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ESSENTIALS OF PHYSICS H-6

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BY

GEORGE A. HOADLEY, C.E., Sc.D.

PROFESSOR OF PHYSICS IN SWARTHMORE
COLLEGE

AMERICAN BOOK COMPANY

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PREFACE

THE most essential thing in the study of any science is that there should be a thorough understanding of the fundamental principles upon which it is based. In this text experimental demonstrations are used to show the relation between the conditions imposed and the results obtained. These demonstrations lead to the statements of fundamental principles which are here given either as simple formulas or as expressions of these formulas in ordinary language.

It has also come to be generally understood that there is no branch of natural science that has a more direct application to the needs of modern life than Physics. It is for this reason that emphasis is placed in this book upon the things that are essential in understanding the applications of the principles of Physics to that which is a part of our everyday experience. At the end of each section there is a group of questions, which not only serve to recall the principles considered in the section and to stimulate the interest of the pupil, but also suggest directions in which these principles can be applied. Moreover, the problems that are given are practical problems based on conditions that are to be met with constantly.

The general applications of Physics to the doing of things are graphically presented throughout by a series of full-page illustrations. Some of these show the advances that have been made in well-known machines; as an example, the modern locomotive compared with Steven-

son's Rocket. While nearly all of these illustrations are of things that did not exist a few years ago, one of them, the section of the Eddystone lighthouse, is given to show that the method of securing stability in such a structure has been known for many years. Railroad trains show the most recent method of applying steam and electricity as motive power, while the Zeppelin airship and the aeroplane are examples of what has been done to secure a means of traveling through the most unstable of fluids, the air. The Gatun locks of the Panama Canal are triumphs of mechanical engineering. The work of the electrical engineer is shown in the electric power station, the electric train, and the wireless telegraph. The page of sound waves is a striking proof of the accurate way in which photography makes a permanent record of a pulse that is invisible to the eye, while the marvelous results of the three-color method of printing are beautifully shown in the frontispiece.

The hope is expressed that those who study the essential principles of Physics, as treated in this book, will master them so thoroughly that they will take pleasure in tracing the dependence of our way of living upon these underlying principles.

Acknowledgment is made of many helpful suggestions made by teachers of Physics and to publishers who have granted the use of subjects for illustration.

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