

**CAMBRIDGE NATURAL SCIENCE
MANUALS. PHYSICAL SERIES. LIGHT.
AN ELEMENTARY TEXT-BOOK,
THEORETICAL AND PRACTICAL. FOR
COLLEGES AND SCHOOLS**

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649635726

Cambridge Natural Science Manuals. Physical Series. Light. An Elementary Text-Book,
Theoretical and Practical. For Colleges and Schools by R. T. Glazebrook

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

R. T. GLAZEBROOK

**CAMBRIDGE NATURAL SCIENCE
MANUALS. PHYSICAL SERIES. LIGHT.
AN ELEMENTARY TEXT-BOOK,
THEORETICAL AND PRACTICAL. FOR
COLLEGES AND SCHOOLS**

LIGHT
AN ELEMENTARY TEXT-BOOK
THEORETICAL AND PRACTICAL

London: C. J. CLAY AND SONS,
CAMBRIDGE UNIVERSITY PRESS WAREHOUSE,
AVE MARIA LANE.

H. K. LEWIS,
186, GOWER STREET, W.C.



Cambridge: DEIGHTON, BELL AND CO.

Leipzig: F. A. BROCKHAUS.

New York: MACMILLAN AND CO.

John Lubbock
CAMBRIDGE NATURAL SCIENCE MANUALS
PHYSICAL SERIES.

Cambridge
LIGHT

AN ELEMENTARY TEXT-BOOK

THEORETICAL AND PRACTICAL

FOR COLLEGES AND SCHOOLS.

BY

R. T. GLAZEBROOK, M.A., F.R.S.

ASSISTANT DIRECTOR OF THE CAVENDISH LABORATORY,
FELLOW OF TRINITY COLLEGE, CAMBRIDGE.

CAMBRIDGE:
AT THE UNIVERSITY PRESS.

1894

[All Rights reserved.]

PREFACE.

IT has now come to be generally recognised that the most satisfactory method of teaching the Natural Sciences is by experiments which can be performed by the learners themselves. In consequence many teachers have arranged for their pupils courses of practical instruction designed to illustrate the fundamental principles of the subject they teach. The portions of the following book designated EXPERIMENTS have for the most part been in use for some time as a Practical Course for Medical Students at the Cavendish Laboratory.

The rest of the book contains the explanation of the theory of those experiments, and an account of the deductions from them; these have formed my lectures to the same class. It has been my object in the lectures to avoid elaborate apparatus and to make the whole as simple as possible. Most of the lecture experiments are performed with the apparatus which is afterwards used by the class, and whenever it can be done the theoretical consequences are deduced from the results of these experiments.

In order to deal with classes of considerable size it is necessary to multiply the apparatus to a large extent. The students usually work in pairs and each pair has a separate

table. On this table are placed all the apparatus for the experiments which are to be performed. Thus for a class of 20 there would be 10 tables and 10 specimens of each of the pieces of apparatus. With some of the more elaborate experiments this plan is not possible. For them the class is taken in groups of 5 or 6, the demonstrator in charge performs the necessary operations and makes the observations, the class work out the results for themselves.

It is with the hope of extending some such system as this in Colleges and Schools that I have undertaken the publication of the present book and others which are to follow. My own experience has shewn the advantages of such a plan, and I know that that experience is shared by other teachers. The practical work interests the student. The apparatus required is simple; much of it might be made with a little assistance by the pupils themselves. Any good-sized room will serve as the Laboratory. Gas should be laid on to each table, and there should be a convenient water supply accessible; no other special preparation is necessary.

The plan of the book will, I hope, be sufficiently clear; the subject-matter of the various Sections is indicated by the headings in Clarendon type; the Experiments to be performed by the pupils are shewn thus:

EXPERIMENT (1). *To illustrate the Rectilinear Propagation of Light by the pinhole Camera.*

These are numbered consecutively. Occasionally an account of additional experiments, to be performed with the same apparatus, is added in small type. Besides this the small-type articles contain some numerical examples worked out, and, in many cases, a notice of the

principal sources of error in the experiments, with indications of the method of making the necessary corrections. These latter portions may often with advantage be omitted on first reading. A few articles of a more advanced character, which may also at first be omitted, are marked with an asterisk.

A book which has grown out of the notes in general use in a laboratory is necessarily a composite production. I have specially to thank Mr Wilberforce and Mr Fitzpatrick for their help in arranging many of the experiments. Mr Fitzpatrick has also given me very valuable assistance by reading the proofs and suggesting numerous improvements. The illustrations have for the most part been drawn from the apparatus used in the class by Mr Hayles, the Lecture Room Assistant, and Mr E. Wilson.

R. T. GLAZEBROOK.

CAVENDISH LABORATORY,
February 15, 1884.

Arrangements have been made with Messrs F. E. BECKER AND CO., 33, 35 and 37 Hatton Wall, E.C., to supply the apparatus required to perform the EXPERIMENTS described in the following pages. Price Lists may be had on application to them.