

MANUAL OF NAVIGATION

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649474875

Manual of Navigation by Robert Assheton Napier

Except for use in any review, the reproduction or utilisation of this work in whole or in part in any form by any electronic, mechanical or other means, now known or hereafter invented, including xerography, photocopying and recording, or in any information storage or retrieval system, is forbidden without the permission of the publisher, Trieste Publishing Pty Ltd, PO Box 1576 Collingwood, Victoria 3066 Australia.

All rights reserved.

Edited by Trieste Publishing Pty Ltd.
Cover @ 2017

This book is sold subject to the condition that it shall not, by way of trade or otherwise, be lent, re-sold, hired out, or otherwise circulated without the publisher's prior consent in any form or binding or cover other than that in which it is published and without a similar condition including this condition being imposed on the subsequent purchaser.

www.triestepublishing.com

ROBERT ASSHETON NAPIER

**MANUAL OF
NAVIGATION**

MANUAL OF NAVIGATION.

PUBLISHED BY
JAMES MACLEHOSE, GLASGOW.

MACMILLAN AND CO., LONDON.

London, *Hamilton, Adams & Co.*
Cambridge, *Macmillan and Co.*
Edinburgh, *Douglas and Foulis.*
Liverpool, *Adam Holden.*

MANUAL
OF
NAVIGATION.

BY
ROBERT ASSHETON NAPIER, LIEUT. R.N.R.



GLASGOW:
JAMES MACLEHOSE, ST. VINCENT STREET,
Publisher to the University.
1877.

All rights reserved.

184. L. 65.

P R E F A C E .

THE Author has been induced to publish this Manual owing to the inconvenience he has at different times experienced from the want of a book containing all the rules and examples required for daily use at sea.

The principal object kept in view has, therefore, been to furnish a compact book of reference for all calculations necessary for the efficient discharge of navigating duties, and while there is nothing included in its pages but what will be of use to the careful seaman, it is hoped that nothing has been omitted which might advantageously have been inserted.

The conclusions to be derived from a careful study of the ever-varying signs of the weather have been placed before the reader as clearly and consecutively as possible.

Considerable care has been taken to produce in a concise form rules for finding and applying the Deviation of the compass. Attention is also directed to the practice of reducing the soundings found by the lead in thick weather, at night, or at any time when standing into shoal water, to the mean height of low water at ordinary spring tides, for exact comparison with the depths marked on the chart. Ignorance or neglect of this simple correction too frequently causes a disastrous termination to a hitherto successful voyage.

All that has been undertaken in connection with observations of celestial objects are a few fully detailed calcula-

tions under various conditions, for purposes of easy reference. Obsolete and approximate methods have been avoided as tending to retard rather than advance the science of navigation.

The Lunar problem for ascertaining Greenwich time, and hence the longitude, is beyond the scope of this manual, and Sumner's method of equal altitudes, used in conjunction with Azimuth Tables, has been substituted. To a man whose brain is confused by long watching and the anxiety of running into dangerous waters, the increased facility afforded by this method must obviously be of the greatest benefit, and will go far to recommend its general adoption.

Lunars are not so often worked in steamers as formerly, owing to the rapidity with which passages are made from land to land, and the opportunities thereby afforded of ascertaining the error of the chronometer. They are never likely to be entirely superseded in sailing vessels, as chronometers, although compensated, are more or less liable to variation and error, when exposed to sudden changes of temperature and the continued damp of long voyages, such as to the East Indies or China Seas.

Although frequently practised, Lunars are not to be absolutely depended upon to within ten or fifteen miles, as an error of only twenty seconds in the Lunar distance will give a corresponding error of about ten minutes of longitude.

As books of some sort are almost indispensable, a list of the best modern works on various analogous subjects is appended for the benefit and further study of the reader.

R. A. N.

GLASGOW, October, 1877.

CONTENTS.

	PAGE
Seamen's Proverbs,	1
Weather Signs,	2
Weather Glasses,	4
Description of the Barometer,	5
Description of the Barometer Diagram,	6
Indications of the Barometer,	8
Beaufort Notation (Modernised),... ..	11
Definitions common to Navigation,	12
Terrestrial Magnetism,	16
Description of the Standard Compass,	18
Deviation of the Compass in Iron Ships,	22
Description of Azimuth Tables,	29
Napier's Deviation Diagrams,	30
Construction of Steering Tables,	35
Points and Quarter Points converted into Degrees, Minutes, etc.,	37
Nautical Miles on every Parallel of Latitude from Equator to Poles,	38
Distance of the Visible Horizon as seen from various Elevations,	39
Showing whether a Steam Vessel gains or loses by Keeping Away,	40
Table for finding the Distance of a Light or other Object,	41
Rules for finding the Distance of a Light or other Object,	42
How to make Use of the Danger Angle,	44
Diurnal Rise and Fall of the Tides,	45
How to find the Time of High Water,	47
How to allow for the Set and Drift of a Current,	48
Leads and Lead-lines,	50
Log-lines and Glasses,	52
Common Logarithms,	54

	PAGE
Traverse Sailing,	57
Parallel Sailing,	58
Mercator's Sailing,	59
Great Circle Sailing,	60
Round the World Sailing,	62
Measurements of Time,	63
Use of Mercator's Chart,	65
Adjustments of the Sextant,	65
Latitude by Meridian Altitude of a Star,	67
Latitude by Meridian Altitude of the Sun,	68
Latitude by Reduction to the Meridian,	69
Longitude by Chronometer,	70
Deviation of the Compass by an Azimuth of the Sun,	72
Deviation of the Compass by an Amplitude of the Sun,	73
Sumner's Method of finding a Ship's Position at Sea,	74
Publications more or less Essential to Navigation,	76
Practical Application of the Boatswain's Call,	77
Regulations for Preventing Collisions at Sea,	78
Signals for Pilots,	84
Signals of Distress,	85
Instructions for using the Rocket Lines,	86
Naval Reserve Flag,	87
Management of Open Boats in a Surf,	88