

is probably psychologically sound. There are also chapters on graphical constructions, on plan and elevation, and on contour lines. The work concludes with a section on kinematics. A good set of graduated examples, together with numerical tables and formulæ, will be found at the end.

(2) M. Guillet's book on vibrations is of the nature of a monograph in which the mathematics of "small oscillations" have been collected and classified, with numerous illustrations taken from the theories of light, sound, and electromagnetism.

The whole is a reprint from notes taken by Dr. M. M. Aubert of lectures given in the University of Paris by the author. The first part of the book deals with the theory of simple harmonic motion, free and damped. Several chapters are devoted to the composition of such motions, of plane and elliptically-polarised vibrations, and to phenomena of interference. A number of examples of the calculation of differences of path are given, having special reference to well-known problems of diffraction.

The second part deals with the propagation of waves in elastic solids and fluids. The author establishes the equations of equilibrium and small motion of an elastic solid, and deduces solutions of the problems of flexure and torsion in the simplest cases. He considers the propagation of dilatational and distortional waves in elastic media, and also the vibrations of rods and wires.

The book concludes with a consideration of the elastic-solid theory of the luminiferous æther, the elastic constants being adjusted to give Lord Kelvin's well-known "contractile" æther; certain vectors found are then interpreted in terms of the electromagnetic theory.

A work of this nature, which touches upon a number of different theories, is always liable to fall into the defect of "scrappiness," and it cannot be said that the present volume altogether escapes this reproach; it is, however, both instructive and stimulating, and contains a great deal of valuable information—information which is usually widely scattered, and therefore largely unavailable for the learner. In this sense the book supplies a distinct want. L. N. G. F.

OUR BOOKSHELF.

Abhandlungen und Vorträge zur Geschichte der Naturwissenschaften. By Prof. E. O. von Lippmann. Zweiter Band. Pp. x+491. (Leipzig: Veit and Co., 1913.) Price 8 marks.

PROF. VON LIPPMANN presents in this volume a second collection of the valuable historical studies which he has contributed to *Chemiker-Zeitung* and other periodicals. The articles are thirty-six in number, and, like those published in the former

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volume, range over the whole history of chemistry. They exhibit the author as a man of wonderfully wide learning and remarkable security of scholarship.

The studies are divided into eight sections upon a chronological basis. The first section contains an analysis, from the point of view of chemical knowledge, of the famous medical papyrus, of the sixteenth century B.C., discovered by Ebers at Luxor. A second article, on the term "caput mortuum" (=iron oxide), throws interesting light upon the mystical interpretations of chemical phenomena which originated, like the "black art" itself, in Egypt. The second section deals with Greek and Hellenistic chemistry. Here, as is fitting, Plato and Aristotle have the pride of place, the great achievements of Aristotle receiving particularly careful attention. A short note upon Archimedes's method of determining specific gravity leaves the "eureka" story unassailed in principle, but proves that the "crown" of Hiero was really a golden wreath. On the other hand, the author robs that early precursor of Mme. Curie, the alchemist Maria (possibly of the first century A.D.), of the credit of inventing the water-bath ("balneum Mariæ") and Papin of his "digester," showing that the former was known before Aristotle and the latter in the third century A.D. These two destructive articles illustrate very well Prof. von Lippmann's encyclopædic knowledge of the literature of his subject. Among the most interesting of the later articles are those on the chemical names used by Marco Polo, on J. J. Becher's observations anticipatory of Mendel and De Vries, on Jean Rey, on the word "gas," which van Helmont is declared to have adopted from the "chaos" of Paracelsus, and on E. C. Howard, the inventor of the vacuum apparatus for sugar-refining. But the author has touched no subject which he has not adorned.

Mineral and Aërated Waters. By C. Ainsworth Mitchell. Pp. xiii+227. (London: Constable and Co., Ltd., 1913.) Price 8s. 6d. net.

THE author takes us back to the beginnings of the mineral-water industry by interesting descriptions of natural mineral springs, spas, and holy wells; for it was from the first attempts to copy the actual or supposed healing virtues of such waters that the extensive manufacture of mineral waters began, developed, and expanded into the great industry of to-day. The analyses of the more famous natural waters are given in the first part of the volume, devoted to the history of the subject, and perhaps the most striking feature of this history is the changed aspect of current belief in the efficacy of such waters by the known presence of radio-active substances contained in some of them. The chemical constituents being accurately known, a natural water can be produced in the laboratory, but, as is frequently asserted, without the therapeutic action of the natural product. The author states, however, that "recently bottles of special construction, containing artificial radio-active mineral waters, have been put upon the market in Sweden."