

**STEAM AND THE
MARINE
STEAM-ENGINE**

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649711932

Steam and the Marine Steam-Engine by John Yeo

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.

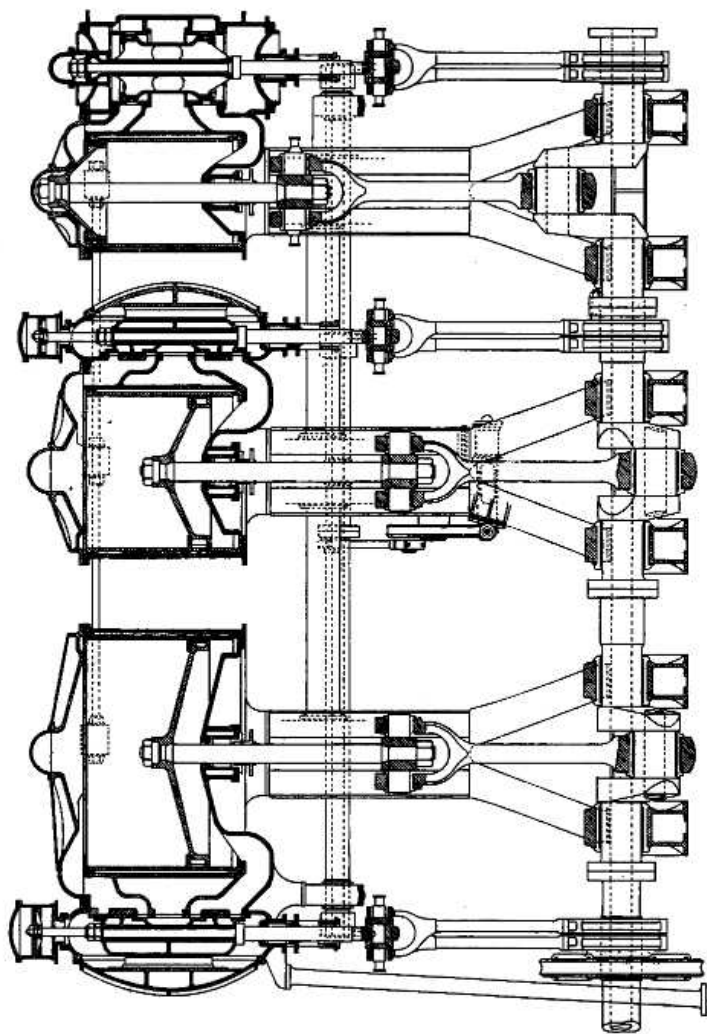
www.triestepublishing.com

JOHN YEO

**STEAM AND THE
MARINE
STEAM-ENGINE**

STEAM
AND THE
MARINE STEAM-ENGINE





LONGITUDINAL SECTION THROUGH SET OF TRIPLE-EXPANSION ENGINES.

STEAM
AND THE
MARINE STEAM-ENGINE

BY

JOHN YEO

FLEET ENGINEER, ROYAL NAVY; FELLOW OF THE ROYAL SCHOOL OF NAVAL ARCHITECTURE
AND MARINE ENGINEERING; MEMBER OF THE INSTITUTION OF NAVAL ARCHITECTS;
INSTRUCTOR IN STEAM AND MARINE ENGINEERING, ROYAL NAVAL COLLEGE

London
MACMILLAN AND CO.
AND NEW YORK

1894

All rights reserved

35003

6966194

TJF
·Y4

PREFACE

THIS book has been prepared from my lecture notes, and represents, in an abbreviated form, a considerable part of the course of instruction for Executive Officers at the Royal Naval College. It is intended for Naval Officers, and for Students of Engineering in the earlier part of their training; it is hoped it may also prove useful to Officers of the Mercantile Marine and others desirous of obtaining some knowledge of the propelling machinery of ships, and of various matters connected with its use and management. The special aim of the book is to give a sound general knowledge of the subject, with as much detail as appears to be necessary for the end in view, in as brief and simple a manner as possible. The subject is a large one, and in order to keep the matter within a small compass it has necessarily been much condensed; this is especially the case in the parts dealing with principles, which I would have much preferred to write with greater fulness. What is given, however, is the result of careful consideration; and I hope the brevity of the statements made may not prevent them from being sufficiently clear to be easily understood.

The illustrations are, in part, reproductions of lecture diagrams, but are principally from drawings specially made for the book. The design has been to secure clearness of illustration in regard to the principal features rather than completeness of detail, and

in some cases simple elementary sketches have been preferred to, or have been given with, the more detailed drawings. The illustration of the Yarrow water-tube boiler, Fig. 17, has been reproduced, on a reduced scale, from *Engineering*, vol. li. p. 79; I am indebted to the courtesy of the Editor of that journal for permission to insert it. I am similarly indebted to the firm of Messrs. Maudslay, Sons, and Field for permission to reproduce the drawing of the Belleville boiler, given on p. 31, from their pamphlet on the subject; and to Messrs. Thornycroft and Co. for a photograph from which the drawing of the Thornycroft boiler, reproduced on p. 28, was made.

I have availed myself of the information published in papers read before the Institution of Naval Architects and other societies, especially those read by professional Officers of the Admiralty.

As one of Professor Cotterill's old pupils, I take this opportunity of acknowledging my indebtedness to him.

I wish, further, to acknowledge my obligation to my colleague, Mr. C. W. J. Bearblock, R.N., for much kind assistance, especially in regard to the drawings.

ROYAL NAVAL COLLEGE,

October 1894.

CONTENTS

CHAPTER I

INTRODUCTION

	PAGE
Steam-Engine—General Features	1
Application of Steam Power to Propulsion—Early Progress	2
Forms of Engines—Paddle, Screw	3
Advance in Marine Engineering. Economy of Fuel—Economy of Weight and Space—Changes leading to improvement in these particulars	5

CHAPTER II

BOILERS

Requirements—Conditions of Working—Working Pressure and Test Pressure—Material	9
Tubular Boiler. General Description—Action	10
Heating Surface	11
Furnace Arrangements	12
Form of Boiler Shell in relation to Pressure—Strength of Circular Section	13
High Cylindrical Boiler. Features—Construction and Strength—End-Plates—Furnaces, Plain and Corrugated—Combustion-Chambers—Tubes	15
Staying—Parts Stayed and Description of Stay used	19
Oval Boiler—Double-ended Boiler	21
Low Cylindrical Boiler. Features and Construction	23
Particulars of Ordinary Naval Boilers	25
Locomotive Boiler. Special Requirements—Features and Construction	25
Water-Tube Boilers. General Features and Advantages of Class—Thornycroft, Yarrow, and Belleville Boiler	27
Forced Draught applied to Ordinary Boilers. Object—System employed in Service—Arrangements—Air-Pressure—Results—Admiralty Ferrule	32
Boiler Mountings. Safety-Valves—Stop-Valves—Pressure-Gauges—Feed-Valves—Water-Gauges and Test-Cocks—Blow-out Valves	37
Main Steam-pipe Connections—Arrangement and Object	45
Care of Boilers under Weigh	47