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been omitted; but the danger of memorizing formulas whose symbols do not stand for well-developed physical concepts has been reduced to a minimum. The pupils who are ready to use algebraic symbols intelligently will have no trouble in putting the relations into the equation form for themselves. Those who are not able to do this will do better thinking without formulas.

For the same reason, the questions and problems at the ends of the chapters are not mathematical puzzles. They are all real physical problems, and their solution depends on the use of physical concepts and principles, rather than on mere mechanical substitution in a formula.

As practical helps to both pupil and teacher the important facts of each chapter have been gathered together at the end under the caption Definitions and Principles. These may be committed to memory. In the text each paragraph constitutes an argument that begins with concrete experience and ends with the statement of the principle or fact that is under discussion. In order to emphasize the fact, the statement is usually printed in italics. The more general and important of these conclusions are printed in black-faced type.

It is expected that both demonstration experiments and laboratory exercises will be given in connection with this book; but no attempt has been made to specify in the text the particular experiments that should be made. Since most schools are supplied with fairly complete equipment of demonstration and laboratory apparatus, it is believed that each teacher will be the best judge as to the selection of such experiments and the order in which they are to be given. Those who adopt this book will not find it necessary to discard their old equipment and buy a new outfit in order to fit the laboratory work to the method here presented. Those demonstration and laboratory experiments that have proved to be workable and significant to the pupils in connection with courses heretofore given, will be found to be the best for use with this book also.

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