

**THE PRACTICAL APPLICATIONS  
OF ELECTRICITY. A SERIES OF  
LECTURES DELIVERED AT THE  
INSTITUTION OF CIVIL  
ENGINEERS, SESSION 1882-83**

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649677481

The Practical Applications of Electricity. A Series of Lectures Delivered at the Institution of Civil Engineers, Session 1882-83 by Various

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](http://www.triestepublishing.com)

**VARIOUS**

**THE PRACTICAL APPLICATIONS  
OF ELECTRICITY. A SERIES OF  
LECTURES DELIVERED AT THE  
INSTITUTION OF CIVIL  
ENGINEERS, SESSION 1882-83**



THE  
PRACTICAL APPLICATIONS  
OF  
ELECTRICITY.

A Series of Lectures

DELIVERED AT

THE INSTITUTION OF CIVIL ENGINEERS,  
SESSION 1882-83.



LONDON:

Published by the Institution,  
25, GREAT GEORGE STREET, WESTMINSTER, S.W.  
1884.

[The right of Publication and of Translation is reserved.]

**ADVERTISEMENT.**

---

The Institution as a body is not responsible for the facts and opinions advanced in the following pages.

## P R E F A C E.

---

IN the Report of the Council submitted to the Annual General Meeting in December 1883, it was stated that, as far back as 1868, a suggestion had been made for the establishment of Readerships for the benefit of young Engineers. That idea was not carried out, as the organisation of Supplemental Meetings, for the reading and discussion of Papers by Students of the Institution, was deemed preferable, and to be more in accordance with the usages of the Society. In August 1879, the expediency of having, in addition to the Ordinary Meetings, Lectures on special subjects of engineering was mooted. It was felt that if a limited number of lectures could be arranged in each session, to be delivered by men of eminence, not on the elementary subjects of the class-room, but on the principles involved in the action of the "Great Sources of Power in Nature," and their practical applications, the provisions of Section xiii. of the By-laws would be met in a proper manner. In March 1882 it was resolved to give effect to this proposal, and arrangements were made for a course of six lectures, by as many lecturers, on the "Practical Applications of Electricity." As, however, the Session 1881-82 was then far advanced, it was decided to postpone their delivery until the Session 1882-83, when the lectures included in this volume were given. All the lecturers were Fellows of the Royal Society, and Members of The Institution of Civil Engineers,

and in every case their services and those of their assistants were afforded gratuitously.

The Council feel assured that the members will fully appreciate the amount of time and labour bestowed in the preparation of these lectures, and the value and importance of the information thus communicated.

These lectures were so successful, that a second series on "Heat in its Mechanical Applications" has been arranged for the Session 1883-84. This course will also be issued to the members in a separate volume.



## CONTENTS.

15 February, 1883.	
THE PROGRESS OF TELEGRAPHY. BY W. H. PREECE (1 plate, 2 woodcuts)	PAGE 1
1 March, 1883.	
TELEPHONES. BY SIR FREDERICK BRAMWELL (15 woodcuts)	26
15 March, 1883.	
THE ELECTRICAL TRANSMISSION AND STORAGE OF POWER. BY DR. C. W. SIEMENS (1 plate, 5 woodcuts)	56
5 April, 1883.	
SOME POINTS IN ELECTRIC LIGHTING. BY DR. J. HOPKINSON (12 woodcuts)	81
19 April, 1883.	
ELECTRICITY APPLIED TO EXPLOSIVE PURPOSES. BY PROFESSOR F. A. ABEL	107
3 May, 1883.	
ELECTRICAL UNITS OF MEASUREMENT. BY SIR W. THOMSON	149
INDEX	177



THE  
PRACTICAL APPLICATIONS OF ELECTRICITY.

---

15 February, 1883.

JAMES BRUNLEES, F.R.S.E., President,  
in the Chair.

---

The Progress of Telegraphy.

By WILLIAM HENRY PREECE, F.R.S., M. Inst. C.E.

MR. PRESIDENT AND GENTLEMEN,—It is my misfortune, and not my fault, that I have to lead off this course of lectures on the Practical Applications of Electricity. It is my misfortune because it happens that Telegraphy is the oldest and the first of these practical applications, and though it is the oldest and the first, nevertheless it is very young, for it dates its birth only from the year 1837. The great shining lights of this Institution were present at its birth. Robert Stephenson, Isambard Kingdom Brunel, Joseph Locke, and George Parker Bidder, were its god-fathers. There are many (and doubtless there are some present to-night) living members of this Institution who assisted materially in its delivery. It grew around our railway system, and our railway managers were not slow in detecting the power that telegraphy gave them to marshal their trains, to adjust their traffic, and to protect life. In 1851 this art, if I may so call it, had scarcely commenced to take a commercial existence, but now it is only necessary to refer to the map to see to what an enormous extent telegraphy has grown.

A Civil Engineer would feel himself disgraced if he knew nothing of the strength of materials, of the pressure of liquids, of stresses and strains; but how many amongst my hearers are there who know much of electromotive force, of resistance, of currents, of volts, of induction, *et hoc genus omne*. An American Author has told us that it is very dangerous to prophesy unless you know; but I think I am justified in prophesying this, that it will not be very long before these terms become household words, for they have already been admitted into commercial, legal, and Parliamentary lore.