*PREFACE

THE first edition of this book, published five years ago, was an effort on the part of its authors to introduce into the teaching of Physics a more vital method of presentation than the one then in common use.

The fundamental principle underlying the method of presentation used in both editions of this book is that the study of Science in high schools can be justified only when the pupils gain both knowledge of the subject matter and training in scientific thinking. In conformity with Spencer's definition of Science as classified knowledge, the teaching of subject matter has so dominated elementary instruction in Physics that little attention has been given to training in methods of thought.

The overestimation of the value of mere subject matter, and the prevalence of the custom of testing the results of a teacher's work by examinations on a specifically outlined list of prescribed topics, drove teachers to use methods of teaching that were mainly formal and didactic. Definitions, laws, and principles were simply stated, memorized by the pupils, and justified afterwards if at all by illustrations in the way of experiments and practical applications.

Both educational experience and educational theory show clearly that scientific facts may be memorized, but not mastered in this way. Scientific knowledge is acquired only on the basis of concrete experience by the trying-out process known as the scientific method. Therefore a method of treatment that develops the subject from the concrete experiences of the learner, and gives practice in the framing, testing, and selection of hypotheses appropriate to the solution of definite, concrete problems, is the only method that gives mastery of subject matter.

*The reference to Part II in the Preface applies to the complete book containing Parts I and II.