was the guess of the intelligent Eskimo here mentioned (p. 201), who from his respect for the prospectors' provision-cans opined that the mysterious phonograph might be "tinned white man."

The book is enlivened by personal incidents and anecdotes, and is abundantly illustrated by well-chosen photographs excellently reproduced. But the cover is ugly both in design and colouring.

G. W. L.

A TEXT-BOOK OF PHYSICS.

General Physics: an Elementary Text-book for Colleges. By Dr. Henry Crew. Pp. xi+522; figures. (New York: The Macmillan Co.; London: Macmillan and Co., Ltd., 1908.) Price 12*s.* net.

"IN these days of numerous text-books the author, who dares still further to increase the number, owes to the public, at least an explanation in which he shall set forth his purpose, however far short of accomplishment he may have fallen."

In these words our author introduces himself to us in his preface; and of the reasons adduced for the present volume the most important is that he has sought "not merely, or even mainly, to impart information, but to set before the student a large and compact body of truth obtained by a method which shall remain for him, throughout life, a pattern and norm of clear and correct thinking."

Prof. Crew has certainly succeeded in presenting a lively account of modern physics, in so far at least as it can be presented in a series of class lectures in which all experiments are of a qualitative nature only. We regret that he has not done more than this. It is quite possible in very many cases in class lectures to perform quantitative experiments also, and students are never so interested as when such experiments are being performed. There is no suggestion of this in the book before us. This is to be regretted, because, even if in the lectures which the student is privileged to hear qualitative methods are alone presented, yet his text-book should provide him with a detailed account of some of the historical experimental methods by which the present state of science has been attained. We do not quarrel in general with what we find here, but with what is omitted. Open where we may, and it is rare that we find what we hoped. Thus, in connection with Charles's law for gases:—

"The actual measurement of these quantities is a somewhat difficult matter, requiring many precautions, and may well be reserved for the student's second or third year in physics."

We are astonished that this should be thought to be advisable.

Conspicuous gaps also exist in the exposition. After emphasising the fact that speed is the *limiting value* of a ratio of distance over time, and the importance of a knowledge of limiting values even in elementary physics, Prof. Crew does not make the slightest effort to impart this knowledge. How easy and instructive it is to take one or two cases as illustrations, such as $y=\kappa t$ or $y=\kappa t^2$, and calculate the speeds from them. The student thereby learns something, whereas, at present, the matter is left with an air of mystery hanging over it.

We are not enthusiastic admirers of D'Alembert's principle; it is correct but confusing, introducing a fictitious equilibrium where equilibrium does not exist. But, at the early stage of instruction covered by the book, to speak of the reversed effective forces as the reaction of the masses against their acceleration immediately after having given Newton's law of action and reaction (the reaction acting on a second body) is only to make confusion worse confounded.

Prof. Crew follows everyone else in defining energy as power of doing work. In view of the fact which everybody recognises, that a body may have enormous stores of energy and yet have no power of doing work, is it not time that the customary definition should be revised? The present writer is accustomed to define it as "that which diminishes when work is done, by an amount equal to the work so done."

The formula for a simple pendulum is written $T=2\pi\sqrt{l\theta/(g\sin\theta)}$, as though this was the exact form, the usual approximation following it; of course, this is not the case.

Pascal's theorem for fluid pressure is given as "At any point in a liquid at rest the stress (pressure) is the same in all directions." This is not the principle which usually goes under the name of Pascal's theorem.

The subject of magnetism is started with the definition, Any body which attracts iron filings is said to be magnetised and is called a magnet. Surely something more satisfactory than this can be found in the way of a definition. Those of us who have had considerable experience in examining are very familiar with the candidate who presses the passion for the unification of knowledge so far as to consider identical all forces of attraction. The present writer has been told by many dozens that we know the earth to be a magnet because if it were not so and we were to jump out of a window we should not fall down.

Looking back over this review, the writer feels that adverse criticism preponderates in it. He does not wish to convey the idea that the book must be condemned, but to show where it might be improved. He has read it from cover to cover (except the index); there is a certain breezy informality about it which is somewhat pleasing, although, to an English ear, a few of the expressions suggest slang.

Prof. Crew has evidently considerable interest in the historical side of the subject. Every leading principle is attributed to its source and is dated. He takes special pains to introduce each section by allusion to facts of familiar experience, and then endeavours out of this "chaos" to produce scientific order. This method serves to stimulate interest, and deserves commendation

The book includes the whole range of physics; the part on mechanics (205 pages) bears, perhaps, an excessive ratio to the rest.