

**ELEMENTS OF PHYSICS
EXPERIMENTAL
AND DESCRIPTIVE**

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Elements of Physics Experimental and Descriptive by Amos T. Fisher & Melvin J. Patterson

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AMOS T. FISHER & MELVIN J. PATTERSON

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BY

AMOS T. FISHER, B.S.

ASSISTED BY

MELVIN J. PATTERSON, B.S.

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PREFACE.

THIS book is the outgrowth of an attempt, covering a period of six years, to teach physics to young pupils in a manner which combines simplicity of language and presentation with the important manifestations of matter which constantly make up their environment. It is the aim of the text to combine experimental and descriptive instruction in order that both may be better understood.

The authors have sought throughout this book to keep constantly before the pupils things and phenomena which they can see and observe. Plain, logical, and accurate statements of fact and explanations have been sought. Formulated statements of definitions and principles relating to the subject have been brought out, and as far as practicable, the application has been shown and illustrated. It has not been the intention to produce a complete work on any particular phase of the subject, but such an elementary treatment of first principles as it is hoped will prove helpful and welcome.

Most of the apparatus used in the work can be made at home, and will be a means of keeping interested many a boy who otherwise might not be. Such further apparatus as is needed may be secured at very moderate prices from Messrs. Alfred L. Robbins & Co., or Messrs. Walmsley, Fuller & Co., of Chicago, or the L. E. Knott Apparatus Co. of Boston and New York.

A. T. F.

M. J. P.

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ELEMENTS OF PHYSICS.

CHAPTER I.

MATTER AND SOME OF ITS PROPERTIES.

Matter. *Definition.* — Every object that has extension or that can affect our senses directly or indirectly is called matter. (This definition is only provisional.) Any observed condition or change in matter is a *phenomenon*.

Extension is that property or quality of matter by virtue of which it occupies space or takes up room.

Questions. — What is an extended object? Name some extended objects. How many of those named are material things? How many can you perceive with one of the five senses? Can you name some object which you can perceive with all of the five senses? Can you name anything that can be perceived but is not material? Describe some phenomenon. Is the sound of a hammer a phenomenon? Is a star a phenomenon? Can you name some object not composed of matter? How does one become aware of the existence of matter? What reason have you for thinking that a tree which you never saw is matter? Why do you infer that the sun, moon, and stars are composed of matter? Can you think of some sensation not due to matter? Distinguish between matter and a substance.