre of breast without altering the direction of the edge, remaining out with the arm extended.

“Guard.”—Step smartly back and show 1st Guard.

“Parry.”—Parry as quickly as possible upwards and to the left by forming the 2nd Guard, and (without pausing an instant) downwards and to the right by forming 1st Guard.

“Slope Swords.”—As before detailed. (*See Note to “Slope Swords,”* at the end of “Cutting Practice.”)

“Guard.”—As before detailed.

“Second.”—Form the 2nd Guard, as detailed in the “Guarding Practice.”

“Point.”—As before detailed.

“Guard.”—As before detailed.

“Parry.”—As before detailed.

“Slope Swords.”—As before detailed.

“Guard.”—As before detailed.

“Third.”—Form the 3rd Guard, as detailed in the “Guarding Practice.”

“Point.”—As before detailed.

“Guard.”—As before detailed.

“Parry.”—As before detailed.

“Slope Swords.”—As before detailed.

NOTE. — In pointing, the arm is never to be drawn back, which causes delay and gives warning to the opponent; but the point should be instantly delivered from each Guard with the utmost rapidity, at the centre of the breast.

The General Practice is intended to teach the delivery of each cut or point from the 1st Guard (which is the best position a man armed with a cutlass can assume for attack or defence), and that immediately the cut or point has been delivered the 1st Guard is to be resumed.

#### “THE GENERAL PRACTICE.”

##### *A Caution.*

“Guard.”—As before detailed.

“Cut One.”—As before detailed, in the “Cutting Practice.”

“Guard.”—As before detailed.

“Point.”—As before detailed, in the “Pointing Practice.”

“Parry.”—Step back smartly, and parry as before.

“Cut Two.”—As before detailed, in the “Cutting Practice.”

“Guard.”—As before detailed.

“Point.”—As before detailed, in the “Pointing Practice.”

“Parry.”—As before detailed.

“Slope Swords.”—As before detailed.

The object desired to be obtained by the Attack and Defence Practice is to impress on the men that, having guarded any cut or point delivered by an adversary, they should INSTANTLY return point to the breast, and having delivered the point, at once resume the position of “First Guard,” ready for immediate attack or defence.

“THE ATTACK AND DEFENCE PRACTICE.”

*A Caution.*

“— March.”—The front rank will advance on the rear rank, the latter closing on the centre man to half-distance. If at *close* order, extend from the centre and take up the same position.

FIRST SECTION.

Instructor. “FRONT (OR REAR) RANK.”	Front (or Rear) Rank.	Rear (or Front) Rank.
“HEAD, POINT, AND GUARD.”	A Caution.	A Caution.
“GUARD.”	As before detailed.	As before detailed.
“HEAD.”	Step smartly out a short pace with the right foot, and “Cut one” at head.	Defend the head with the 2nd Guard.
“POINT.”	Step smartly back a short pace with the right foot, and parry by forming 1st Guard.	Step smartly out a short pace with the right foot, and deliver the point as quickly as possible for centre of breast; re- maining out with the arm extended and edge of sword up.
“GUARD.”	As before detailed.	Step smartly back a short pace with the right foot and form “Guard,” as before detailed.
“SLOPE SWORDS.”	See Note to “Slope Swords,” at the end of the Cut- ting Practice.	

## SECOND SECTION.

Instructor.	Front (or Rear) Rank.	Rear (or Front) Rank.
"FRONT (OR REAR) RANK."		
"ARM, POINT, AND GUARD."	A Caution.	A Caution.
"GUARD."	As before detailed.	As before detailed.
"ARM."	Step smartly out a short pace with the right foot, and "Cut two" at arm.	Defend the arm with 3rd Guard.
"POINT."	Step smartly back a short pace with the right foot, and parry by forming 2nd Guard.	Step smartly out a short pace with the right foot, and deliver the "Point," as detailed in 1st Section.
"GUARD."	As before detailed.	Step smartly back a short pace with the right foot, and form "Guard," as before detailed.
"SLOPE SWORDS."	See Note in 1st Section.	

## THIRD SECTION.

Instructor.	Front (or Rear) Rank.	Rear (or Front) Rank.
"FRONT (OR REAR) RANK."		
"THIGH, POINT, AND GUARD."	A Caution.	A Caution.
"GUARD."	As before detailed.	As before detailed.
"THIGH."	Step smartly out a short pace with the right foot, and "Cut one" at thigh.	Defend the thigh with 2nd Guard.
"POINT."	Step smartly back a short pace with the right foot, and Parry by forming 2nd Guard.	Step smartly out a short pace with the right foot, and deliver the "Point," as detailed in 1st Section.
"GUARD."	As before detailed.	Step smartly back a short pace with the right foot, and form "Guard," as before detailed.
"SLOPE SWORDS."	See Note in 1st Section.	

FOURTH SECTION.

Instructor.	Front (or Rear) Rank.	Rear (or Front) Rank.
"FRONT (OR REAR) BANK."		
"LEG, POINT, AND GUARD."	A Caution.	A Caution.
"GUARD."	As before detailed.	As before detailed.
"LEG."	Step smartly out a short pace with the right foot, and "Cut two" at leg.	Defend the leg with the 1st Guard.
"POINT."	Step smartly back a short pace with the right foot, and Parry by forming 2nd Guard.	Step smartly out a short pace with the right foot, and deliver the "Point," as detailed in 1st Section.
"GUARD."	As before detailed.	Step smartly back a short pace with the right foot, and form "Guard," as before detailed.
"SLOPE SWORDS."	See Note in 1st Section.	

FIFTH SECTION.

Instructor.	Front (or Rear) Rank.	Rear (or Front) Rank.
"FRONT (OR REAR) BANK."		
"POINT, POINT, AND GUARD."	A Caution.	A Caution.
"GUARD."	As before detailed.	As before detailed.
"POINT."	Step smartly out a short pace with the right foot, and deliver the "Point," as detailed in 1st Section.	Parry the "Point" by forming 2nd Guard.
"POINT."	Step smartly back a short pace with the right foot, and parry the "Point" by forming the 1st Guard.	Step smartly out a short pace with the right foot, and deliver the "Point," as detailed in 1st Section.
"GUARD."	As before detailed.	Step smartly back a short pace with the right foot, and form "Guard," as before detailed.
"SLOPE SWORDS."	See Note in 1st Section.	

The foregoing Sections of the Attack and Defence Practice are to be performed in quick time, the Instructor denoting the point of attack. For instance, take the Third Section :—

Instructor.	Rear Rank.	Front Rank.
"GUARD."	As before detailed.	As before detailed.
"REAR RANK."	A Caution, to show which rank is to attack.	A Caution, &c.
"THIGH."	Cut one at thigh, parry "Point" with 2nd Guard, resume Guard.	Defend thigh with 2nd Guard, return "Point," resume Guard.
"SLOPE SWORDS."	See Note in 1st Section.	

#### LOOSE PLAY.

The men being perfect in the foregoing exercises, should now commence loose play. Only two opponents are to engage at the same time, the Instructor watching most carefully for any defects in their modes of attack and defence, and pointing them out. When a hit is received, the man hit is at once to recover to the guard, and then drop the point of his sword in acknowledgment.

It is most important that the following points should be very clearly explained to the men :—

The eye should be fixed on that of the opponent, weight of body divided equally on both feet, the proper distance kept by advancing or retiring with rapidity ; every effort to be used for the purpose of taking off the attention of opponent and causing him to expose a weak point. It must *especially* be remembered that a point can be returned very much quicker than a cut, and with far more effect ; therefore when a man has guarded a cut or point, he should *instantly* return point at breast, and then assume the 1st Guard, as being the best position from which to attack or defend. During the attack, if a man sees a weak point in his opponent more open to the delivery of a cut than a point, he should, of course, attack with a cut, but having guarded a cut or point, he should always return a point *instantly*.

## SWORD BAYONET EXERCISE.

The division will fall in two deep.

**“Fix Swords.”**—As detailed in the **“Manual Exercise.”**

**NOTE.**—The front rank will then be marched across the deck, or single rank will be formed in the usual manner.

**“Guard.”**—Step back with the right foot, bend both knees, at the same time bring the rifle to the position of **“Charge swords,”** except that the right wrist will be upon the upper part of the hip, and the left elbow close to and in front of the body.

**“Point.”**—Point quickly at centre of breast, extending the arms, elbows under, and then resume the position of **“Guard.”**

**“Advance.”**—Close the right foot to the left, and then instantly advance the left foot.

**“Point.”**—As before detailed.

**“Retire.”**—Close the left foot to the right, and instantly step back with the right foot.

**“Point.”**—As before detailed.

**“Right Parry.”**—Keeping the left elbow close into the body, carry the point off quickly to the right front, at the same time inclining the barrel to the right, and then immediately return to the position of **“Guard.”**

**NOTE.**—This parry will carry off all cuts or points delivered at the right side. When necessary to parry a high or low cut or point, the point must be smartly raised or lowered at the same time that it is carried to the right. The instructor will occasionally direct the men to give a high or low parry by denoting the point of attack, thus:—**“Head.”** A caution. **“Right Parry.”** As above detailed.

**“Left Parry.”**—Same as **“Right Parry,”** and the same note, but for **“Right”** put **“Left,”** except **“Left elbow.”**

**“About.”**—Turn to the right about on the heels, and at the same time smartly change the hold of the rifle with the right hand at the balance, grasping the small of the butt with the left, and sink down again to the position of **“Guard.”**

**NOTE.**—The whole of the foregoing drill will now be gone through with the rifle at the left side, after which the word **“About”** will be again given, when the division will resume their original front.

**“Order Arms.”**—As in the **“Manual Exercise,”** bringing the right foot up to the left.

**NOTE.**—The original formation in two ranks will now be resumed.

**“Unfix Swords.”**—As in the **“Manual Exercise.”**



## PISTOL EXERCISE.

### ADAMS'S BREECH-LOADING REVOLVER.

#### *To make Ready and Fire by Numbers.*

By Numbers, Ready.—Take the pistol from the belt with the right hand, then seize the handle with the left, holding the pistol nearly upright, the forefinger pointing to the muzzle between the trigger-guard and the cylinder; and half-cock with the right hand, thumb remaining on the comb of the hammer.

Two.—Open the breech with the forefinger and thumb of the right hand, then carry the hand to the pouch and take hold of a cartridge at the rim.

Three.—Put a cartridge into each chamber, pressing them well home with the thumb, turning the cylinder at the same time with the forefinger of the left hand, then close the breech and drop the right hand to the side.

Four.—Full-cock with the thumb of the right hand, then pass the pistol into the right hand, holding it upright, with the forefinger outside the trigger-guard.

Present.—Point the pistol a few inches below the object, with the arm slightly bent, then raise the muzzle until the top of the foresight is brought in line with the object through the notch of the back-sight, and press the trigger at the same time with the forefinger until the hammer falls.

As you were.—Pass the pistol into the left hand, holding it as in the 1st motion of "Ready," then proceed with the 4th motion of "Ready."

Two.—Pass the pistol into the left hand, and hold it as in the 1st motion of "Ready," then half-cock, open the breech, seize the head of the extractor and force out the empty cartridge-case, return the extractor to its former position, carry the hand to the pouch and take hold of a cartridge at the rim.

Three.—Proceed with the 3rd motion of "Ready," as before detailed.

#### *To Return the Pistol to the Belt.*

Return.—If the pistol is loaded, push the extractor down into one of the chambers with the right hand, then return the pistol to the belt, and drop the hands to the sides.

*To come to the "Ready" from the Belt.*

Ready.—Place the pistol in the left hand, as detailed in the 1st motion of "Ready," and withdraw the extractor from the chamber with the right hand, then proceed as before laid down for "Ready."

*To Half-cock, if at the "Ready."*

Half-cock.—Pass the pistol into the left hand, and hold it as in the 1st motion of "Ready," then half-cock with the thumb and forefinger of the right hand, and drop the hand to the side.

*To Unload the Pistol.*

Unload.—Place the pistol in the position of "Ready" with the muzzle inclining to the front, then open the breech, force back the cartridges with the extractor, return them to the pouch, close the breech, ease the hammer down, and return the pistol to the belt.

*To make Ready and Fire, in Quick Time.*

The men having been thoroughly instructed in slow time, will next be taught to "Ready" and fire in quick time.

## INDEPENDENT FIRING.

CAUTION.—Independent firing.

Commence.—Each man will come to the "Ready" and "Present" independently of his right or left-hand man, and will continue firing without reloading until all the chambers are discharged. He will then return to the "Ready" position, reload, and proceed as before.

Cease firing—Complete the loading and "Return."

The pistol can be fired without full-cocking by merely pressing the trigger each time; but this should only be resorted to in close action, as the increased pull off of the trigger has a tendency to render the aim uncertain.

The men should be exercised in firing with the left hand as well as the right; and they should be taught that, when time permits, a more accurate aim may be taken by supporting the pistol with the left hand.

To remove the cylinder:—

Place the pistol at half-cock, then press in the base-pin spring and withdraw the base pin, the cylinder can then be removed.

## RULES AND REGULATIONS.

### BOYS' CLOTHING.

Each boy, on joining, is to be supplied with the articles enumerated on the following list :—

No.	ARTICLES.	Price of Material.			Making.			Total.		
		£	s.	d.	£	s.	d.	£	s.	d.
1	Cloth cap . . . . .	0	1	5	0	0	5	0	1	10
1	Cloth trousers, No. 1 . . .	0	13	2 $\frac{1}{2}$	0	1	6	0	14	8 $\frac{1}{2}$
1	Cloth trousers, No. 2 . . .	0	11	9	0	1	6	0	13	3
3	Duck trousers* . . . . .	0	6	10 $\frac{1}{2}$	0	0	10	0	7	8 $\frac{1}{2}$
1	Serge trousers . . . . .	0	6	11 $\frac{3}{4}$	0	1	0	0	7	11 $\frac{3}{4}$
2	Duck jumpers . . . . .	0	4	7 $\frac{1}{2}$	0	0	6	0	5	11 $\frac{1}{2}$
1	Duck bag . . . . .	0	2	3 $\frac{1}{2}$	0	0	4	0	2	7 $\frac{1}{2}$
2	Flannels . . . . .	0	5	4	0	0	4	0	5	8
3	Drill frocks . . . . .	0	6	9	0	0	10	0	7	7
1	Blue serge frock (thick) . .	0	10	3 $\frac{3}{4}$	0	1	0	0	11	3 $\frac{3}{4}$
1	Blue serge frock (thin) . .	0	7	4	0	1	0	0	8	4
1	Shoes . . . . .	0	6	6	...	...	...	0	6	6
2	Combs . . . . .	0	0	7	...	...	...	0	0	7
1	Scissors . . . . .	0	0	6	...	...	...	0	0	6
1	Knife . . . . .	0	0	8	...	...	...	0	0	8
2	Cotton shirts . . . . .	0	5	10	...	...	...	0	5	10
2	Bed covers . . . . .	0	2	3	...	...	...	0	2	3
1	Black silk handkerchief . .	0	3	11	...	...	...	0	3	11
2	Towels . . . . .	0	1	2	...	...	...	0	1	2
1	Worsted cap . . . . .	0	1	5	...	...	...	0	1	5
1	Cap ribbon . . . . .	0	1	0	...	...	...	0	1	0
2	Boys' stockings† . . . . .	0	4	0	...	...	...	0	4	0
1	Comforter† . . . . .	0	1	8	...	...	...	0	1	8
Total . . . . .								£5	15	7 $\frac{1}{2}$

\* To be supplied when discharged to a sea-going ship.

† The articles are not used in the summer months.

A uniform pattern of clothes having been approved, a complete set of which has been furnished for guidance to each training and coast-guard ship, in order to insure that all the boys may always be dressed exactly alike, no deviation is at any time to be permitted from the authorized patterns.

## BADGES FOR PROFICIENCY AND GOOD CONDUCT.

In order to stimulate boys to diligence, assiduity, and good conduct, badges are to be conferred on those who are recommended, and in accordance with the following rules:—

## QUALIFICATIONS.

Any boy who has been recommended for general good conduct, cleanliness, and neatness, and who has made satisfactory progress in his drills and school studies, and also passed the following examination, will be entitled to wear a chevron of gold lace on his sleeve.

*Seamanship.*

To know the name of the masts and yards, standing and running rigging for plain sail; to be able to pull in a boat; to have a fair knowledge of the compass and lead line; to be able to make all the bends, and hitches, and knots, and splices named on the instruction board; to have a knowledge of the different parts of a topsail, and to be able to pass an earring.

*Gunnery.*

To be passed out of the first and second class truck gun instructions, as also out of the awkward squad of the rifle and sword drills.

*School.*

To be able to read and write well, to write fairly from dictation, to know arithmetic as far as compound division, to have a general knowledge of the outlines of geography, and to have made satisfactory progress in religious knowledge.

NOTE.—A boy in the second class, who is making satisfactory progress in the above-named studies, is to be considered eligible to receive a badge, but the second one is not to be conferred unless he is in the first class and comes up fully to the regulations. No boy whilst in the lower school can be awarded a badge.

## ADVANTAGES.

Boys wearing badges, whose parents reside in the locality, may be allowed leave on Sundays, from after Sunday-school until sunset, when they are to return on board: the exact hour will be told them, according to the season. Badge boys are to be exempt from all punishment (except theft and gross insubordination) whilst wearing the badge; they are to enjoy all the privileges of a boy petty officer, and are never to be employed as sweepers and bag-stowers. It is to be noted on their instruction certificate the number of

badges which have been awarded to them for proficiency and exemplary conduct.

After a badge has been worn three months, a second one may be conferred, provided that the boy's conduct has been meritorious, and that his progress has been quite satisfactory ; but it is not to be given unless he has attained to the highest numbers in "The Record of Progress Book."

In selecting a draft, the preference is to be given to those boys that wear badges, provided that they have passed the examination for the rating of first-class boy.

Misconduct in aggravated cases is to be punished by deprivation of the badge by the Captain only. It is to be done in the presence of all the boys, for which they are to be assembled, and it is to be inserted in the defaulters' book.

The badges are to be competed for at the quarterly examinations, and are to be awarded by the Captain.

#### LEAVE.

Boys whose parents do not live in the locality are not to be allowed to visit the town more than once a week, and they are to return at 5 P.M. ; but on other leave days they may be landed for a walk, or to amuse themselves, under the charge of an adequate number of instructors and police.

All boys in the training ships may have leave four times per year, if they desire it, and in the following proportion:—

Christmas..... 3 weeks.

Easter, Midsummer, and Michaelmas 2 weeks each.

This leave is not to be granted until after the quarterly examinations are over, and those boys that are backward and have not made satisfactory progress may be detained on board for a period not exceeding six days after the rest, as a merited punishment for their indolence. It is to be regulated by the inspecting officer, with the approval of the commander-in-chief, so as to commence as follows, and after the inspection of the director of education :—Midsummer and Christmas, about the 16th of June and December ; Michaelmas, about the 24th of September ; Easter holidays will depend on the time on which Easter falls, but as a rule the boys should go home on the previous Thursday.

Boys who go on leave must be given to understand that they must go and return at their own expense, and before going, prove to the commanding officer that they have the means of so doing.

Boys who reside at a distance from the port, and who have not the means of defraying their travelling expenses, but who have a *credit of wages*, may receive an advance for that purpose.

Each boy may take with him in his white duck bag, when proceeding on leave :—

1 Drill frock.	1 Shirt.
1 Pair of stockings.	1 Flannel.

Those that go by sea may take, in addition :—

1 Duck jumper.	1 Pair of serge trousers.
1 Blue Scotch bonnet.	

Boys who unfortunately miss their passage, or lose their return tickets, either by railway or steamer, are to be directed immediately to report themselves on board of the nearest flag or coast-guard ship.

#### MESSING.

Two boys are to be told off to each mess as captains, and are to wear an embroidered anchor on the left arm. They are to be selected with the greatest care, and are to be lads of good character and good disposition. They are to be held responsible for the good order and cleanliness of their messes, and they are to portion out the food to each boy. Two cooks are also to be told off daily in rotation. At 11. 30 A.M. one cook is to lay out the table with the mess traps, &c., and the other is to go to the coppers for the meat and soup, &c., which is to be fairly divided, and a portion put into each plate by the captains of the messes, under the superintendence of the gunners and the instructors. The boys are to be ranged outside of the stools, and standing. When the dinner has been portioned out, it is to be inspected by the lieutenant or other officer, after which the captains of the messes are to say grace ; the boys are afterwards to take their places, and to dine with their caps off.

If, on inspection, it is found that any boy has an unfair proportion of bone, the captain of the mess is to be made to change dinners with the one who has an inferior share given to him : by this means this selfish practice will be easily corrected.

#### RECREATIONS AND AMUSEMENTS.

The main deck is to be well lighted every evening. A fiddler will be allowed to each training ship, to give those who desire it the opportunity of dancing, as also to promote cheerfulness.

After the hours of study, the school-rooms are to be thrown open to the boys, and they are to be well lighted in the evenings. It will be found that many boys will be delighted to avail themselves of this accommodation to write letters, to read books, and also to amuse themselves with quiet games.

They are to be provided from the funds with skittles, bats, balls, quoits, boxing gloves, &c., for out-door amusements; and draughts, chessmen, dominoes, puzzles, &c., for winter recreation.

#### POCKET MONEY.

Each boy is to be allowed threepence weekly, which is to be given to him prior to his going on shore on Thursday. This sum is to be provided by retaining in hand a sufficient amount from the advance, 17s. 6d., which is to be paid on entry to meet the requirements of the first six months, and *afterwards* by taking up monthly money when required, provided always that the boy *is at the time out of debt*.

When small necessaries have been lost by boys through negligence, they are to be replaced, and the value paid out of their pocket money; but in no case is the allowance of pocket money to be withheld for a longer period than two months.

In the event of a boy being discharged to the shore who is in debt to the Crown, any balance remaining in the chaplain's hands from the advance is to be at once paid over to the paymaster, who will take charge of the same in his cash account, per order of the Captain of the ship.

#### BOYS' FUNDS

Are to be derived from two sources. First—

	£	s.	d.
Advance on joining ... ..	0	17	6
Four months' monthly money, if out of debt ... ..	1	0	0
	<hr/>		
	£1	17	6

This sum is to meet a boy's requirements for *one year*, and it is to be expended as follows:—

	£	s.	d.
Seaman's Catechism ... ..	0	1	0
Two towels ... ..	0	0	8
Needles and thread ... ..	0	0	6
Tape, worsted, &c. ... ..	0	0	8
White line for clothes stops ... ..	0	0	4
Two cotton pocket-handkerchiefs ... ..	0	0	9
Clothes brush ... ..	0	1	0
	<hr/>		
Carried forward ... ..	0	4	11

	£	s.	d.
Brought forward ... ..	0	4	11
Scissors ... ..	0	0	5
Pocket money, 52 weeks at 3d. ... ..	0	13	0
Subscription to library and papers ... ..	0	3	6
Cash at Midsummer and Christmas, when going on leave ... ..	0	5	6
Soap and ditty bags ... ..	0	0	8
Small articles, viz., Combs, Brushes, Handkerchiefs, Knives, &c., at about 10d. per month ... ..	0	10	0
	<u>£1</u>	<u>17</u>	<u>6</u>

This fund is to be managed by the Chaplain, assisted by the senior schoolmaster. A proper time and place is to be appropriated for noting the requirements daily, which are to be ordered, if the state of the funds will admit of it; and at that time any boy is to be allowed to examine the state of his account, for which purpose a ledger is to be kept.

The second source of funds is to be derived from savings, and it is to be expended principally in procuring extra vegetables, flour and materials for making puddings, so as to insure a change of diet, which is so highly requisite, and without which the boys will quickly sicken. Thread for the tailors to repair the boys' clothes, bristles and twine for the shoemakers to repair their shoes, blacking and shoe-brushes for each mess, materials for keeping their mess traps clean, shoestrings, and braid for marking their frocks, and candlesticks for the messes, are also to be purchased by these means. From this fund will be provided the requisites for amusements, such as bats, balls, &c., and also to defray the expense of excursions. It is to be under the control of the Captain, who is to restrict the expenditure to the articles above enumerated.

#### SYSTEM OF CHANGING THE SEAMANSHIP INSTRUCTION AT THE ROLL OF DRUM.

First Instruction.—Topsail-yard party to change with boat and lead line.

Second Instruction.—From bends and hitches to knotting and splicing and the compass.

Third Instruction.—From knotting and splicing to compass and helm and running gear.

Fourth Instruction.—From compass and helm to knotting and splicing, making up a topsail or jib for bending, passing nippers and stoppers, and running gear.



The upper school division from rifle and passed out school boys to shifting jib ; if weather will not permit, they are to fall in to seamanship according to their classes.

NOTE.—The passed out of school boys are to be kept at seamanship during the time they would otherwise have been at school.

#### GUNNERY INSTRUCTION.

The boys are to be instructed strictly in the system laid down on board the *Excellent*. They are to be divided into four instructions, so as to alternate with the seamanship divisions.

A register of the classes is to be kept by the second gunner, who is to note the date whenever a boy is passed up to a higher class.

A weekly report is to be made by the senior gunner to the Captain, of the state of the gunnery instruction, on which the names of the backward boys are to be specially noted.

The boys are to be accustomed to use powder, and the guns are to be laid at a moving target (a boat), which is to be kept pulling abreast of the ship.

When practicable, as many boys as are not attached to the school division are to be landed on Fridays at 12.45 P.M., under arms, for rifle drill and field evolutions, as also to learn to march. If the boys are taught to play on the fifes and drums, a band will be established, which will very materially conduce to their marching well.

#### *First Class Truck Gun Instruction.*

Gunnery.—Stations of a ship's company at quarters ; manning both sides ; stations and duties of powder boys ; clearing decks for action.

Rifle.—Inspection of arms ; manual by numbers in single rank ; squad drills, sections 23 to 33 (with arms).

Cutlass.—Cutting and guarding practices.

#### *Second Class Truck Gun Instruction.*

Gunnery.—Sponging and loading ; searching ; securing out board ; pointing ; lock practice ; using marked coins.

Fire 3 rounds from 6-pounder gun, 4-oz. charges, at 200 yards.

Rifle.—Manual and platoon by numbers in slow time, and in quick time ; squad drills, sections 36 to 48.

Cutlass.—Cutting, guarding, pointing, and general practice.

*Third Instruction.*

Gunnery.—Exercise in quick time ; the several methods of fighting the guns ; shifting breechings ; extreme training and squaring ; dismounting.

Fire 1 round from great gun at about 800 yards in training brig.

Rifle.—Manual and firing ; piling arms ; naval sling- ing arms, &c. ; company drills, all sections (except marching past in slow time). To fire 10 rounds from Snider rifle.

Cutlass.—General stick practice.

SYSTEM OF SCHOOL TRAINING.

The upper school division is to consist of two classes for instruction, and are to be called the first and second classes, which are to be subdivided into four parts, to regulate the attendance.

The subjects of instruction in the several classes are to be :

1st Class—To read and write well and correctly from dictation. Arithmetic—Rule of three, simple and compound ; fractions, vulgar and decimal (to be optional) ; and practice.

2nd Class—To read and write well and freely from dictation. Arithmetic—Reduction to compound division.

The lower school division is also to consist of two classes for instruction, to be called the third and fourth classes. They are to be arranged into two parts each, so as to regulate the attendance.

The qualifications of the classes are to be—

3rd Class—To read and write fairly. Arithmetic—Simple multiplication, short and long division.

4th Class—To read and write a little. Arithmetic— Numeration to multiplication.

REGULATIONS FOR CONDUCTING THE MORNING INSPECTION.

The boys are to fall in at 8.30 A.M., with their towels in hand. As soon as they have been mustered, they are to be hung up on lines, the instructors attending to see that it is properly done. No towels are to be taken below, nor are the boys to place them inside of their frock, or the waistband of their trousers :—

When the boys reassemble, the following system is to be carried out by the ship's corporals and instructors :—

First.—The sleeves of the frocks are to be turned up above

the elbow, and the cleanliness of the person is to be minutely ascertained.

Second. — “Right about face.” Examine critically the state of the clothing, which is to be in good repair, and free from grease.

Third.—“Right half face.” Each boy is to hold up, first his right arm, and afterwards his left, to show that his frock is in proper repair.

Fourth.—“Front.” Off shoes and stockings. Tuck the trousers up above the knees; examine legs and feet.

Fifth.—“Right about face.” Examine heels, legs, and heads.

Sixth.—“Front.” Off caps. Instructors and police are to satisfy themselves that the hair has been properly cut, after which the caps are to be examined to ascertain that they are properly marked, as also that a good chin-stay is attached to each.

Seventh.—The frock collars and shoes are to be inspected at least once a week, to see that they have been properly marked, as also to renew the marking of the serges, which may have been washed out.

Eighth.—On Tuesdays and Thursdays the boys are to appear at divisions, with the sleeves of the blue frock turned up, in order to show that they have a clean white one underneath.

#### REGULATIONS FOR THE DISCHARGE OF BOYS.

As soon as a boy has completed one year under training, if he has attained the age of sixteen, and can pass the following examination, he is to be advanced to the first class, and discharged for sea service :—

#### EXAMINATION FOR THE RATING OF FIRST-CLASS BOYS.

##### *Seamanship.*

1st. To be well up in the 1st, 2nd, 3rd, and 4th instructions, as detailed in the training regulations, and to be able to pass nippers and stoppers.

2nd. To have a perfect knowledge of the different parts of a sail; to be able to name the gear that is attached to it, and how it is bent; also to pass an earring, and to be able to reeve running gear for plain sail.

3rd. To be able to use the palm and needle fairly, to sew a seam, and to work an eyelet-hole.

4th. To be able to pull in a boat.

5th. To have a perfect knowledge of the helm, lead, and compass; to understand and explain compass bearings, as also the system of bow lights.

6th. To be able to swim.

#### *Gunnery.*

To be well up in the Truck Gun instructions, as also in the rifle and sword drills. A passing book is to be kept in each training ship, in which the result of each examination is to be noted, after which it is to be submitted to the Captain, who will note thereon what boys are to be rated.

#### DRESS REGULATIONS TO BE OBSERVED BY THE BOYS IN THE TRAINING SHIPS.

*(To be hung up on boards between Decks.)*

A uniform pattern of clothes having been adopted for the boys, they are strictly enjoined that they will not be permitted to make any alteration whatever in their clothing. All are to be dressed exactly alike *in every respect*. The collars of the frocks are not to exceed 17 inches in length, and 8 inches in depth. No needlework or embroidery will be allowed to be worn.

The boys of the watch that are to come on deck after breakfast are always to be dressed, and their bags stowed before they fall in to muster.

Both watches are to fall in for muster and inspection half an hour before divisions, notice of the time being given by sound of bugle. They are to bring their towels with them when they fall in.

Clean frocks are to be put on on Sundays, Tuesdays, and Thursdays, and the flannels are to be changed every Sunday morning.

Shirts may be worn from evening inspection until the next morning, but at no other time.

Hat ribbons are all to be of the same pattern.

In warm weather each boy is to muster at divisions on Wednesday and Friday, dressed in white duck jumpers, in readiness for general exercise.

On Sundays and Thursdays all are to appear at divisions, dressed in their best suits and with shoes on.

The round blue bonnet is always to be worn on board, excepting boats' crews, side boys, and messengers, who are to wear the uniform cloth cap and ribbon, and are also always to have shoes on. No boy is ever to be permitted to go into a boat without having shoes on.

Each boy is to bring with him to divisions for inspection on Thursday, his Seaman's Catechism, two combs, knife and lanyard, hammock and clothes stops, as also his round blue bonnet.

Boats' crews, side boys, and messengers, are to fall in by themselves daily for inspection, immediately after breakfast, and they are to remain dressed until after supper.

Clothes and bedding will be mustered and inspected by watches on the first and second Thursday in every month; the former are always to be kept neatly rolled and stopped round.

The bags not to be unstowed, excepting at the appointed hours, and are never to be left lying about the decks; they are either to be stowed between the messes or placed in the racks.

No clothes or shoes are ever to be issued without being previously marked by the police and shoemakers with *the boy's name in full*.

It is hoped that every boy will see the necessity of keeping his person very clean, and always well washed, as also that he will take a pride in acquiring habits of cleanliness and neatness in his dress.

#### MESS REGULATIONS.

*(To be placed on a board and hung up on the mess decks.)*

Two boys are to be selected as captains to each mess. They are to wear an anchor badge on their sleeve, and will be held responsible for the order and cleanliness of their messes.

Two cooks are daily, at breakfast time, to be selected for each mess, whose duty it will be to procure the food, to lay out the tables, to clean the mess traps, and to sweep the mess out after meals.

At 11.30, one cook is to lay the table with the mess traps, and the other is to go to the coppers for the meat, &c. This is to be divided, and a portion put into each plate by the captains of the messes, under the supervision of the instructors and the Officer of the deck. The boys are all to be

ranged outside the stools, standing. When the dinner has been portioned out, it will be inspected by a lieutenant, after which the senior boys of each mess will say grace, and the boys are to be seated and dine with their caps off.

Nothing is to be placed overhead excepting ditty boxes, hats, and shoes, for which the racks are fitted. Nothing is to be put on the mess shelves excepting basons, plates, and mess gear. All cloths, deck rubbers, and brushes, are to be kept in the mess drawer. No bread bags or tubs are to be placed on the deck under the tables. The mess cloths and deck rubbers are daily to be hung up on a line to dry at 7.30 A.M. and 12.45 P.M.

Nothing whatever is to be taken in at, or thrown out of the ports, nor are any clothes to be hung up or left lying about the mess decks.

The bags, when up, are to be stowed between the messes, and are never to be left lying about the mess decks.

No singing or riotous conduct will be permitted, and all quarrelling and fighting will be severely punished.

On no account are cards, dice, or gambling of any sort to be allowed in the messes.

Throwing biscuit at each other, being a highly dangerous practice, is strictly prohibited.

The police are ordered to report any boy making use of bad language, which is most strictly forbidden.

No boy is ever to interfere with his messmate's property. Nothing can be lost in a ship, and anything that is found is immediately to be taken to the police of the mess decks.

Washing on the lower deck is prohibited; and all hair-cutting and cleansing of the person is to take place in the bath rooms.

No cooking is to be allowed at the Brodie's stoves; they are never to be interfered with by the boys, and are to be under the care of the police and instructors.

Boys are never to be guilty of spitting on the deck; it is a most filthy, disgusting, and un-English habit.

Loud talking or any noise whatever is forbidden when the boys are in their hammocks and after the lights have been put out.

The mess decks are always to be ready for inspection at the following times:—At a quarter of an hour before divisions, 11.45 A.M., 1 P.M., at evening quarters, and at the hour of the rounds.

It is to be hoped that every boy will not only take a pride

in keeping his mess and traps perfectly clean, but that each will willingly and cheerfully do his share of the work, and be perfectly obedient to the captain of his mess, who is charged to carry out these orders, and to see that they are duly observed, being overlooked by the instructors, who are to be stationed at the boys' messes, in order that there may be a complete and efficient supervision.

---

## R U L E S

TO BE

### HUNG UP IN EACH MESS FOR THE INFORMATION OF NEWLY-RAISED BOYS.

1. OBEY *all* orders implicitly.
2. Never steal, never buy or sell clothes ; never trade, chop, or change anything in any way ; if you find or pick up what belongs to another, take it *immediately* to one of the police.
3. Always speak the truth ; if you commit a fault *own it at once*.
4. Be clean and decent in your person, keep your clothes neat and well mended.
5. Never use bad language, never fight, strike, or quarrel with any one ; be civil and obliging to all, especially at meals.
6. When you address an Officer take your cap off ; when you meet an Officer of the Army or Navy on shore, always touch your cap to him respectfully ; if a flag Officer, take your cap off.
7. Never abuse indulgence ; never *break your leave*.
8. Never talk or skylark *on duty* ; never make a noise in your Hammocks after turning in.
9. If you are beaten and illtreated, make your complaint respectfully on the Quarter Deck to the Commanding Officer, but be very careful that you have been strictly obedient and subordinate.





# WEIGHTS AND MEASURES.

## *Division of the Circle.*

60 Seconds .....	1 Minute.	
60 Minutes .....	1 Degree.	
360 Degrees .....	1 Circumference.	
4 Minutes of Time .....	= 1 Degree of Longitude.	
15 Degrees .....	= 1 Hour.	

## *Time.*

60 Seconds .....	1 Minute.	
60 Minutes .....	1 Hour.	
24 Hours .....	1 Mean Solar Day.	
7 Days .....	1 Week.	
28 Days .....	1 Lunar Month.	
12 Calendar Months (365 Days) .....	1 Civil Year.	
365 Days, 5 Hours, 48 Minutes, 47.6352 Seconds .....	1 Solar Year.	

## *Money.*

4 Farthings ...	1 Penny.	20 Shillings .....	1 Pound.
12 Pence .....	1 Shilling.	21 Shillings .....	1 Guinea.

NOTE.—A Sovereign	weights		dwts.	grs.		
A Half-Sovereign	—	.....	5	3 $\frac{17}{62}$ $\frac{1}{3}$	Troy	
A Crown	—	.....	18	4 $\frac{4}{11}$	—	
A Half-Crown	—	.....	9	2 $\frac{2}{11}$	—	
A Shilling	—	.....	3	15 $\frac{3}{11}$	—	
A Sixpence	—	.....	1	19 $\frac{7}{11}$	—	
A Fourpenny Piece	—	.....	1	5 $\frac{1}{11}$	—	
A Threepenny Piece	—	.....	0	21 $\frac{9}{11}$	—	

## WEIGHTS,

### *Troy.\**

24 Grains .....	1 Pennyweight.	
20 Pennyweights .....	1 Ounce.	
12 Ounces .....	1 Pound.	

\* Used for the precious metals and in Philosophical experiments. Diamonds and other precious stones are weighed by carats of 3 $\frac{1}{2}$ -grs. 151 $\frac{1}{2}$  carats are equal to an ounce Troy.

NOTE.—By an Act of Parliament (5 George IV., c. 74), it was enjoined that the standard of weight for the Kingdom should henceforward be the Imperial pound Troy of 5760-grs., and that in case the standard should be lost or injured, it might be recovered from the knowledge of the fact, that a cubic inch of distilled water, at a temperature of 62° Fahrenheit, and when the barometer is at 30-in., weighs 252.458 of these grains.

*Avoirdupois.\**

27.34375 Troy Grains .....	1 Drachm.
16 Drachms.....	1 Ounce.
16 Ounces .....	1 Pound.
14 Pounds ..	1 Stone.
28 Pounds .....	1 Quarter.
4 Quarters .....	1 Hundredweight.
20 Hundredweight .....	1 Ton.

\* Used for all ordinary Goods.

NOTE.—By the before-mentioned Act, it is provided that the Pound Avoirdupois shall consist of 7000 Grains Troy.

*Apothecaries.*

20 Grains ....	1 Scruple.
3 Scruples .....	1 Drachm.
8 Drachms .....	1 Ounce.
12 Ounces .....	1 Pound.

By this Weight only, Apothecaries compound their Medicines; but Drugs are bought and sold by Avoirdupois Weight.

NOTE.—The Grain, Ounce, and Pound, are the same as in Troy Weight.

480 Minims, or Drops .....	=	1 Fluid Ounce.
20 Ounces .....	=	1 Pint.
8 Pints .....	=	1 Gallon.
8750 Grains of Distilled Water	=	1 Imperial Pint.
437.5 Ditto           Ditto	=	1 Imperial Fluid Ounce.

## MEASURES,

*Wine Measure.*

4 Gills .....	1 Pint.
2 Pints .....	1 Quart.
4 Quarts.....	1 Gallon.
10 Gallons .....	1 Anker.
18 Gallons .....	1 Runlet.
42 Gallons .....	1 Tierce.
63 Gallons .....	1 Hogshead.
84 Gallons .....	1 Puncheon.
126 Gallons .....	1 Pipe.
252 Gallons .....	1 Tun.

*Ale Measure.*

4 Gills .....	1 Pint.
2 Pints .....	1 Quart.
4 Quarts.....	1 Gallon.
9 Gallons .....	1 Firkin.
18 Gallons .....	1 Kilderkin.
36 Gallons .....	1 Barrel.
54 Gallons .....	1 Hogshead.
72 Gallons .....	1 Puncheon.
108 Gallons .....	1 Butt.

*Dry Measure.*

2 Imperial Gallons .....	1 Peck.
4 Pecks.....	1 Bushel.
8 Bushels ... ..	1 Quarter.
32 Bushels.....	1 Chaldron.
40 Bushels .....	1 Wey, or Load.
8 Bushels .....	1 Last.

*Measure of Solidity, or Cubic Measure.*

1728 Cubic inches .....	} 1 Cubic Foot.
2200 Cylindrical Inches (nearly) ...	
3300 Spherical Inches (nearly) ...	
6600 Conical Inches (nearly) .....	
27 Cubic Feet .....	1 Cubic Yard.
1357.17 Cubic Inches .....	1 Cylindrical Foot.
904.78 Cubic Inches .....	1 Spherical Foot.
459.39 Cubic Inches .....	1 Conical Foot.

NOTE.—A Cubic Inch is a cube 1-in. square; a Cylindrical Inch is a cylinder 1-in. long and 1-in. in diameter; a Spherical Inch is a sphere 1-in. in diameter; and a Conical Inch is a Cone 1-in. in length, and 1-in. in diameter at the base.

*Measure of Surface, or Square Measure.*

144 Square Inches .....	1 Square Foot.
9 Square Feet .....	1 Square Yard.
30 $\frac{1}{4}$ Square Yards .....	1 Square Pole.
40 Square Poles .....	1 Square Rood.
4 Roods (4840 Sq. Yards).	1 Statute Acre.
640 Acres .....	1 Square Mile.
6084 Square Yards .....	1 Scotch Acre.
7840 Square Yards .....	1 Irish or Plantation Acre.
113.0972 Square Inches .....	1 Circular Foot.
183.346 Circular Inches .....	1 Square Foot.

NOTE.—A Circular Foot is a circle whose diameter is One Foot.

*Superficial Measure for Land.*

62.7264	Square Inches .....	1	Square Link.
10000	Square Links .....	1	Square Chain.
10	Square Chains .....	1	Acre.

*Measure of Length.*

12	Lines .....	1	Inch.
12	Inches .....	1	Foot.
3	Feet .....	1	Yard.
5½	Yards .....	1	Pole, Rod, or Perch.
40	Poles .....	1	Furlong.
8	Furlongs (1760 Yards) ...	1	Mile.
2240	Yards .....	1	Irish Mile.
14	English Miles .....	11	Irish Miles.
3	Miles .....	1	League.

*Miscellaneous.*

3	Inches .....	1	Palm.
4	Inches .....	1	Hand.
9	Inches .....	1	Span.
18	Inches .....	1	Cubit.
5	Feet .....	1	Pace.
6	Feet .....	1	Fathom.
120	Fathoms (strictly 126½ fathoms) .	1	Cable's Length.
8	Cables' Lengths .....	1	Nautical Mile.
600	Square Feet of Inch Boards .....	1	Load.
40	Cubic Feet of Round Timber... }	1	Ton, or Load.
50	Cubic Feet of Hewn Timber... }		
1000	Billets, or .....	1	Cord of Wood.
8	Cubic Feet, or .....		
10	Hundredweight .....		
108	Cubic Feet .....	1	Stack of Wood.
630	Pounds, or .....	1	Fathom of Wood
6-ft. × 6-ft. × 2-ft. ....			
84	Pounds .....	1	Bushel of Coals.
2	Hundredweight .....	1	Sack of Coals.
10	Sacks (42-ins. × 30-ins.) .....	1	Ton of Coals.
53	Hundredweight .....	1	Chaldron of Coal (Newcastle).
112	Pounds .....		
40	Cubic Feet .....	1	Ton of Shipping
8	Pounds of Meat or Fish .....	1	Stone.
56	Pounds of Butter .....	1	Firkin.

250 Pounds of Hops, Kentish .....	}	1 Pocket.
112 Pounds of Hops, Surrey and Sussex		
236 Gallons of Sweet Oil .....	}	1 Ton.
252 Gallons of Fish .....		

1 Acre Scotch, 1.271 Acres English, or 6084 Square Yards.		
1 Acre Irish, 1.638 Acres English, or 7840 Square Yards.		
1 Barrel, Imperial Measure ...	9981.86	Cubic Inches.
1 Barrel of Soap .....	256	Pounds.
1 Bushel, Imperial Measure...	2218.19	Cubic Inches.
1 Bushel, Winchester .....	2150.42	Cubic Inches.
1 Bushel of Barley .....	50	Pounds.
1 Bushel of Coal .....	88	Pounds.
1 Bushel of Flour or Salt ...	56	Pounds.
1 Bushel of Oats .....	40	Pounds.
1 Bushel of Wheat .....	60	Pounds.
1 Chain .....	100	Links.
1 Clove of Wool .....	7	Pounds.
1 Fodder of Lead—Stockton .	22	Hundredweight.
1 Fodder of Lead—Newcastle	21	Hundredweight.
1 Fodder of Lead—London ...	19 $\frac{1}{2}$	Hundredweight.
1 Gallon, Imperial Measure...	277.27	Cubic Inches.
1 Gallon of Distilled Water, 60°	10	Pounds.
1 Gallon of Proof Spirit or Oil.	9.3	Pounds.
1 Gallon, former Wine Measure	231	Cubic Inches.
1 Gallon, former Ale Measure	283	Cubic Inches.
1 Gallon, Irish Measure .....	217.6	Cubic Inches.
1 League .....	3	Miles.
1 Geographical Mile .....	1.15	English Miles.
1 Geographical Degree .....	69.12	English Miles.
1 Nautical Mile (mean) .....	6075.5	Feet.
1 Gross .....	12	Dozen.
1 Great Gross .....	12	Gross.
1 Hand .....	4	Inches.
1 Hundred of Deals .....	120	In Number.
1 Hundred of Nails .....	120	In Number.
1 Hundred of Salt .....	7	Lasts.
1 Last of Salt .....	18	Barrels.
1 Last of Gunpowder .....	24	Barrels.
1 Last of Potash, Soap, Pitch, or Tar	12	Barrels.
1 Last of Flax or Feathers ...	17	Hundredweight.
1 Link .....	7.92	Inches.
1 Line .....	$\frac{1}{12}$ th	of an Inch.
1 Load of Bricks .....	500	In Number.

1 Load of Corn .....	40	Bushels.
1 Load of Hay or Straw .....	36	Trusses.
1 Load of Lime .....	32	Bushels.
1 Load of Planks (2-inch) .....	300	Square Feet.
1 Load of Sand .....	36	Bushels.
1 Load of Timber (Squared) .....	50	Cubic Feet.
1 Load of Timber (Unhewed).....	40	Cubic Feet.
1 Mile .....	80	Chains.
1 Pack of Wool .....	240	Pounds.
1 Palm .....	3	Inches.
1 Pole—Woodland.....	18	Feet.
1 Pole—Plantation .....	21	Feet.
1 Pole—Cheshire .....	24	Feet.
1 Sack of Wool .....	364	Pounds.
1 Seam of Glass .....	124	Pounds.
1 Cubit .....	18	Inches.
1 Span .....	9	Inches.
1 Military Pace .....	5	Feet.

*Cloth Measure.*

2 $\frac{1}{4}$ Inches .....	1 Nail.
4 Nails .....	1 Quarter.
4 Quarters .....	1 Yard.
3 Quarters .....	1 Flemish Ell.
5 Quarters .....	1 English Ell.
6 Quarters .....	1 French Ell.

RELATIVE VALUE OF BRITISH AND FOREIGN WEIGHTS AND MEASURES.

	<i>Weights.</i>	
<i>French.</i>		<i>British.</i>
Gramme .....	15.434	Grains.
Décigramme .....	1.5434	Grains.
Centigramme .....	0.15434	Grains.
Milligramme .....	0.015434	Grains.
Décagramme .....	154.34	Grains.
Hectogramme .....	{ 3.527	Ounces Avoirdupois, or
	{ 3.2154	Ounces Troy.
Kilogramme .....	{ 2.6795	Pounds Troy, or
	{ 2.2048	Pounds Avoirdupois,
Myriagramme .....	{ 26.795	Pounds Troy, or
	{ 22.048	Pounds Avoirdupois.
Quintal .....	1 Cwt. 3 qrs. 24 $\frac{1}{2}$ lbs.	
Millier, or Bar .....	9 Tons 16 cwt. 3 qrs. 12 lbs.	

*Measures of Capacity.*

Litre* .....	}	61.028	Cubic Inches, or
		1.761	Imperial Pints.
Décilitre .. .. .		6.1928	Cubic Inches.
Centilitre .. . . .		0.6103	Cubic Inches.
Millilitre .. . . .		0.0610	Cubic Inches.
Décalitre .. . . .	}	610.28	Cubic Inches, or
		2.2	Imperial Gallons.
Hectolitre ,. . . . .	}	3.5317	Cubic Feet, or
		2.75	Imperial Bushels.
Kilolitre .. . . . .		35.317	Cubic Feet.
Myrialitre .. . . . .		353.17	Cubic Feet.

\* The Litre = a Cubic Décimètre.

*Measures of Length.*

Mètre .. . . . . .	39.371	Inches.
Décimètre .. . . . .	3.9371	Inches.
Centimètre .. . . . .	0.39371	Inches.
Millimètre .. . . . .	0.039371	Inches.
Décamètre .. . . . .	32.809	Feet.
Hectomètre .. . . . .	328.09	Feet.
Kilomètre .. . . . .	1093.6	Yards.
Myriamètre ,. . . . .	6.2138	Miles.

*Measure of Superficies.*

Are† .. . . . . .	119.60	Square Yards.
Déciare .. . . . . .	11.960	Square Yards.
Centiare .. . . . . .	10.764	Square Feet.
Milliare .. . . . . .	155.00	Square Inches.
Décare .. . . . . .	1196.0	Square Yards.
Hectare .. . . . . .	2.4712	Acres.

† The Are = A Square Décimètre.

*Measures of Solidity.*

Stère‡ .. . . . . .	35.317	Cubic Feet.
Décistère .. . . . . .	3.5317	Cubic Feet.
Centistère .. . . . . .	610.28	Cubic Inches.
Millistère .. . . . . .	61.028	Cubic Inches.
Décastère .. . . . . .	13.080	Cubic Yards.
Hectostère .. . . . . .	130.80	Cubic Yards.

‡ The Stère = A Cubic Mètre.

NOTE.—The Décimètre, Centimètre, and Millimètre are respectively formed by dividing the Mètre by 10, 100, and 1,000; and the Décamètre, Hectomètre, Kilomètre, and Myriamètre, by multiplying the Mètre by 10, 100, 1,000 and 10,000. The other Measures and Weights of the Decimal System are formed in a like manner from their respective Units.

*Foreign Measures with their English equivalents.*

COUNTRY.	Name of Measure.	Equal to 100 Eng. Feet	COUNTRY.	Name of Measure.	Equal to 100 Eng. Feet
Amsterdam	Foot.	107.71	Naples	Palmo.	115.60
Antwerp	Foot.	106.76	Prussia	Foot.	97.16
China	Foot.	94.41	Riga	Foot.	111.21
Copenhagen	Foot.	97.16	Russia	Foot.	87.27
Dantzic	Foot.	106.19	Sardinia	Palmo.	122.69
France	Foot.	91.46	Sicily	Palmo.	125.91
Genoa	Foot.	123.45	Spain	Foot.	107.91
Hamburgh	Foot.	106.38	Sweden	Foot.	102.73
Lisbon	Foot.	92.73	Venice	Foot.	87.71
Malta	Foot.	107.52			

*Foreign Weights, with their English equivalents.*

COUNTRY.	Weights.	Equal to 1-Cwt. British.	COUNTRY.	Weights.	Equal to 1-Cwt. British.
Alexandria	Rottolo for	119.84	Malta	Rottolo	64.17
Amsterdam	Pound Flem.	50.79	Naples	Cantaro grosso	56.99
Algiers	Rottolo	94.12	Persia	Batman	88.31
Barcelona	Pound.	126.97	Portugal	Pound.	110.68
Cairo	Rottolo	117.89	Prussia	Pound.	108.60
China	Catty.	84.00	Riga	Pound.	121.51
Constantinople	Oke.	39.53	Rotterdam	Pound.	102.82
Copenhagen	Pound.	101.55	Russia	Pound.	124.08
Cyprus	Rottolo	21.35	Sardinia	Pound.	128.00
Dantzic	Pound.	108.42	Sicily	Pound.	160.00
France	Livre usuelle	101.59	Smyrna	Pound.	39.53
Geneva	Pound heavy	145.69	Spain	Pound.	110.40
Hamburgh	Pound.	104.86	Sweden	Pound.	149.33
Japan	Catty.	86.15	Trieste	Pound.	90.75
Leghorn	Pound.	149.61	Tripoli	Pound.	100.00
Madeira	Pound.	110.79	Tunis	Pound.	100.85
			Venice	Pound.	50.79



**MEMORANDA.**

<b>DATE.</b>		<b>£</b>	<b>s.</b>	<b>d.</b>

**MEMORANDA.**

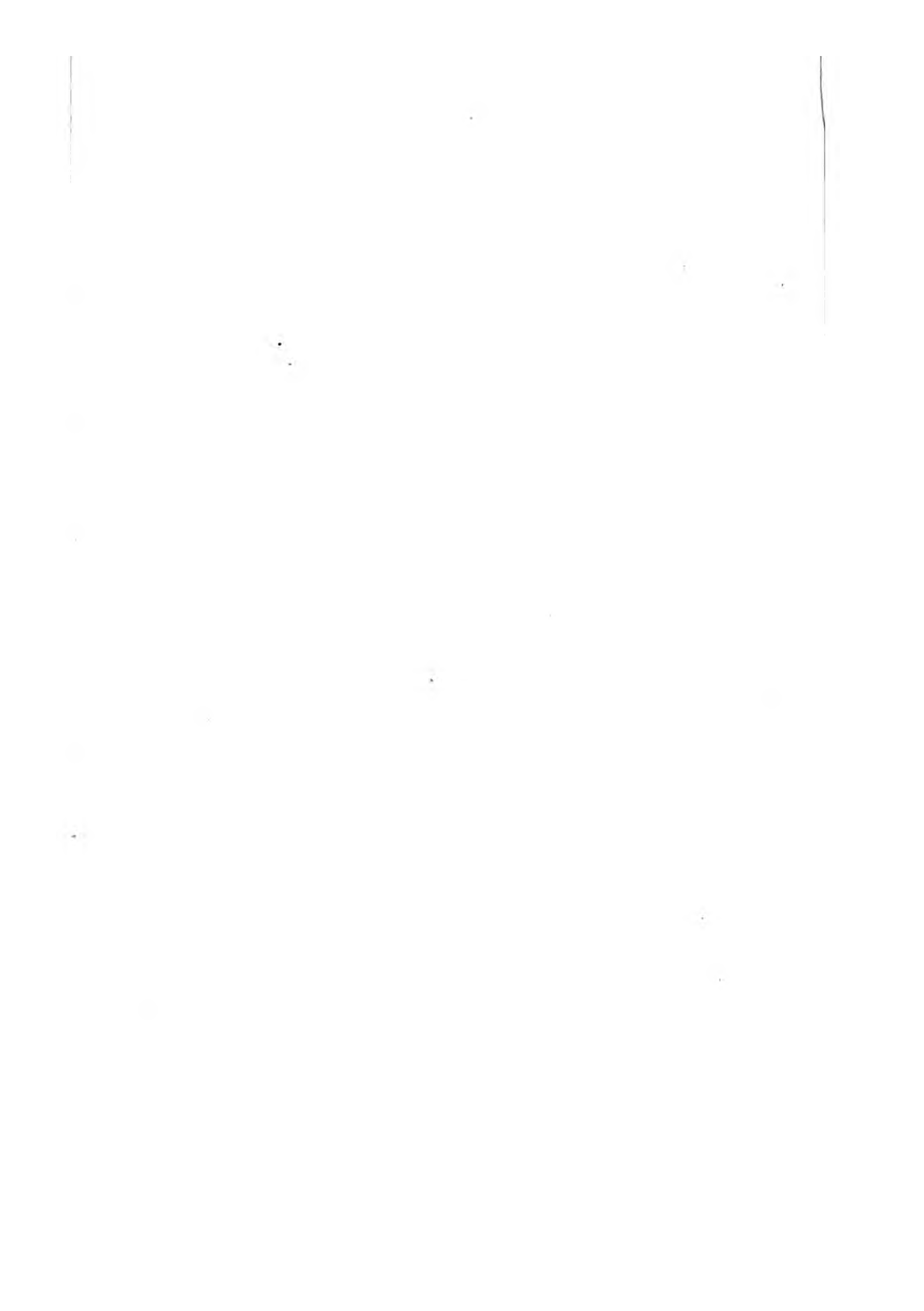
DATE.		£	s.	d.

# MEMORANDA.

DATE.		£	s.	d.

**MEMORANDA.**

DATE.		£	s.	d.



# INDEX.

## SEAMANSHIP.—FIRST INSTRUCTION.

	PAGE		PAGE
Arrangement of the Crew of a Ship of War ... ..	9	Messes, place for, in various classes of Ships ... ..	11
Bags ... ..	12	Naval Lines ... ..	6
Bells ... ..	11	Reef Band ... ..	2
Belly-band ... ..	2	Reef Earrings ... ..	4
Bolt Rope ... ..	4	Reef Lines ... ..	6
Bowline Bridle ... ..	5	Reef Line Secured by a Naval Line ... ..	7
Buntline Cloths ... ..	3	Reef-Tackle Piece ... ..	3
Clew Hanger ... ..	6	Reef-Tackle, use of a ... ..	7
Corvette or smaller Vessel, the Decks of ... ..	1	Robands ... ..	3
Crew, sleeping arrangements for ... ..	12	Robands, not all alike ... ..	3
Crew, division of, for messes ... ..	11	Robands to Secure ... ..	6
Crew, division of ... ..	9	Slab Points ... ..	7
Cringles ... ..	3	Spilling Line ... ..	7
Cringles, not all fitted alike ... ..	3	Three Decked Ship, the Decks of ... ..	1
Distinction, marks of ... ..	10	Time, denotation of, on board Ship ... ..	11
Eyelet Holes ... ..	3	Top Lining ... ..	3
Figures denoting the Force of the Wind ... ..	7	Topsail, how many Bands ... ..	2
Foot Band ... ..	2	Topsail, how to know a Main from a Fore or Mizzen ... ..	6
Foot Rope ... ..	4	Topsail, or any other Square-sail, consequence of being Bent with the roping part forward ... ..	6
Frigate, the Decks of ... ..	1	Topsail, or any other Square-sail, Tabling of ... ..	3
Gaskets ... ..	5	Topsail, Parts of ... ..	2
Gaskets, Bunt and Yard-arm, difference between ... ..	5	Topsail, to know the Fore from the After-part of a ... ..	6
Goring Cloth ... ..	3	Two Decked Ship, the Decks of ... ..	1
Hammocks, Berths, and Swinging of ... ..	12	Watches ... ..	10
Head Earrings ... ..	4	Watches, distinction of ... ..	9
Head Earrings Secured ... ..	6	Watches, division of, under various circumstances ... ..	10
Iron Ships, Arrangement of ... ..	1	Yards, Masts, and Spars in a Full Rigged Ship ... ..	2
Letters to denote the State of the Weather ... ..	7		
Letters denoting Force of the Wind ... ..	7		
Mast Lining ... ..	3		
Messes ... ..	11		

## SEAMANSHIP—SECOND INSTRUCTION.

Bend, a ... ..	18	Cask, to Sling a ... ..	17
Bend, a Fisherman's ... ..	18	Cat's Paw ... ..	16
Blackwall Hitch ... ..	14	Clench, Inside ... ..	18
Bowline Knot, how to make a ... ..	13	Clench, Outside ... ..	18
Bowline on a Bight ... ..	13	Clove-Hitch ... ..	14
Bowline, Running, its use ... ..	14	Half-Hitches ... ..	16
Carrick Bend ... ..	17	Hawsers, to Bend ... ..	17

	PAGE		PAGE
Hitch, a common Marline ...	20	Reef Knot ... ..	13
Hitch, a Marline Spike ...	20	Rolling Hitch ... ..	16
Hitch, a Midshipman's or Ad- miralty ... ..	20	Sheepshank ... ..	17
Hitching over a Ring Bolt ...	20	Sheet Bend ... ..	16
Jigger, to put on a backstay ...	18	Stopper, to pass a ... ..	18
Knot, Figure of Eight ... ..	18	Studsail Halyard Bend ... ..	16
Knot, Overhand ... ..	18	Timber Hitch ... ..	14
		Yarns, to Knot ... ..	13

## SEAMANSHIP—THIRD INSTRUCTION.

Block, to Strop a ... ..	26	Rigging, Rattling down ...	32
Blocks, table for fitting ...	29, 30	Rigging, things to attend to in turning in ... ..	31
Dead Eye ... ..	31	Rope, to point or graft a ...	32
Double or Single Block with Tail	27	Rope, parcelling a ... ..	26
Double-strop for Double Scored Block ... ..	28	Rope, serving a ... ..	26
Eye-Splice, an ... ..	22	Rope, worming a ... ..	24
Grommet, a ... ..	22	Salvagee or Warped Strop, to fit	27
Grommet Strop ... ..	27	Sea Gasket or English Sennit ...	24
Harbour Gasket or French Sen- nit, a ... ..	24	Short Splice, a ... ..	21
Jew Strop, a ... ..	28	Shroud Knot, English ... ..	23
Jumpsurgee Strop, a ... ..	28	Shroud Knot, French ... ..	23
Knot, Matthew Walker ... ..	22	Single Block, to strop with lash- ing eye ... ..	27
Lanyard, to reeve a ... ..	31	Single Strop, to fit two ... ..	28
Long Splice, a ... ..	21	Stopper Knot ... ..	22
Point, its use and how made ...	23	Turk's Head ... ..	23

## FOURTH INSTRUCTION—STANDING RIGGING.

Bolster Cloths ... ..	36	Foremost Shrouds or Swifters, how parcelled and served ...	71
Bolsters on Topmast, how secured	52	Fore or Main Stay, to mark a, for turning in ... ..	39
Boom Mainsail or Spanker Boom, how fitted, and what rigging is attached to it ... ..	61	Fore Topgallant Funnel, to rig a ... ..	52
Bowsprit, how to clothe a ...	53	Futtock Rigging ... ..	43
———Strop or Bale Sling Plan	55	Gaff, rigging attached to a ...	61
———Heart Plan ... ..	55	Half Tops, getting over ... ..	36
Bowsprit Cap, how to get on ...	57	Head Earring Strop ... ..	65
Bumpkins ... ..	57	Hemp or Wire Lower Rigging, difference in cutting out ...	70
Bunt Slabline Blocks ... ..	64	Heart, how many Turns there are rove through a, for setting up	40
Brace Blocks ... ..	66	Lower Stays ... ..	66-67
Chafing Grommet, a ... ..	62	Jackstays ... ..	62
Clew Garnet Blocks, the ... ..	62	Jeer Blocks ... ..	58
Clothing a Bowsprit, how to measure for, and the first Col- lar to lash on ... ..	72	Jib-boom, how to rig a ... ..	40
Cross Jack Yard, how to rig a ...	66	Lanyard of Lower Stays, its size in proportion to the Stay ...	40
Dolphin Striker, to ship in place a Flemish Horse ... ..	67	Lanyards of Lower Stays, how rove ... ..	40
Flying Jib-boom, how to rig it out	59	Lanyards for Topmast Stays, how rove ... ..	50
Flying Jib-boom, how to rig a ...	69	Leech Line Blocks ... ..	62
Flying Jib-Stay, where set up ...	60	Lift Blocks ... ..	66
Foot Ropes, how fitted ... ..	65		
Fore, Main, and Mizzen Topmast, difference in rigging a ... ..	50		

	PAGE		PAGE
Long and Short Legs of the Lower Masthead Pendants, how fitted, and their length when fitted ... ..	71	Spanker or Trysail Gaff, how fitted, and what Gear is attached to them ... ..	61
Lower Cap, how to put it on ...	41	Spritsail Gaff, how to rig a ...	60
Lower Cap, how to send it up ...	41	Spritsail Gaffs, how to ship the	60
Lower Crosstrees, to get in place	34	Staying Masts ... ..	43
Lower Dead Eyes for the Topmast Rigging, how fitted ...	48	Topgallant Backstays ... ..	71
Lower Mast, to rig a ... ..	34	Topgallant Yard, how to rig a ...	68
Lower Rigging, fitting ... ..	69	Topgallant and Royal Mast, how to rig a ... ..	52
Lower Rigging, how to set it up...	43	Topgallant Parrel ... ..	69
Lower Rigging over the Mast Head, how to send the ...	36	Topgallant Rigging, how to measure for ... ..	71
Lower Stays, how to send up ...	39	Topgallant Shrouds ... ..	71
Lower Stays, how turned in ...	39	Topmast and Lower Stays, for putting over masthead after the shrouds ... ..	39
Lower Yard Slings ... ..	65	Topmast Backstays ... ..	71
Main or Spanker Boom Foot Ropes, to fit them ... ..	62	Topmast Cap in place, how to get a ... ..	51
Main or Spanker Boom Jackstay	62	Topmast Crosstrees, how to send in place... ..	45
Main Topmast Stay, how to set up ... ..	50	Topmast, how to rig a ... ..	45
Main Topmast Stays ... ..	49	Topmast Necklace, how secured, and what made of ... ..	51
Main Topsail Yard, how to rig a	67	Topmast Rigging, how to measure for... ..	71
Main Yard how to rig a ... ..	62	Topmast Rigging, how to set up	49
Martingale, how to ship it in place ... ..	58	Topmast Shrouds ... ..	71
Masthead Eye, measure for the	70	Topmast Shrouds, difference in fittings of the ... ..	48
Parcelling, where to commence it ... ..	70	Topmast Shrouds, to send over Topmast Head ... ..	47
Parrel, to fit the ... ..	69	Topmast Stays, Fore, Main, and Mizzen, how to send up and place over Topmast Head, and how set up ... ..	48
Purchases used for setting up Lower Stays, and how applied	40	Topmast Stays, how turned in ...	49
Reef Tackle Blocks ... ..	67	Topmast Stays, Purchases used for setting up, and how applied ... ..	50
Rigging over the Funnel, how to place the ... ..	58	Top over, to get a ... ..	34
Rigging, to set up the Jib-boom.	59	Topsail Parrel ... ..	67
Rolling Tackle Strop ... ..	67	Topsail Yard, how to rig a ...	68
Royal Backstay ... ..	72	Truss Strops, the ... ..	66
Royal Funnel ... ..	53	Wire or Hemp Rigging, difference in fitting... ..	70
Royal Rigging, how to measure for ... ..	71	Yard Tackle Pendant ... ..	66
Seizing to form the Eye ... ..	70		
Shroud Knots, how numbered	36		
Shrouds, how to mark the ...	70		
Shrouds, how to proceed to fit them ... ..	70		
Shrouds, how served ... ..	71		
Slab Line Blocks... ..	64		

FOURTH INSTRUCTION—RUNNING RIGGING.

Bowline, Fore, to Reeve a ...	74	Brails ... ..	81
Bowline, Fore Top, to Reeve a ...	76	Brails, Peak ... ..	81
Bowline, Fore Topgallant, to Reeve a ... ..	77	Brails, Throat ... ..	82
Bowline, Main, to Reeve a ...	74	Brails, to Reeve ... ..	82
Bowline, Main Top, to Reeve a	76	Buntline Spans, and their use...	75
Bowline, Mizzen Top, to Reeve a	76	Buntline, Topsail, to Reeve a ...	75
		Buntline, Topgallant to Reeve...	77



	PAGE		PAGE
Buntlines, Fore and Main Reeve	73	Sheet, Fore or Main to Reeve a...	72
Bunt Slabline, to Reeve a ...	74	Sheets, Boom ... ..	82
Bunt Whip, to Reeve a... ..	74	Sheets, Spanker Boom ... ..	82
Bunt Whip, to Reeve a... ..	76	Single Vang, a ... ..	84
Chain Topsail Sheet, to Reeve a	74	Slab Lines, Fore or Main, to	
Clew Garnet, Fore or Main, a ...	73	Reeve ... ..	73
Clewline, Topsail, to Reeve a ...	75	Spanker, foot outhaul, to	
Clewline, Royal, to Reeve a ...	78	Reeve ... ..	80
Clewline, Topgallant, to Reeve ...	77	Spanker, head outhaul, to	
Course, the Running Gear of a...	72	Reeve ... ..	81
Flying Jib, downhaul, Reeve a...	79	Spanker, or Boom Mainsail,	
Halyards, Flying Jib, to Reeve...	79	Reeve the Running Gear	
Halyards, Jib, to Reeve the ...	78	of a ... ..	80
Halyards, Peak, to Reeve the ...	80	Spanker, to Reeve the Throat	
Inhaul, the ... ..	81	Halyards of a ... ..	80
Jaw Rope... ..	83	Staysail, a Fore Topmast, down-	
Jib and Flying Jib, running		haul ... ..	79
gear of... ..	78	Staysail, Fore ... ..	79
Jib, downhaul, Reeve a ... ..	78	Staysail, Fore Topmast ... ..	79
Lazy Guy, a ... ..	82	Staysails, Reeve the Running	
Leech Lines, Fore and Main,		Gear of ... ..	79
to Reeve ... ..	73	Tack, Fore or Main to Reeve ...	72
Long Bunt Whip ... ..	77	Tack Tricking Line, the ... ..	81
Reef Tackle, to Reeve a... ..	74	Topgallantsail, Reeve the Run-	
Reef Tackle, Second, to Reeve ...	76	ning Gear of a ... ..	77
Reef Tackle, Topsail, to Reeve a	75	Topping Lifts, to Reeve the ...	83
Rope Topsail Sheet, to Reeve a	74	Topsail, to Reeve the Running	
Royal, to Reeve the Running		Gear of a ... ..	74
Gear of a ... ..	78	Vangs, or Peak Downhauls ...	83

## SEIZINGS.

Cross Seizing, a ... ..	86	Racking and End Seizing, a ...	85
Dead Eye, Turning a, in wire		Rose Lashing, a ... ..	86
Rigging ... ..	85	Throat or Round Seizing, a ...	84
End Seizing, the... ..	85	Throat or Round Seizing, to	
Quarter or Flat Seizing, to pass	85	pass a ... ..	84

## WHIPPINGS.

American Whipping ... ..	88	Sailmaker's Whipping for Sen-	
Common Whipping ... ..	88	nit ... ..	88
Sailmaker's Whipping for Reef		West Country Whipping ... ..	88
Points of Fore and Aft Sails...	89		

## ROPE MAKING.

Bolt Rope ... ..	91	Rumbowline Rope ... ..	90
Cable Laid or Cablet Rope ...	91	Rope distinguished according to	
Coir Rope ... ..	91	its Manufacture ... ..	90
Gun Gear ... ..	90	Spunyarn... ..	90
Hawser Laid Rope ... ..	90	Strands and Junk ... ..	89
Hemp, Home made ... ..	89	Wire Rope ... ..	91
Hide Rope ... ..	91	Yarns or Threads ... ..	89
Rounding and Oakum ... ..	89, 90		

## SAILMAKER'S INSTRUCTION.

	PAGE		PAGE
Canvas, how manufactured ...	96	Foot Rope of a Topsail to the	
Cringle in the Leech of a Sail		Leech Rope, to Splice a ...	92
to work a ... ..	94	Rope of a Sail with Single	
Cringle on the Crown, to finish		Strand, to lengthen a... ..	93
off a ... ..	95	Sailmaker's Splice, a ... ..	92
		Twine, how made ... ..	96

## SAILS AND HOW FITTED.

Boom Mainsails, &c. ... ..	100	Staysails Lower ... ..	103
Courses and how fitted ... ..	96	Studdingsails, Lower and Top-	
Jibs ... ..	102	mast ... ..	104
Lower Studdingsail ... ..	105	Topgallantsails ... ..	99
Number of Sails issued for Sea		Topgallant Studdingsail ... ..	106
Service ... ..	108	Topsails, how fitted ... ..	98
Roping ... ..	102	Trysails, Storm ... ..	103
Royals ... ..	100		

## SAIL INSTRUCTION.

After Clew of a Boom Mainsail		Gaff Topsail, how to bend ...	129
and a Spanker, difference in		Gaff Topsail, running Gear of a	116
securing the ... ..	115	Gaff Topsails, how to make up	
Awnings, how made up ... ..	123	for stowing away ... ..	123
Bending strop, a, and its use ...	119	Gear Bent, how, and to what	
Boat Sails, how bent ... ..	129	part is the ... ..	114
Boat Sails, how made up ... ..	123	Gear Bent to sail, how, and to	
Boom Mainsail, Gear to haul on		what part of the ... ..	116
and let go in taking in ... ..	115	Gear Bent, how and to what	
Boom-mainsail, how furled ... ..	137	part of the Sail ... ..	112
Boom Mainsail, Spanker and		Jib, Flying Jib, or Staysail,	
Trysail, running gear of a ... ..	114	named the Running gear of a	112
Boom-mainsail, Spanker, or Try-		Jib, how bent ... ..	126
sail, how to bend ... ..	127	Jib, how furled in harbour ... ..	136
Boom-mainsail, Spanker, or		Jib, how stowed at sea ... ..	136
Trysail, how to make up for		Jib, how to shift ... ..	130
stowing... ..	123	Jib or Staysail, a, what Gear	
Boom, to man ... ..	137	do you let go and haul on in	
Boom-mainsail, to reef ... ..	134	taking in ... ..	114
Course, how to bend a ... ..	123	Jib, or Staysail, how to make up	
Course, how to bend a, not		for Stowing away ... ..	123
furled ... ..	124	Jibs and Flying Jibs, &c., fitted	
Course, how to furl ... ..	134	with Lacings and a Fore Top-	
Course, how to reef ... ..	130	mast, why ... ..	113
Courses furled, shifting ... ..	129	Lazy Sheet, the use of a ... ..	116
First Reef earring, how many		Loosing Sails ... ..	118
turns to take ... ..	132	Lower Topmast and Topgallant	
Fore or Main Trysail, Gear to		Studsails, running Gear of ...	117
let go and haul on in setting a	116	Outer and Inner Turns, the	
Fourth Reef-earring, how many		meaning of ... ..	132
turns to take ... ..	132	Reef-pendant, how rove in the	
Full Rigged Ship, Sails of a ...	109	sail ... ..	132
Gaff-topmast, how to furl, ... ..	138	Reef-pondants to a Boom-	
Gaff Topsail, gear to haul on and		mainsail, how fitted ... ..	132
let go in taking in ... ..	117	Reef-tackle, how hooked ... ..	132
Gaff Topsail, Gear to let go and		Ruuning gear of a Course, and	
haul on in setting a ... ..	117	how bent to a sail ... ..	109

	PAGE		PAGE
Running Gear of a Topsail, name the, and how it is bent	110	To Furl a Topsail on deck for bending or shifting	121
Second Reef-earring, how many turns to take	132	To make a Course up for stowing away (not furled)	121
Setting a Boom Mainsail, what Gear do you let go, and haul on in	115	To make a Jib up for bending or shifting	121
Setting a Course, what Gear do you let go, and haul on in	110	To make a Topsail up for stowing in the bins (not furled)	122
Setting a Jib or Staysail, what Gear do you let go and haul on in	113	Topgallantsail and Royal a, what Gear to let go and haul on in taking in	112
Spanker, Gear to haul on and let go in taking in	115	Topgallantsail and Royal, Gear to let go and haul on in setting	112
Spanker, name the Running Gear of a	115	Topgallantsail and Royal, the running gear of a	111
Spanker or Trysail, how furled	137	Topgallantsail or Royal, how to furl	136
Spanker or Trysail, to reef	134	Topgallantsails and Royals, how bent	126
Spanker, Gear to let go and haul on in setting a	115	Topgallantsails and Royals, how to make up for stowing away	122
Staysail with Hanks	113	Topsail, bent, made up not furled	126
Staysails, how bent	127	Topsail, Gear to let go, and haul on in setting a	111
Storm Trysails, how bent	127	Topsail, Gear to let go, and haul on in taking one in	111
Studdingsails, how bent...	129	Topsail, how to bend	124
Studdingsails, how made up	123	Topsail, how to furl	135
Studdingsails, how to furl	138	Topsail, how to reef	131
Studdingsails, lower, topmast, or topgallant, gear to let go or haul on in taking in	118	Topsails and Lower Yards, what Gear ought to be hauled well taut before laying out on	132
Studdingsails, lower, topmast, or topgallant, gear to let go and haul on when setting	118	Topsails furled, shifting	130
Tack of a Trysail to that of a Spanker, difference in securing the	116	Topsails, in reefing, what the men on yard are to do after the word 'lay out' is given	131
Tack Tackle, use of a	114	Trysail in, Gear to haul on and let go in taking a	116
Tack Tricing Line, use of a	114	Trysail, running Gear of a	116
Taking a Course in, what Gear do you let go and haul on in	110	Trysail, with gaff lowered, how to furl	137
Third Reef-earring, how many turns to take	132	Yard secured to the Mast	117
To Furl a Course on deck for Bending or shifting	120		

## BOAT EXERCISE.

Assistance rendered by a Ship when unable to fetch her	150	Boat ordered to be Hoisted up, what is to be done	140
Belaying a Sheet, precaution to take	145	Boat ordered to be lowered, what are the necessary things to attend to	139
Blowing off the land, in a Boat, how to keep her head on to the sea and prevent her drifting to leeward	143	Boat rigged with Gaffsails, how to make sail in it	144
Boat being towed by a Ship, precaution to take	148	Boat, to haul one up on a beach	150
Boat capsized or swamped, what the Crew are to do	145	Boat, to launch a	150
		Boat's sail, what is to be observed in taking a Reef in a	145
		Boats, carvel built	154

	PAGE		PAGE
Boats, clinker built ...	154	Making Sail, precautions to be	
Boats, diagonally built ...	156	taken before ...	144
Boat's Fall ...	139	Manning a Boat at Sea, or when	
Boats, how built ...	154	a Ship is Rolling much, what	
Boats, in a sea way, or when a		precaution is necessary in ...	139
ship is rolling, precaution to		Manning a Boat ordered along-	
be taken ...	156	side ...	138
Boats, number and description		Pinnacle or Barge, purchase used	
of, allowed to different classes		for hoisting ...	156
of ships ...	157	Preparation to be made when in	
Boats of a ship of war, duties of	158	charge of a Boat under Sail,	
Boats, principal parts of ...	156	before going alongside a Ship,	
Boats, purchases used for hoist-		and the guide for properly	
ing in and out... ..	156	laying a Boat alongside the	
Boats under Canvas, Manage-		Gangway ...	150
ment of ...	142	Reef in a Boat, when to ...	145
Boats, what made of ...	156	Sailing in a stiff breeze, precau-	
'Bow,' what is to be done at the		tion in placing your Crew ...	143
word ...	139	Sailing on a Wind and caught	
Dipping a Lug, what do you		in a Squall, what to do ...	149
mean by ...	142	Sailing with the Wind Abeam,	
Downhaul, how is it fitted to a		and Caught in a Squall, what	
Lug Sail ...	144	to do ...	149
'Down Oars,' what precaution		Sail, when about to, what to	
would you take at the word ...	139	observe ...	149
Halyards of a Lug Sail, where		Salutes to Officers when passing	
to belay the ...	144	in boats ...	151
Halyards of a Standing and		Sheets, when to unhook them ...	142
Dipping Lug, where you bend		'Shove Off,' what is to be done	
them ...	145	at the order ...	139
Halyards requiring a Pull, if on		Standing and Dipping Lug ...	142
a Wind, what precaution to		Steadying Line, what is a, and	
take ...	144	its use ...	140
Launch, to secure Lower Yards		Things to be observed 152, 153, 154	
for hoisting in or out ...	156	Tow a Spar, how to ...	150
Launch, what precaution to take		Using Oars in a Light Wind,	
before hoisting ...	156	precaution to take when the	
Laying on your Oars under Sail,		breeze freshens ...	148
precaution to take ...	145	'Way Enough,' what is to be	
Life Lines and Lanyards of		done at the order ...	139
Gripes; what they are, and		Working to Windward among	
their use ...	139	shipping, or into an harbour,	
Lug for Dipping, how to lower		and in doubt whether you will	
a ...	142	weather any particular object,	
Lug in Wearing, how to Dip a ...	144	what to do ...	150
Lug Sail, how to take it in ...	145		

COMPASS INSTRUCTION.

Bow, Weather and Lee, what is		Compass, repeat it the reverse way	160
meant by, and how distin-		Compass, repeat the ...	160
guished ...	163	'Keep her away, and no higher'	
Compass, Boxing the ...	160	—the meaning of ...	164
Compass Card, a ...	159	Lubber's Point ...	164
Compass Card, how it denotes		Luff, meaning of ...	164
the position of a ship ...	165	Nothing Off, meaning of ...	164
Compass, Points of the, how		Points, how distinguished and	
reckoned ...	162	known by letters ...	159

	PAGE		PAGE
Running Gear of a Topsail, name the, and how it is bent	111	To Furl a Topsail on deck for bending or shifting	121
Secant Reef-carring, how many turns to take	132	To make a Course up for stowing away (not furled)	121
Setting a Boom Mainsail, what Gear is you let go, and haul on it	115	To make a Jib up for bending or shifting	121
Setting a Course, what Gear do you let go, and haul on it	113	To make a Topsail up for stowing in the bins (not furled)	122
Setting a Jib or Staysail, what Gear is you let go and haul on it	113	Toppallantsail and Royal, a, what Gear to let go and haul on in taking in	112
Spanker, Gear to haul on and let go in taking in	115	Toppallantsail and Royal, Gear to let go and haul on in setting	112
Spanker, name the Running Gear of a	115	Toppallantsail and Royal, the running gear of a	111
Spanker or Trysail, how furled	137	Toppallantsail or Royal, how to furl	136
Spanker or Trysail, to reef	134	Toppallantsails and Royals, how bent	126
Spanker Gear to let go and haul on in setting a	115	Toppallantsails and Royals, how to make up for stowing away	122
Staysail with Slants	113	Topsail bent, made up not furled	126
Staysails, how bent	127	Topsail, Gear to let go, and haul on in setting a	111
Staysails, how bent	127	Topsail, Gear to let go, and haul on in taking one in	111
Studdingsails, how bent	129	Topsail, how to bend	124
Studdingsails, how made up	123	Topsail, how to furl	135
Studdingsails, how to furl	138	Topsail, how to reef	131
Studdingsails, lower, topmast, or topgallant, gear to let go or haul on in taking in	118	Topsails and Lower Yards, what Gear ought to be hauled well taut before laying out on	132
Studdingsails, lower, topmast, or topgallant, gear to let go and haul on when setting	118	Topsails furled, shifting	130
Tack of a Trysail to that of a Spanker, difference in securing the	116	Topsails, in reefing, what the men on yard are to do after the word 'lay out' is given	131
Tack Tackle, use of a	114	Trysail in, Gear to haul on and let go in taking a	116
Tack Tying Line, use of a	114	Trysail, running Gear of a	116
Taking a Course in, what Gear do you let go and haul on in	110	Trysail, with gaff lowered, how to furl	137
Third Reef-carring, how many turns to take	132	Yard secured to the Mast	117
To Furl a Course on deck for Bending or shifting	120		

## BOAT EXERCISE.

Assistance rendered by a Ship when unable to fetch her	150	Boat ordered to be Hoisted up, what is to be done	
Belaying a Sheet, precaution to take	145	Boat ordered to be lowered, are the necessary attendants to attend to	
Blowing off the land, in a Boat, how to keep her head on to the sea and prevent her drifting to leeward	148	Boat rigged, to make	
Boat being towed by a Ship, precaution to take	148	Boat, to be	
Boat capsized or swamped, what the Crew are to do	145	Boat, to be	
		Boat's	
		in	
		to	

	PAGE
Boats, clinker built ... ..	154
Boats, diagonally built ... ..	156
Boat's Fall ... ..	139
Boats, how built ... ..	154
Boats, in a sea way, or when a ship is rolling, precaution to be taken ... ..	156
Boats, number and description of, allowed to different classes of ships ... ..	157
Boats of a ship of war, duties of	158
Boats, principal parts of ... ..	156
Boats, purchases used for hoisting in and out... ..	156
Boats under Canvas, Management of ... ..	142
Boats, what made of ... ..	156
'Bow,' what is to be done at the word ... ..	139
Dipping a Lug, what do you mean by ... ..	142
Downhaul, how is it fitted to a Lug Sail ... ..	14
'Down Oars,' what precaution would you take at the word ... ..	1
Halyards of a Lug Sail, where to belay the ... ..	1
Halyards of a Standing and Dipping Lug, where you bend them ... ..	1
Halyards requiring a Pull, if on a Wind, what precaution to take ... ..	1
Launch, to secure Lower Yard for hoisting in or out ... ..	1
Launch, what precaution to take before hoisting ... ..	1
Laying on your Oars under precaution to take ... ..	1
Life Lines and Lanyards	
Gripes; what they are and their use ... ..	1
Lug for Dipping, how to take a ... ..	1
Lug in Wearing, how to take	
Lug Sail, how to take it	

	PAGE
ger ... ..	178
old purchase ... ..	181
rton ... ..	179
ant halyard purchase ... ..	180
ant purchase ... ..	180
Down Tackle ... ..	178
ckle ... ..	180
Neck ... ..	184
gs ... ..	182
vays ... ..	182
Pipes ... ..	182
r ... ..	182
r Board ... ..	183
Bitts ... ..	183
r Plugs ... ..	182
rs ... ..	182
s ... ..	182
... ..	184

STAN.

e ... ..	185
et Wheel ... ..	185
os, Chocks, Bed ... ..	185
or, Sheet ... ..	187
or Stock, wooden one, how constructed ... ..	186
or, Stream ... ..	187

ES.

7-rope bent to anchor, how	
ne ... ..	193
7-rope bent to a nun buoy, how done ... ..	194
7 to an Anchor, use of ... ..	194
7, who streams the ... ..	194
7, hemp, precaution to prevent eye ... ..	190
7, hemp sheet, how bent to ... ..	190
7, sheet, how fitted ... ..	190
7, inboard end, ... ..	190
7, when running ... ..	194
7, many shackles in a ... ..	188
7, how secured to the mes- senger for heaving ... ..	196
7, how secured when sufficient is out ... ..	194

	PAGE		PAGE
Points how many a ship will wear in ... ..	163	Ship's Head W.S.W., on port tack, and close to wind, how the look-out should report a ship bearing W., W.N.W., &c.	164
Right Abeam, what it is ...	165	Ship's Head steering W., N.W., &c., her position ... ..	165
Ship Lying N.W., on starboard tack, how to keep her away four points, and the position she is then in ... ..	165	Ship, the meaning of wearing and steering a ... ..	163
Ship's Head E., on port tack, state of wind ... ..	164	Ship, to know how steering ...	164
Ship's Head E., on starboard tack, state of wind ... ..	164	Tacking a Ship, what meant by ...	163
Ship's Head, how moved ...	163	Tack, Port or Starboard, the meaning of a Ship being on ...	163
Ship's Head S.E., on port tack, state of wind ... ..	164	Technical terms used in directing the conning of a ship	166-169
Ship's Head S.E., on starboard tack, laying five points from the wind, state of wind ...	164	Wind, how close a ship will lay to ... ..	163
		Wind, ship five points from the, how many she will take in ...	163

LEAD-LINE INSTRUCTION.

Deep Lead and Line, how hauled in ... ..	172	Heave the Lead; first thing to be done on going into the Chains	170
Deep Sea Lead Line, and its use	169	Lead, how bent to the Hand or Deep Sea Line ... ..	172
Deep Sea Lead, soundings obtained by the ... ..	171	Lead Line, a ... ..	169
Deep Sea Lead, the weight of ...	171	Leads and Lead Lines, description of ... ..	169
Deep Sea Line, how marked, and its Length ... ..	171	Marks and Deeps, how called ...	170
Depth of Water you are in, to know by Hand and Lead Line	170	Marks and Deeps, how many, and Names of Marks ... ..	170
Hand Lead and Line, use of ...	169	Soundings, how to know on a dark night ... ..	170
Hand Lead, the weight of ...	171		

SIGNALS, LIGHTS, &c.

Anchor, Vessels at ... ..	174	Signals, Fog ... ..	174
Sailing Vessels ... ..	173	Steam Vessels ... ..	172

BLOCKS.

Blocks ... ..	177	Pin, the ... ..	177
Blocks, morticed ... ..	176	Score, the ... ..	177
Bouch, the ... ..	177	Sheave, the ... ..	177
Brace Blocks ... ..	177	Shell, the ... ..	177
Clump Blocks ... ..	177	Shoe Blocks ... ..	177
Common Blocks ... ..	177	Shoulder Blocks ... ..	177
Fiddle Blocks ... ..	177	Sister Blocks ... ..	177
Head and Ass, the ... ..	177	Snatch Blocks ... ..	177
Iron Stropped Blocks ... ..	177	Strop-bored Blocks ... ..	177
Monkey Blocks ... ..	177	Swallow, the ... ..	177
Ninepin Blocks ... ..	177		

PURCHASES.

Double Whip ... ..	178	Gun tackle purchase on double luff ... ..	179
Forestay tackle ... ..	181	Launches purchase ... ..	181
Four-fold Purchase ... ..	181	Lower lift purchase ... ..	181
Gun tackle purchase for boats' guns ... ..	179	Luff Tackle ... ..	178

	PAGE		PAGE
Mainstay tackle ... ..	181	Tail Jigger ... ..	178
Mizen Burton ... ..	179	Three-fold purchase ... ..	181
Quarter Tackle ... ..	179	Top Burton ... ..	179
Runner ... ..	178	Topgallant halyard purchase ... ..	180
Runner and Tackle ... ..	179	Topgallant purchase ... ..	180
Sail tackle ... ..	179	Up and Down Tackle ... ..	178
Single Whip ... ..	178	Yard tackle ... ..	180
Spanish Burton ... ..	178		

FITTINGS.

Belaying Pins, Cleats, Cavils ...	183	Goose Neck ... ..	184
Bits ... ..	183	Gratings ... ..	182
Bollard Heads ... ..	183	Hatchways ... ..	182
Bucklers ... ..	182	Hawse Pipes ... ..	182
Bumpkin ... ..	184	Manger ... ..	182
Cathead ... ..	183	Manger Board ... ..	183
Chain Pipes ... ..	183	Riding Bits ... ..	183
Coamings ... ..	182	Scupper Plugs ... ..	182
Compressor ... ..	183	Scuppers ... ..	182
Davits ... ..	184	Scuttles ... ..	182
Fife Rail ... ..	183	Spider ... ..	184
Fish Davit ... ..	184		

PARTS OF A CAPSTAN.

Barrel ... ..	185	Spindle ... ..	185
Drum Head ... ..	185	Sprocket Wheel ... ..	185
Pauls, Paul Rim ... ..	185	Whelps, Chocks, Bed ... ..	185

ANCHORS.

Anchor, Bower ... ..	187	Anchor, Sheet ... ..	187
Anchor, Kedge ... ..	187	Anchor Stock, wooden one, how constructed ... ..	186
Anchor; Ring, Shank, Stock, Arms, Crown, Fluke, Bill ...	186	Anchor, Stream ... ..	187

CHAIN CABLES.

Anchor being a cockbill, mean- ing of ... ..	193	Buoy-rope bent to anchor, how done ... ..	193
Anchor, Bow, how cleared when hove up to the bows foul ...	200	Buoy-rope bent to a nun buoy, how done ... ..	194
Anchor end, how to know ...	188	Buoy to an Anchor, use of ...	194
Anchor, hove up to the bows, what is done ... ..	197	Buoy, who streams the ... ..	194
Anchor, how let go ... ..	192	Cable, hemp, precaution to pre- serve eye ... ..	190
Anchor, hung from the bows ready to let go ... ..	192	Cable, hemp sheet, how bent to sheet anchor ... ..	190
Anchor to bend a cable to ...	189	Cable, hemp, sheet, how fitted	190
Anchor up to Cathead, what is done ... ..	200	Cable, hemp sheet, inboard end, where secured ... ..	190
Anchors clear for letting go, who clears them ... ..	192	Cable how checked when running out ... ..	194
Bars, how secured in place ...	191	Cable, how many shackles in a ...	188
Bars swifted, meaning of ...	191	Cable, how secured to the mes- senger for heaving ... ..	196
Bower Cable, what hawser-hole to take in ... ..	189	Cable, how secured when suffi- cient is out ... ..	194
Buoy, nun or can ... ..	194		



	PAGE		PAGE
Cable, inner end of, and how secured ... ..	189	Fish-fall, what precaution to take before walking away with ... ..	200
Cable, length of ... ..	188	Fish, what prevents it from unhooking ... ..	199
Cable, length supplied to a ship of war ... ..	188	Fish, who hooks it ... ..	199
Cable, Sheet, which side coiled ...	190	Ganger, a ... ..	190
Cable, stream hemp, which side coiled in ... ..	190	Hawser-holes, spare outer, their use ... ..	189
Cable, to bring the opposite to, if necessary ... ..	192	Hawser brought to a capstan ...	192
Cable, why bitted ... ..	197	Joining Shackle, Anchor Shackle, difference between ... ..	188
Cables, Chain, and Hemp Sheet, why stowed the same side ...	190	Martingale, consequence if not taut ... ..	196
Cables, hemp sheet and stream, what supplied for ... ..	190	Messenger, hemp how fitted ...	191
Cables, hemp, where stowed ...	190	Messenger, how hove taut for shackling ... ..	191
Cable, how many swivels in a ...	188	Messengers, how many supplied to a ship of war ... ..	190
Cables, how to stow in a lighter	188	Messenger, how rove ... ..	191
Cables, number supplied to a first-class Frigate ... ..	187	Messenger, what to be done if carried away ... ..	192
Cables, to take inboard out of lighter ... ..	189	Messenger, who reeves the ...	191
Capstan, rigging meaning of ...	190	Nipper iron, how secured to a Cable ... ..	197
Capstan, who rigs the ... ..	190	Pellets, precautions when replacing ... ..	189
Capstan, working the ... ..	190	Pin, how kept in place by a leaden pellet ... ..	189
Cat and Fish-falls, where the hauling parts are led ... ..	200	Rope nipper, how passed ... ..	196
Cat and Fish-falls, why rove through the foremost sheaves	199	Shackle, or length of Cable, how marked ... ..	188
Cat-block, who hooks it and how it is done ... ..	199	Shackle, which end forward and outward, and why ... ..	188
Cat-block, why unhooked before walking up the fish ... ..	200	Shackles, the use of ... ..	188
Cat-fall, how to reeve a ... ..	200	Ship going to anchor, precautions to be taken ... ..	192
Cat, where the men stand to hook it ... ..	199	Signal, who gives it ... ..	193
Chain Cables, where stowed ...	189	Slip, when knocked off ... ..	197
Chain Lockers, how many ...	189	Slipping a cable, precautions ...	194
Compressor tackle, who attends it ... ..	194	Stock Pendant and Tackle, how fitted and its use ... ..	200
Cross Pins or studs in the links of a Chain Cable ... ..	188	Stream the buoy; stream the cable, precautions ... ..	193
Fish-back, what is a ... ..	199	Swivel, a, the use of ... ..	188
Fish-davit, shipped and how secured in place ... ..	195	Swivels, to preserve ... ..	188
Fish-davit, use of a martingale to ... ..	196	Technical terms, relating to Anchors and Cables ... ..	201
Fish-davit, use of topping lift to ... ..	196	Weighing Anchor, preparations for ... ..	195
Fish-fall, how to reeve a ... ..	199		

## LIFE BUOYS.

Kisbie's Life Buoy ... ..	202	The Service Life Buoy ... ..	203
---------------------------	-----	------------------------------	-----

## LOG LINE.

Advantages of the patent log over a common ... ..	208	Log, how often it is hove ...	207
Cause of the difference between	207	Log Line, description of ...	204
Log, how it is hove ... ..	205	Log Line, when marked, how it denotes the speed of a vessel.	204

	PAGE		PAGE
Log, Massey's Patent ...	207	Log, who heaves it ...	207
How it is used ...	207	Nautical and land mile, difference between ..	207
What it consists of ...	207	Stray Line, its use and length ...	204
Log Ship, how attached to a Log Line ...	204		

GUNNERY EXERCISE.

Attending the Surgeon ...	213	Preliminary Drill ...	212
Battle, preparation for ...	214	Powdermen ...	215
Burning Fragments, what to do with ...	209	Preparation for battle ...	214
Cartridge, how to enter ...	208	Priming Wire, jammed in vent, what to be done ...	210
Cartridge, why pricked ...	208	Priming wire, use of ...	208
Charge would not ignite if not pricked ...	208	Quarters ...	211
Elevation, if more required, how to get it... ..	210	Rammer broken or lost, what to do	209
Fire Brigade ...	213	Rammer-head in gun, what to do	210
Fire of Guns, arrangements for concentrating and directing the Fire of ...	213	Rammer jammed, what to do ...	209
Gun, cause of its missing fire ...	209	Rammer, use of ...	209
Gun, how to lay horizontally, at sea, and in harbour ...	210	Riggers, Magazine Men ...	212
Gunnery Instructors ...	212	Seamen Gunners ...	212
Guns' Crews, remainder ...	212	Serving the vent, use of ...	210
Gun, with a common spike, how to clean... ..	210	Shellmen ...	213
Gun, with a spring spike, how to clean... ..	210	Ship, rolling, how to fire ...	210
Nos. 3 and 4, duties of ...	209	Spiking a Gun, meaning of ...	210
Numbering the Guns ...	211	Sponge, use of ...	209
		Sponge, why tapped ...	209
		Stationing the men at Quarters	212
		Store Room, Signals, Wheel and Relieving Tackle... ..	213
		Truck Gun Exercise ...	231
		Vent bitt, use of... ..	209
		Worm, use of ...	209

HEAVY RIFLED GUN EXERCISE.

Action, clearing for ...	221	Practice ...	220
Broadside Firing... ..	223	Preliminary Drill ...	215
Broadside Firing, both Bolts ...	224	Rear Winches ...	230
Dismounting ...	230	Shifting Breechings ...	229
Exercise by Signals ...	227	Training Winch with Cogged Traces ...	231
Exercise with diminished Crews	228	Transporting ...	229
Independent Firing ...	221		
Mounting... ..	230		

TRUCK GUN EXERCISE.

Broadside... ..	237	Practice ...	236
Dismounting ...	238	Preliminary Drill ...	231
Exercise by Signals ...	237	Dismounting ...	238
Exercise with diminished Crew	237	Shifting Breechings ...	237
Independent Firing ...	236		
Exercise with Breechloading Guns ...	239	Exercise with Boat Guns ...	239

MUSKETRY INSTRUCTION.

Aiming Drill ...	241	Explaining Rules ...	243
Difference between Fine Sight, Full Sight, and Half Sight ...	242	Error in aim, consequences of ...	243
		Instructor's explanation ...	242

	PAGE		PAGE
Instructor's correction ...	243	Progress, how tested ...	241
Practice ...	241	Rule requiring particular atten-	
Preliminary Drill ...	240	tion ...	242

## SNIDER RIFLE DRILL.

Inspecting company on Parade	254	Preparing for Cavalry ...	252
Instructions for cleaning Rifles	255	Review Exercise...	253
Feu de Joie, to fire a ...	253		
Firing exercise for the 'short Snider Breech-loading Rifle ...	244		

## NAVAL CUTLASS EXERCISE,

Attack and Defence ...	259	Loose Play ...	262
Cutting Practice, the ...	256	Pointing Practice ...	257
General Practice, the ...	258	Sword Bayonet Exercise ...	263
Guarding Practice ...	257		

## PISTOL EXERCISE.

Adam's Breech-loading revolver	264	Independent Firing ...	265
--------------------------------	-----	------------------------	-----

## RULES AND REGULATIONS.

Advantage ...	267	Gunnery Instruction ...	272
Badges for proficiency and good conduct...	267	Leave ...	268
Boys' Clothing ...	266	Messing ...	269
Boys, discharge of ...	274	Mess Regulations ...	276
Boys, First Class, Rating of ...	274	Morning Inspection ...	273
Boys' Funds ...	270	Pocket Money ...	270
Boys, Form of Monthly Report, showing the Progress of ...	279	Qualifications ...	267
Changing Instruction at Roll of Drum ...	271	Recreation and Amusement ...	269
Dress Regulations ...	275	Rules for the information of newly-raised Boys ...	278
Gunnery ...	267	School ...	267
		School Training, system of ...	273
		Seamanship ...	267

## WEIGHTS AND MEASURES.

Ale Measure ...	282	Measure of Superficies ...	286
Apothecaries Weight ...	281	Measure of Surfaces, or Square Measure ...	282
Avoirdupois Weight ...	281	Measures of Capacity ...	286
British and Foreign Weights and Measures ...	285	Measures of Length ...	286
Cloth Measure ...	285	Measures of Solidity ...	286
Division of the Circle ...	280	Miscellaneous ...	283
Dry Measure ...	282	Money ...	280
Foreign Measures, with their English Equivalents ...	287	Superficial Measure for Land ...	283
Foreign Weights, with their English Equivalents ...	287	Time ...	280
Measure of Length ...	283	Troy Weight ...	280
Measure of Solidity, or Cubic Measure ...	282	Wine Measure ...	281

THE END.







BOYS MANUAL

OF

ADMIRALTY TRAINING

IN THE ROYAL NAVY

STAFF COMMANDER O. BURNETT R.N.

R. G. S.