

**A MANUAL FOR THE USE OF
CANDIDATES REQUIRING A
CERTIFICATE OF COMPETENCY
AS MATES AND ORDINARY
MASTERS**

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A manual for the use of candidates requiring a certificate of competency as mates and ordinary masters by Edward J. Henessey

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FOR THE USE OF

CANDIDATES REQUIRING A CERTIFICATE OF COMPETENCY

AS

MATES AND ORDINARY MASTERS;

AND COMPRISING

- I. THE PRINCIPLES FULLY LAID DOWN AND TAUGHT BY EXAMPLES.
- II. TWO METHODS OF FINDING THE TIME OF HIGH WATER, BEING THOSE REQUIRED BY THE LOCAL MARINE BOARDS OF ENGLAND AND SCOTLAND.
- III. QUESTIONS IN ASTRONOMY, WITH ANSWERS.

BY

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MASTER OF THE BOARD OF TRADE SCHOOL OF NAVIGATION, ABERDEEN;
LATE OF THE NAVIGATION SCHOOLS, LONDON AND LIVERPOOL.

WITH NINE ILLUSTRATIONS.

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PREFACE.

THAT the majority of Seamen do not pursue their studies when absent from our Schools is a fact too well known for me to enlarge upon. I am aware, however, that they are not wholly to blame, seeing they are compelled to follow a science of whose alphabet the majority of seamen are totally ignorant. If the Board of Trade, with whom the matter specially rests, wishes the British Seaman to acquire a taste for Nautical Science, it must organise a system very different from that now in force, before the success desired can be attained. Having long felt the want of a work compendious and yet sufficiently simple, the following Manual has been compiled, with the view of its being useful as a Text-Book for Mariners while in school, and more particularly to enable them to follow up with advantage at sea the instructions they may have received while in port.

In working out the problems in the book, it may be thought I have been somewhat verbose, and to have given more explanations than were deemed necessary; but I have chosen rather to err in that direction, knowing by experience the difficulties to be sustained, consequent on the want of a proper elementary education on the part of those, who from time to time present themselves for examination. I trust that the class of seamen for whom this Manual is designed will find it

serviceable, and that by its use they will be enabled to prosecute their studies, particularly while at sea, and be less dependent on the assistance of a teacher.

Norie's Tables have been used in preference to others, that work being most in repute with seamen. I must say, however, that, in my opinion, a great fault with Norie is redundancy of Tables. This has the effect of rendering Seamen careless and inaccurate, trusting too implicitly to extraneous assistance, and so defeating the object the Board of Trade has in view, viz. that they shall be able to compute for themselves.

E. J. H.

BOARD OF TRADE NAVIGATION SCHOOL.
ADDRESSED, 1st January 1866.

NOTICE

OF

EXAMINATIONS OF MASTERS AND MATES,

Established in Purvance of the **MERCANTILE MARINE ACT, 1850;**

AND OF

VOLUNTARY EXAMINATIONS IN STEAM.

To come into operation on the 1st September 1852.

No Foreign-going* vessel is permitted to clear out from any custom-house in the United Kingdom unless the masters and mates respectively are in possession of Certificates, either of Service or of Competency.

The Certificate of Service entitles an officer, who has already served as either master or mate in the British merchant service before the 1st January 1851, to go in those capacities again, and may be had by application to the Registrar-General of Seamen, Custom-House, London, on the transmission of the necessary certificates and testimonials.

Certificates of Competency will be granted by the Board of Trade to all mates and masters who have passed examinations, whether under the old or the present regulations, and also to all officers who have passed Lieutenants', Masters', and Second Masters' examinations in the Royal Navy and East India Company's Service, unless special reasons to the contrary exist; and any person desirous of exchanging a passing certificate—obtained under the former Board of Examiners—for a Certificate of Competency, should send it to the Registrar-General, as before mentioned, with a request to that effect, and state the port to which he wishes it to be sent, where it will be delivered to him by the Collector of Customs or the Shipping Master.

All other officers, entering for the first time upon their duties,

* By a Foreign-going vessel is meant one which is bound to some place out of the United Kingdom, beyond the limits included between the River Elbe and Brest.

whether as mate or master, will be required to undergo an examination before one of the Local Marine Boards before they can act in either of those capacities.

For this purpose, Examiners have been appointed under the Local Marine Boards, and arrangements have been made for holding the examinations at the under-mentioned ports upon the day specified against them; and these days are so arranged for general convenience, that a candidate wishing to proceed to sea, and missing the day at his own port, may proceed to another port where an examination is coming forward. The days for commencing the examinations at the various ports are as follow:—

PLACES	DAY
ABERDEEN* .. {	Fridays and Saturdays in the first and third week in each month.
BELFAST	1st and 3d Tuesday in each month.
BRISTOL*	1st Friday and 3d Tuesday in each month.
CORK	4th Monday in each month.
DUBLIN	1st and 3d Thursday in each month.
DUNDEE*	Saturday in each week.
GLASGOW*	Thursdays, held alternately at each place.
GREENOCK*	
HULL*	2d Tuesday in each month.
LEITH*	2d Tuesday and 3d Saturday in each month.
LIVERPOOL*	Monday, Tuesday, Thursday, and Friday in each week.
LONDON*	Monday for examining Testimonials; Tuesday, Wednesday, Thursday, Friday, and Saturday for examination.
NEWCASTLE ..	1st day of each month, not being Sunday.
SHIELDS*	10th day of each month, ditto.
SUNDERLAND* ..	20th day of each month, ditto.
PLYMOUTH*	3d Wednesday in each month.

The examinations required for qualification for the several ranks undermentioned, are as follow:—

A SECOND MATE must be 17 years of age, and must have been 4 years at sea.

IN NAVIGATION.—He must write a legible hand, and understand the four first rules of arithmetic and the use of logarithms. He must be able to correct the courses steered for variation and leeway, and find the difference of latitude and longitude therefrom; be able to correct the sun's declination for longitude, and find his latitude by meridian altitude of the sun; and work such other easy problems of a like nature as may be put to him. He must understand the use of the sextant, and be able to observe with it, and read off the arc.

IN SEAMANSHIP.—He must give satisfactory answers as to

* At these places extra Examinations are held.

the rigging and unrigging of ships, stowing of holds, &c. ; must understand the measurement of the log-line, glass, and head-line ; be conversant with the rule of the road, as regards both steamers and sailing-vessels, and the lights carried by them.

An **ONLY MATE** must be 19 years of age, and have been 5 years at sea.

IN NAVIGATION.—In addition to the qualification required for a Second Mate, an Only Mate must be able to work a day's work complete, including the bearings and distance of the port he is bound to by Mercator's method. He must be able to observe and calculate the amplitude of the sun, and deduce the variation of the compass therefrom. He must know how to lay off the place of the ship on the chart, both by bearings of known objects, and by latitude and longitude. He must be able to use a sextant, and determine its error, and adjust it, and find the time of high water from the known time at full and change. He must also be able to find the longitude by chronometer from an observation of the sun.

IN SEAMANSHIP.—In addition to what is required by a Second Mate, he must know how to moor and unmoor, and to keep a clean anchor ; to carry out an anchor ; to stow a hold ; and to make the requisite entries in the ship's log.

A **FIRST MATE** must be nineteen years of age, and have served five years at sea, of which one year must have been as either Second or only Mate, or as both.*

IN NAVIGATION.—In addition to the qualification required for an Only Mate, he must be able to observe azimuths and compute the variation ; to compare chronometers and keep their rates ; to work the latitude by single altitude of the sun off the meridian ; and be able to use and adjust the sextant by the sun.

IN SEAMANSHIP.—In addition to the qualification required for an Only Mate, a more extensive knowledge of seamanship will be required, as to shifting large spars and sails, managing a ship in stormy weather, taking in and making sail, shifting yards and masts, &c., and getting cargo in and out ; and especially heavy spars and weights, anchors, &c. ; casting ship on a lee-shore ; and securing the masts in the event of accident to the bowsprit.

A **MASTER** must be twenty-one years of age, and have been six years at sea, of which one year must have been as first or Only Mate, and one year as Second Mate ; or two years as First and Only Mate.*

* Service in a superior capacity is in all cases to be equivalent to service in an inferior capacity.

In addition to the qualification for a First Mate, he must be able to find the latitude by a star, &c. He will be inquired of as to the nature of the attraction of the ship's iron upon the compass, and as to the method of determining it. He must possess a sufficient knowledge of what he is required to do by law, as to entry and discharge, and the management of his crew; as to penalties and entries to be made in the official log. He will be questioned as to his knowledge of invoices, charter-party, Lloyd's agent, and as to the nature of bottomry, and he must be acquainted with the leading lights of the channel he has been accustomed to navigate, or which he is going to use.

In cases where an applicant for a certificate as master ordinary has only served in a fore and aft rigged vessel, and is ignorant of the management of a square rigged vessel, he may obtain a certificate on which the words "*fore and aft rigged vessel*" will be written. This is not, however, to apply to Mates, who, being younger men, are expected for the future to learn their business completely.

An EXTRA MASTER'S EXAMINATION is intended for such persons as are desirous of obtaining command of ships and steamers of the *first class*. Before being examined for an Extra Master's Certificate an applicant must have served one year as a Master with an *ordinary Certificate of Competency*, or as a Master having a *First Class Certificate* granted by one of the former Boards of Examiners.

IN NAVIGATION.—As such vessels frequently make long voyages, to the East Indies, and the Pacific, &c., the candidates will be required, in addition to the qualification necessary for an ordinary Master, to work a lunar observation by both sun and star, to determine the latitude by the moon and star, by Polar star off the meridian, and also by double altitude of the sun, and to verify the result by Sumner's method. He must be able to calculate the altitudes of the sun or star when they cannot be observed, for the purposes of lunars, also to find the error of a watch by the method of equal altitudes. To correct the altitudes observed with an artificial horizon.

He must understand how to observe and apply the deviation of the compass; and to deduce the set and rate of the current from the D. R. and observation. He will be required to explain the nature of great circle sailing, and know how to apply practically that knowledge; but he will not be required to go into the calculations. He must be acquainted with the law of storms, so far as to know how he may probably best escape those tempests common to the East and West Indies, and known as hurricanes.