

**MANUAL OF
NAVIGATION,
GLASGOW, 1880**

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649493401

Manual of Navigation, Glasgow, 1880 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,
GLASGOW, 1880**

MANUAL
OF
NAVIGATION.

BY
ROBERT ASSHETON NAPIER, LIEUT. R.N.R.,
MEMBER OF THE INSTITUTION OF NAVAL ARCHITECTS.

SECOND EDITION.

GLASGOW:
JAMES MACLEHOSE, ST. VINCENT STREET,
Publisher to the University.
1880.

All rights reserved.

184. h. 71.



PREFACE.

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 detailed calculations under various conditions, for purposes of easy reference. Obsolete and approximate methods, which tend to retard rather than advance the science of navigation, have been avoided as far as possible.

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 further study of the reader.

R. A. N.

GLASGOW, October, 1877.

PREFACE TO THE SECOND EDITION.

THE present edition of this Manual is almost a reprint of that published in 1877, with the exception of sundry additions and re-arrangements to date, and a few pages on the development of the Law of Storms.

R. A. N.

GLASGOW, August, 1880.

CONTENTS.

	PAGE
Seamen's Proverbs,	1
Weather Signs,	2
Weather Glases,	4
Description of the Barometer,	5
Description of the Barometer Diagram,	6
Indications of the Barometer,	8
Description of the Aneroid,	11
Beaufort Notation (Modernized),	12
Definitions common to Navigation,	13
Terrestrial Magnetism,	17
Description of the Standard Compass,	20
Description of Sir William Thomson's Compass,	21
Description of the Flinders-bar,	24
Deviation of the Compass in Iron Ships,	29
Deviation by the Bearing of a Distant Object,	34
Description of Azimuth Tables,	36
Napier's Deviation Diagrams,	37
Construction of Steering Tables,	42
Points and Quarter Points converted into Degrees, Minutes, etc.,	44
Nautical Miles on every Parallel of Latitude from Equator to Poles,	45
Distance of the Visible Horizon as seen from various Elevations,	46
Showing whether a Steam Vessel gains or loses by Keeping Away,	47
Table for finding the Distance of a Light or other Object,	48
Rules for finding the Distance of a Light or other Object,	49
How to make use of the Danger Angle,	51
Diurnal Rise and Fall of the Tides,	52
How to find the Time of High Water,	54

	PAGE
How to allow for the Set and Drift of a Current,	55
Sir William Thomson's Sounding Machine,	57
Leads and Lead-lines,	59
Log-lines and Glasses,	60
Common Logarithms,	62
Traverse Sailing,	65
Parallel Sailing,	66
Mercator's Sailing,	67
Great Circle Sailing,	68
Round the World Sailing,	70
Measurements of Time,	71
Use of Mercator's Chart,	73
Adjustments of the Sextant,	73
Latitude by Meridian Altitude of a Star,	75
Latitude by Meridian Altitude of the Sun,	76
Latitude by Reduction to the Meridian,	77
Longitude by Chronometer,	78
Deviation of the Compass by an Azimuth of the Sun,	80
Deviation of the Compass by an Amplitude of the Sun,	81
Sumner's Method of finding a Ship's Position at Sea,	82
Longitude by Equal Altitudes of the Sun,	84
Publications more or less useful for Navigation,	85
Development of the Law of Storms,	86
Regulations for Preventing Collisions at Sea,	89
Signals of Distress,	100
Signals for Pilots,	101
Instructions for using the Rocket Lines,	102
Instructions respecting the Blue Ensign,	103
Management of Open Boats in a Surf,	104

MANUAL OF NAVIGATION.

SEAMEN'S PROVERBS.

A rainbow in the morning
Is the sailor's warning,
A rainbow at night
Is the sailor's delight.

The evening red and morning grey
Are sure signs of a fine day,
But the evening grey and morning red
Make the sailor shake his head.

With the rain before the wind
Your topsail halyards you must mind,
But when the wind's before the rain
You may hoist your topsails up again.

If clouds are gathering thick and fast
Look out sharp for sail and mast,
But if they lag upon their road
Keep your flying kites abroad.

Mackerel sky and mare's tails
Make lofty ships carry low sails.
When the wind shifts against the sun,
Trust it not, for back it will run.

When the glass falls low prepare for a blow,
When it has risen high let all your kites fly.

First rise after very low indicates a stronger blow.
Long foretold, long last; short notice, soon past.