

NEW BOOKS.

X Rays. By G. W. C. KAYE. New York: Longmans, Green & Co., 1914.
Pp. xix + 252. Price \$1.25 net.

This little volume is a welcome addition to the literature of this interesting subject. It covers much the same field as Pohl's book but the treatment is less theoretical. The first seven chapters deal with cathode ray phenomena and some features of high tension generators and x-ray tubes, this is followed by about twenty pages devoted to measurement. The treatment of secondary radiation and the brief discussion of interference phenomena in crystals will be very useful to those wishing a general idea of these recent developments but who lack the time required to read the original papers. Appendices contain a brief description of the Coolidge tube and the production of high vacua. The tables and diagrams are well selected and many references are included. All mathematical theory has been omitted but the resumé of experimental data is as complete as the size of the volume permits.

J. S. S.

Molekularkinetik und Molarassociation als Physikochemische Grundvorstellungen.

By DR. CARL DRUCKER. Leipzig: Akademische Verlagsgesellschaft, 1913.
Pp. 1 + 33.

Dr. Drucker in this "Antrittsvorlesung" emphasizes the importance of the molecular association theory as a working hypothesis for the explanation of a large number of physico-chemical problems. He shows that it should be regarded as a fundamental hypothesis, parallel to and in some cases superior to that of molecular kinetics. This theory is characterized by the assumption of the existence of various molecular complexes, each having definite properties, and of the existence of an equilibrium between them, depending upon the imposed physical conditions, such as temperature and pressure.

The pamphlet gives merely an outline of the theory and a prophesy of its future importance without specific quantitative applications. However, the author has added a large number of references to investigations in which the theory has evidently been used with success.

K. E. G.

Recueil de Constantes Physiques. By HENRI ABRAHAM AND PAUL SACERDOTE.
Paris: Gauthier-Villars, 1913. Pp. xvi + 751.

This volume supplements in an admirable manner the standard collections of physical constants. It brings together a great variety of data otherwise not easily found. The tables of the ordinary constants such as density, boiling

point, fusion, specific heat, etc., are augmented by the inclusion of much new material, and a great variety of useful information not found in previous compilations has been added. By the free use of diagrams many relations, which are not conveniently expressed in tabular form, are rendered available. This method is particularly useful in describing the properties of alloys, mixtures, solutions, etc. All the essential formulae and relations are given with an explicit statement of the notation employed. The volume is well indexed and lists of the authors from whom data have been taken accompany the various tables.

E. L. N.

Die Hydrierung durch Katalyse. By PAUL SABATIER. Leipzig: Akademische Verlagsgesellschaft, 1913. Pp. 1 + 20.

This is an address given by Professor Sabatier when he received the Nobel prize in December, 1912. It is a nontechnical description of his general method of producing direct hydration by catalysis and his chemical theory of catalysis. It also contains the history of its conception and development, and the principal applications of the method.

K. E. G.

Dialogues Concerning Two New Sciences. By GALILEO GALILEI. Translated from the Italian and Latin into English by HENRY CREW and ALFONSO DE SALVIO. New York: The Macmillan Company, 1914. Pp. xiii + 300. Price, \$2.00 net.

To anyone who is interested in the history of physics or who wishes to send his students to the sources of that science this book will be of great value. When the principal interest of a book is in the ideas which it contains, one can always tolerate a translation, particularly when, as in this instance, the translator has caught the style and spirit of the original. Everyone knows the principal contributions which Galileo made to the science of motion, but most of us do not know how many other notions, which are now the common property of mathematicians and physicists, of less fundamental importance, perhaps, than these, but still of great interest, were first presented or acutely discussed by that great genius. An examination of these dialogues on the strength of materials and on motion will reveal, on almost every page, something to attract attention.

The style of the translators is easy, fluent, and clear. The book is beautifully printed in an antique form and type. The diagrams are reproductions of the originals.

W. F. M.

Die Photographie. By OTTO PRELINGER. Leipzig: B. G. Teubner, 1914. Pp. iv + 110.

Die Luftfahrt. By DR. RAIMUND NIMFÜHR. Leipzig: B. G. Teubner, 1913. Pp. viii + 132.

Unsere Kohlen. By PAUL KUKUK. Leipzig: B. G. Teubner, 1913. Pp. ix + 120.

These booklets are three volumes of Teubner's series, entitled "Aus Natur und Geisteswelt," which is published for the distinct purpose of counteracting the modern tendency towards overspecialization. Each volume is written by an authority on the subject, but in accordance with the aim of the whole series the treatment is elementary and nontechnical. As means for the diffusion of knowledge the booklets certainly accomplish their purpose.

Dr. Prelinger's book presents in a popular form—in addition to a description of the various processes employed in photography and the physical and chemical principles underlying them—a short historical introduction and a condensed chapter on photography in natural colors.

One half of the volume, entitled "Die Luftfahrt" contains a general presentation of the physics of the atmosphere and the fundamental laws of aerostatics and aerodynamics. The second half gives an account of the technical development of balloons and aeroplanes.

"Unsere Kohlen" is written mainly from a geological and geographic point of view. It contains mere references to the physics and chemistry of coal and to the technical side of the subject. Only a few pages are devoted to the occurrence of coal in countries outside of Germany.

K. E. G.

Natural Sources of Energy. By A. H. GIBSON. New York: G. P. Putnam's Sons, 1913. Pp. vi + 131.

This is an interesting little book on the world's energy problem discussing the present and future available sources of energy. It concludes with the consoling optimistic view that the gradual depletion of the supply of fossil fuel will be more than compensated for by bringing into use the perennial supply of solar energy in its various available forms.

C. A. S.

Electrical and Magnetic Calculations. By A. A. ATKINSON. New York: D. Van Nostrand Company, 1913. Pp. vii + 310. Price, \$1.50.

The book, a fourth edition, contains a large number of problems in elementary magnetism and electricity and in the applications of these subjects to electrical engineering. Each chapter contains a short introduction explaining the terms and principles to be used, some illustrative problems with the solutions given in detail, and finally a large number of original problems. These are well selected and contain many valuable practical hints. A number of tables of magnetic and electrical constants are scattered through the book.

As a collection of useful problems the book is of value to teachers in technical high schools or small colleges where only the rudiments of electrical engineering are taught. As a text, however, the book is obsolete. Many of the units described are out of date and loose definitions and statements are frequently

found. The "metre des Archives" and the corresponding kilogram still figure as standards of length and of mass though long ago replaced by the international standards. Similarly the electrical units given in the book are still those proposed by the Chicago conference twenty years ago. "g" is called the force of gravity and a statement like this: "One volt delivering one ampere of current per second represents a power of one watt" is meaningless. Even an elementary text should not lag so many years behind modern knowledge and practice. This is especially to be regretted when it occurs in an otherwise very useful book.

K. E. G.

Modern Seismology. By G. W. WALKER. New York: Longmans, Green and Company, 1913. Pp. xii + 88. Price, \$1.40.

The author of this book is a practical seismologist. He gives in it an outline of the theory of seismographs including a study of the conditions of sensitiveness, and of the methods employing in registration; a description of the types of seismographs in present use and directions for their installation. In a second part, he considers the theory of a solid isotropic earth and the application of the seismographic records to the study of particular earthquakes as well as to the testing of theories of the earth's structure. The book contains a number of plates giving specimens of records which illustrate special phenomena and the peculiarities of particular instruments.

W. F. M.

Investigacion Experimental Sobre Las Corrientes de Turbulencia en Tubos Capilares. By TRIFON UGARTE. Buenos Ayres, 1913. Pp. 1 + 89.

This extensive thesis contains a full discussion of the formulas which have been proposed to represent the efflux of liquids from capillary tubes as a function of the pressure, the time and the temperature, and of the observations upon which they are based. The author presents an elaborate series of experiments upon the same subject, and verifies the types of these formulas, finding in certain cases that the constants of the formulas are of unexpected simplicity and of general interest.

W. F. M.

Magneto-optische Untersuchungen mit besonderer Berücksichtigung der magnetischen Zerlegung der Spektrallinien. By P. ZEEMAN. Pp. xi + 242. Price, Mk 9.

This is an exact translation of the original English edition of the author's work, *Researches in Magneto-Optics*, MacMillan and Co., London, 1913, by Max Iklé.

C. A. S.

Die realistische Weltansicht und die Lehre vom Raume. By E. STUDY. Braunschweig: Vieweg and Sohn, 1914. Pp. ix + 145. Price, Mk 4.50.

This book, by a distinguished mathematician, will be found interesting by anyone who is philosophically inclined. The author assumes the realistic

position, and criticizes acutely and with humor the opposing positions of idealism, positivism, and pragmatism. Proceeding to consider the problem of space, he accepts as possible hypotheses for the geometry of space, the Euclidean and the various forms of the non-Euclidean geometry. He accepts as a definition of a point that it is a system of n related numbers, and proceeds from this and similar definitions to describe these geometries by equations. The book ends with a discussion of the part played by the axioms in geometry.

W. F. M.

The Norwegian Aurora Polaris Expedition, 1902-1903. Vol. I. By KR. BIRKELAND. New York: Longmans, Green and Co., 1913. Price, \$10.00.

This great volume contains the results of more than ten years' hard and continuous study of magnetic storms and of the origin of terrestrial magnetism. The general thesis which is supported by the author is that magnetic storms are caused by cathode rays projected from the sun. The mathematical theory of the action of such rays, when they are deflected by the magnetic field of the earth, is worked out, and illustrated by the records of magnetic storms. The consequences of theory are also illustrated by a model earth, or terella, past which, when it is magnetized, cathode rays are sent; and the terella is also made a source of cathode rays, and other phenomena, analogous to the zodiacal light, Saturn's rings, and spiral nebulae are observed. The observations with the terella will be of special interest to the physicist.

W. F. M.