

*Interest and Education. The Doctrine of Interest and its Concrete Application.* By Prof. C. DeGarmo. Pp. xiii + 226. (New York: The Macmillan Company, 1902.) Price 4s. 6d. net.

THE masters in English secondary schools have in the past been a little impatient of philosophical treatises dealing with the principles underlying educational practice; they have been apt to recognise education as an art, though unwilling to give attention to writers anxious to formulate a science of education. While fond of insisting upon the value to the teacher of individuality and freedom of action, our schoolmasters have failed to understand that until they have discovered and can apply the principles of their art, they are mere empirics, each knowing only what he has learnt from personal experience. The greater attention given in America and Germany to the training of teachers has incidentally resulted in the growth of a body of able men devoted to the study of educational science. Prof. DeGarmo, of Cornell University, is one of these students of pedagogic problems, and the book before us, with its evidences of enthusiasm on every page, represents some of his recent work. Taking Schurman's dictum as his text, that "interest is the greatest word in education," he shows how interest arises among primitive men, what its object should be, how it can be made to assist in the delimitation of the curriculum, and what relation it has to methods of teaching. Prof. DeGarmo has no sympathy with those intellectual aristocrats who cherish archaic educational ideals and deny the badge of scholarship to all who do not accept their estimate of the value of Greek and Latin. He attaches as much importance to rational instruction in science as to the making of Latin verses—"the student in the scientific, the technological or the commercial course is not inferior to his brother in the arts course . . . difference is not inferiority." He quotes approvingly, too, Lord Kelvin, who has said, "the higher education has two purposes—first, to enable the student to earn a livelihood, and second, to make life worth living," and this book should greatly assist teachers so to educate their pupils as to make both these requirements possible of attainment.

A. T. S.

*The Theory of Optics.* By Paul Drude. Translated from the German by C. R. Mann and R. A. Millikan. Pp. xxi + 546. (London: Longmans and Co., 1902.) Price 15s. net.

A VERY full account of the German edition of the above work appeared in these pages rather more than two years ago (October 18, 1900), under the title "A Modern Text-book of Optics." To what was then said little need be added. Prof. Michelson, in his preface to the translation, expresses the facts when he writes, "But no complete development of the electromagnetic theory in all its bearings, and no comprehensive discussion of the relation between the laws of radiation and the principles of thermodynamics have yet been attempted in any general text in English."

Prof. Drude's book fills the gap, and we may well agree with Prof. Michelson in his opinion that by making the book accessible to English-reading students, the translators have done an important service.

The translation has been well done; to the English reader the get-up of the book has an unfamiliar and not quite pleasing appearance, due to its American origin, and the illustrations of apparatus are not as good as we are accustomed to see in books of the class, but this does not really detract from the high merit of the work.

An index, which was wanting in the German edition, has been added, but the references to original

papers, especially papers of historic interest, are singularly incomplete. The book does not pretend to develop the subject from the historic standpoint, it is true, but still the omissions noted are very marked.

In spite of these, the book is of very real value, and should be found on the shelves of every physical laboratory.

*Le Forzè Idrauliche.* By Ingegnere Torquato Perdoni. Pp. 205; with four plates. (Milan: Ulrico Hoepli, 1902.)

IN a country like Italy, where coal has to be purchased from abroad, the utilisation of natural sources of available energy is an important problem. In this volume the author gives in tabular form a list of the principal water courses of the Italian mainland, and estimates, so far as information will permit, the amount of horse-power obtainable from these (a) under normal conditions ("magra ordinaria") and (b) during the dry seasons of the year ("minima magra"), exceptional droughts being excluded. Between these two limits, there is a large amount of energy available during the greater part of the year, which might be utilised if provision were made for supplying the deficiency during the dry months, and one method suggested is to apply this water power to electric traction on the railways, supplementing it in the summer by the use either of ordinary locomotives or steam engines at the generating stations. Of other sources of energy, the sea with its tides and waves is considered, and even glaciers are mentioned in connection with the property that a cold body may act as a store, if not of energy (as the author implies), at any rate of availability. This distinction between energy and availability might with advantage be pointed out clearly in the introduction, which deals with "the unity of concepts in modern physics," but in which the part devoted to matters thermodynamic is suggestive of Carnot's caloric theory of the motive power of fire rather than of the second law as modified by Clausius.

*De Ether.* By Dr. V. A. Julius. Pp. 56. (Haarlem: De Erven F. Bohn, 1902.)

*L'Etere e la Materia ponderabile.* By Ingegnere M. Barbèra. Pp. viii + 134. (Turin: Bertolero, 1902.)

THE first of these pamphlets consists of a discourse given to a vacation class of teachers in April, 1902, shortly before the death of the author. It was published at the request of many members of the class, and is as good a general historic account as could possibly be given in so short a space of our knowledge of the ether, considered with regard to optical phenomena, starting with the corpuscular theory of Newton, and tracing the various theories of Huyghens, Fresnel, Cauchy, Lord Kelvin, Maxwell, Fitzgerald, Larmor, Lorentz, and other writers.

Signor Barbèra's book is of a very different nature. In it he endeavours to account, without the use of mathematical formulæ, for the whole of the phenomena of modern physics and physical chemistry, on the supposition that the ether like matter consists of an aggregate of material particles, and that it differs from matter only in its very small density and very great elasticity. In the fifth paragraph he discusses the propagation of transverse waves on the hypothesis that the ether is a fluid. The motions which he describes in this connection are, however, well known to readers of hydrodynamical text-books as those produced by a sphere moving or oscillating in liquid. The book is up-to-date so far as the inclusion of recently discovered physical phenomena is concerned, but no theories of the ether can be adequately discussed in a pamphlet of this size and character, however carefully written.