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A TREATISE ON
NAVIGATION
BY STEAM

COMPRISING A HISTORY
OF THE STEAM ENGINE

JOHN ROSS



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A Treatise on Navigation by Steam

Comprising a History of the Steam Engine

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CAMBRIDGE
UNIVERSITY PRESS

CAMBRIDGE UNIVERSITY PRESS

Cambridge, New York, Melbourne, Madrid, Cape Town,
Singapore, São Paulo, Delhi, Mexico City

Published in the United States of America by Cambridge University Press, New York

www.cambridge.org

Information on this title: www.cambridge.org/9781108062138

© in this compilation Cambridge University Press 2013

This edition first published 1828

This digitally printed version 2013

ISBN 978-1-108-06213-8 Paperback

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A Treatise on Navigation by Steam

Following distinguished service during the Napoleonic Wars, the Scottish naval officer and Arctic explorer Sir John Ross (1777–1856) embarked on an abortive expedition to discover the North-West Passage. The existence of the Croker mountains, which he claimed had blocked his path, was afterwards disputed and his reputation suffered. His 1819 account of that voyage has been reissued in the Cambridge Library Collection. Prior to setting out in a steam vessel on a second expedition, for which he would be knighted, Ross published the present work in 1828. Seeking to establish himself as an authority on steam power when the technology was still in its infancy, Ross explores the development of the steam engine, the commercial and military potential of steam navigation, and how this called for a radical change in naval tactics. Illustrated throughout, this is the work of a practical maritime mind, combining both historical and technical detail.

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J. ROY'S

The James Watt, Steam Packet, propelling against

A STORM.

On the Night of the Twenty-third of November, 1824.

A
TREATISE
ON
NAVIGATION BY STEAM;
COMPRISING A
HISTORY OF THE STEAM ENGINE,
AND AN ESSAY TOWARDS A SYSTEM OF
THE NAVAL TACTICS PECULIAR TO STEAM NAVIGATION,
AS APPLICABLE BOTH TO
COMMERCE AND MARITIME WARFARE;
INCLUDING A COMPARISON OF ITS ADVANTAGES AS RELATED TO OTHER SYSTEMS IN THE CIRCUMSTANCES OF
Speed, Safety and Economy,
BUT MORE PARTICULARLY IN THAT OF
THE NATIONAL DEFENCE.

PATRONIZED BY
HIS ROYAL HIGHNESS THE LORD HIGH ADMIRAL.

ILLUSTRATED WITH PLATES AND ENGRAVINGS.

BY
CAPTAIN JOHN ROSS, K. S. R. N.

LONDON:
PUBLISHED BY LONGMAN, REES, ORME, BROWN, AND GREEN;
AND BLACKWOOD AND CO. EDINBURGH.

1828.

LONDON :

PRINTED BY PLUMMER AND BREWIS, LOVE LANE, EASTCHEAP.

TO HIS ROYAL HIGHNESS
THE LORD HIGH ADMIRAL
OF GREAT BRITAIN,, &c. &c. &c.

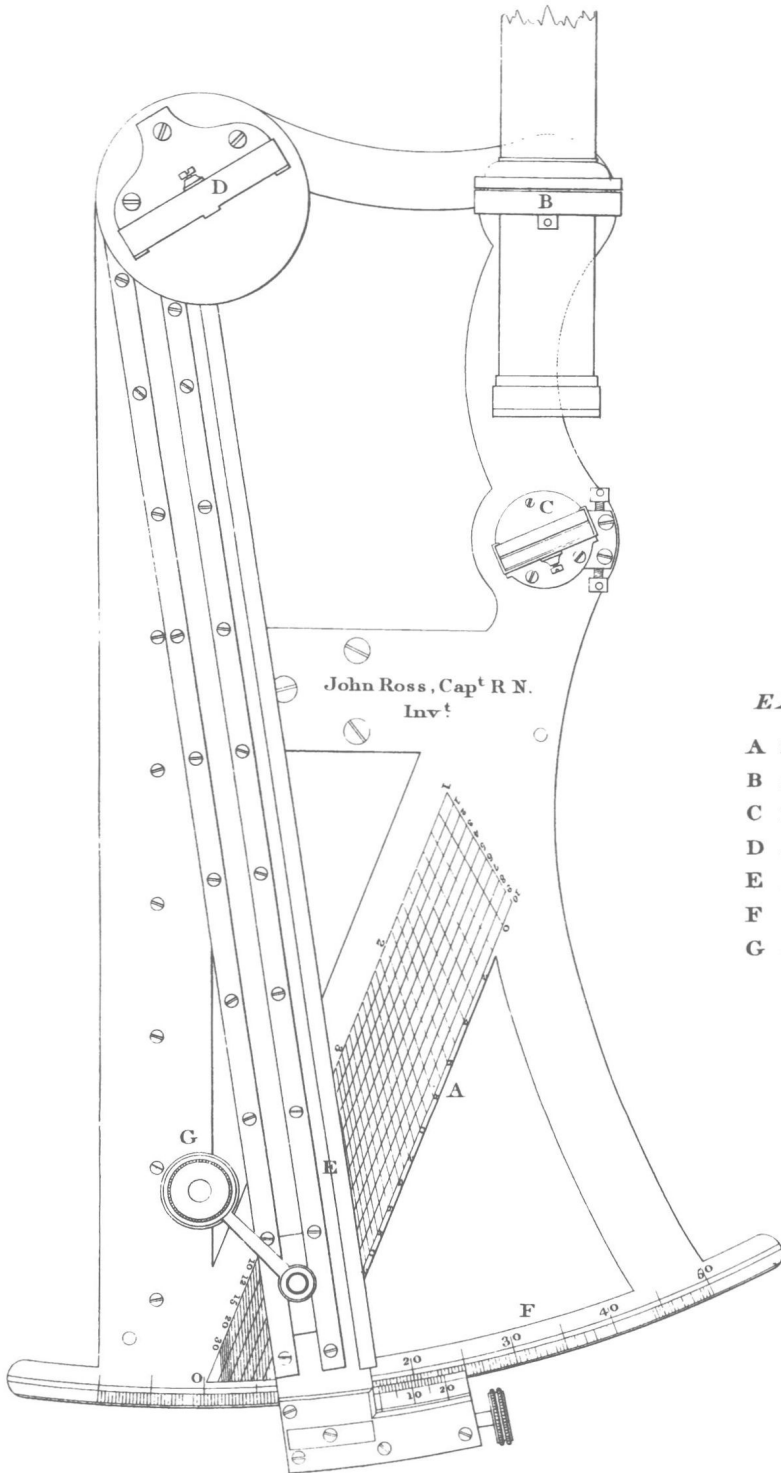
SIR,

THE era which placed your Royal Highness at the Helm of the British Navy, being that of the introduction of the Steam Engine into His Majesty's Fleet, I had the honor to lay before your Royal Highness my proposition of publishing a System of the Naval Tactics peculiar to Steam Navigation, the result of much labour and enquiry; urging the necessity of instructing the Officers of the Royal Navy, in the theory of that important part of their profession. Notwithstanding the general prejudice against innovations on a system which has for ages protected the nation, and raised our naval renown to the pinnacle of glory, Your Royal Highness patiently listened to my arguments and suggestions, and, with a laudable desire to afford every facility to improvements, was graciously pleased to sanction my humble undertaking, and to permit me to dedicate the fruits of my labours, to The Lord High Admiral. Impressed with unfeigned gratitude for this mark of condescension, as well as for the honor which has thus been conferred upon me, and with an anxious hope that my endeavours may prove worthy of them, I beg leave to subscribe myself,

Your Royal Highnesses
Most Dutiful and
Most Obedient Servant,

JOHN ROSS,
Captain of the Royal Navy.

ROYAL CLARENCE SEXTANT.



EXPLANATION.

- A The Clarence Scale.
- B The Eye piece.
- C The Horizon Glass } forming a Right angled Triangle.
- D Index Glass
- E The Index.
- F The Arc.
- G The Microscope.

INTRODUCTION.

IN the late war which desolated Europe for twenty-three years, events took place which raised the glory and renown of the British Navy so decidedly above all other nations, that it was considered a settled point, and a generally acknowledged fact, that the "Wooden Walls of Old England," were alone a sufficient protection to her shores, from foreign invasion. Her fleets were no sooner laid up dismantled in her harbours, and those officers who had hitherto been actively employed in offensive and defensive warfare, doomed to spend the remainder of their days in contemplation of the past, than their minds were naturally turned towards the various scenes they had witnessed, and in "fighting their battles o'er again," they reviewed the peculiarities of every action, and being naturally led to reason and reflect on the importance of the subject, in the event of a renewal of hostilities, and with a most patriotic and laudable desire to improve the young and aspiring officers, who are expected to maintain the glory, and ensure the future safety of the nation, they felt it a duty incumbent on them to publish those facts and opinions which had been so fully established by talent and experience; thus affording advantages to the rising generation of officers, which would bring them at once to a knowledge of the profession, which, without those, could not have been obtained in years of practice. Among these, I may mention the works of Admiral Pender on "Seamanship," Captain Griffith's "Practical

Hints," and Admiral Ekin's "Naval Battles," &c.; the two former giving a complete system and view of seamanship, and deciding points in the profession which were even doubtful among experienced officers, and often subjects of controversy on which the sailor could not make up his mind during the course of an active life; and the latter, giving an insight into the higher branches of the profession, which would have been invaluable to most of those captains who commanded ships of the line during the war. Had no alteration taken place in naval tactics or warfare, these would have remained standard volumes in the library of every naval officer.

Navigation in general, has however undergone so complete a revolution by the introduction of the steam engine, as to render its theory and practice no longer the same, and, consequently, the able works alluded to, are no longer of that importance which were at first attached to them; the change which has taken place, is however still more applicable to naval warfare, than to commercial or mercantile purposes, and we trust that this fact has not been overlooked by those whose duty it is to watch over and defend our country.

There is, indeed, abundant reason to believe, that it is fully felt, not only by the government itself, but by every naval officer who has bestowed the slightest attention on the subject; while, if it be true, as is generally understood, that our rivals and enemies are turning their attention very particularly to this object, it is the more incumbent on us to see that no time is lost by ourselves, in taking such steps as may insure us that continued superiority at sea on which our very existence depends,

It is for the purpose of hastening the general attention to this most vital subject, that the present work has been undertaken; imperfect as it needs must be, where every thing is entirely new, and we have as yet no experience to guide us. Such as it is, pretending to no more than a bare sketch of what time and practice must hereafter fill up, it will at least

serve to call the thoughts and labours of other officers to the same subject, while I may occupy a few pages of introduction on some general remarks on the most leading points connected with a system of offensive and defensive Steam Navigation.

The first remark is, that such a system will require a great numerical increase of officers, in the event of a future war, proportioned to that of the men; whether the object be merely the protection of our commerce, or a national defence against invasion and active offensive warfare. Such officers, must also be educated with the knowledge, not only of Steam Navigation, and of the construction and management of Steam Vessels, but of the very machinery and principles of the engine itself, without which they will rarely be efficient for their duties; much as the adequate management of a ship of this nature depends on an intimate knowledge of its moving power, and highly necessary as it is that they who command should be able to direct and controul every thing. It is indeed plain, that if it is necessary that a good officer should be intimate with every thing that appertains to the construction and guidance of a ship on the present system, so that he may direct every thing and depend on no one, not less is it indispensable that he should equally know every thing which relates to the new force which will thus be placed in his hands.

It is moreover plain to a very slight reflection, that the adoption of this mode of motion, and these new inventions, will produce an entire revolution in the present system of attack and defence, and that an entire new method of tactics must be a necessary consequence; great differences in the management and conduct of vessels, whether separately or in bodies, must follow from substituting the present mechanical powers, utterly independent as they are of the wind, for those which depend solely on that force: and hence, an entire new course of study becomes opened to naval officers, no less indispensable, than it is new. Thus, for example, must the ancient rule of forming the line of battle, be utterly changed;

since the nature and direction of the wind will no longer form the same elements of calculation: and similar changes will become necessary, in the modes of attacking and defending, and even in the usual and simpler cases of chasing, and of other operations between single ships. Some of these will be demonstrated hereafter; but I may also here remark, that another essential variation in the conduct of ships of war, in action, or intending it, will occur in the present system, from the power which is possessed of rendering vessels of this nature partially invulnerable, and of making them shot proof, within at least, certain limits. Thus, for example, it will become possible, for a ship rendered shot-proof, within six hundred yards, or more or less, should it so happen, to approach within that distance of a ship of the line, and, even with one gun, to maintain an action, perhaps to disable and destroy her much more weighty opponent; while the difference in favour of the steam vessel is obvious, because the machine can be secured, both by being fortified and placed beneath the water, so as to keep the hull and all the moving power secure from injury, when the sails and rigging of her antagonist, or her moving powers, are as well as her hull, completely exposed; constituting a difference, the great influence of which can be immediately appreciated.

Another advantage appertaining to steam vessels thus fortified, which is also of immense importance and effect in its general results, as to naval warfare, is this, that a vessel of this nature cannot be boarded by boats; while the general system of attack and defence on boarding at close quarters, must also undergo an entire change, as the least consideration will render apparent. In reality, a steam vessel, fortified in the manner above alluded to, is incapable of being boarded at all, and cannot be taken in this manner; while it is plain also, that this mere fact will lead to considerable changes of plan and conduct in the case of close actions.

Still more, a steam vessel may be rendered a single offensive weapon in herself, on a system similar to that of the ancient warfare of galleys in the

time of Rome ; and to use familiar language, may be employed in running down its antagonist, by the mere impulse of a fortified stem, accompanied by a superior weight and velocity ; while this is a species of attack, which, by being always at command, and being independent of wind, will necessarily lead to manœuvres at once new and complicated ; since the object of the assailant will be to attack the broadside, or most vulnerable part of the enemy, reversing entirely, what is now attempted. If I add to this, that vessels of this description may easily engage with red-hot shot, and with other missiles, which the present system does not appreciate, or which are now not deemed convenient, it is further easy to see that there is scarcely a limit to the changes which a system of this nature will introduce into naval warfare, and that consequently, an entire new course of study will be required in training both men and officers to this science.

It is true, however, I fear, that there are many old officers, who as yet oppose the introduction of this system, or doubt of its practicability ; and if it be so, it is no great cause of surprise, while it must be also allowed, that there are objections, many of which are more obvious than admissible. Certain it is, that should such a system become general, we must bid farewell to the pride of seeing our flags flying in a three-decker, and to all the pomp and consequence of a glorious fleet, so captivating to the human fancy ; and what is more, officers will no longer enjoy, particularly in the superior ranks, that comfort and accommodation which they now possess. It is true ; the insignificance of an admiral's flag flying at the miserable mast of a steam boat cannot be denied ; nor indeed, the generally insignificant aspect of a fleet of this character, compared to the gigantic and noble structures of present warfare. But, whatever may be the ideal value of all this, we must recollect, in opposition to it, the enormous difference of expence in favor of a system of defence on the projected principle. The value or cost of a first rate, would build and equip forty steam vessels ; either of which, singly, might be sufficient to subdue two