of $(p-3)$ and $(p-4)$. Tables VI and VII give $(1-\alpha^2)^{\frac{1}{2}} G_s^{(i)}$ for $i=0-4$, $s=\frac{1}{2}, \frac{3}{2}$, with the argument α in the interval $0{\cdot}900-0{\cdot}950$. The remaining tables give certain special data. Schedules for harmonic analysis are appended with fully worked examples.

(3) These useful tables give, to four decimal places, circular and hyperbolic sines, cosines, tangents and cotangents of the complex argument $\frac{1}{2}\pi x+iy$, and the corresponding inverse functions. The unit of the real part of the angle being a right angle, the whole complex plane is covered by taking x from 0 to 1, y from 0 to 1 and then y^{-1} from 1 to 0, all at interval 0·02. A similar device is adopted for the inverse functions. Printed first differences are given both down and across the tables. Where linear interpolation is insufficient, exponential interpolation is used by means of an auxiliary table. The auxiliary tables, nomograms, and reliefs of the functions are in a separate removable part, which makes their use very convenient. L. M. M.-T.

Theory of Functions: as Applied to Engineering Problems. Edited by R. Rothe, F. Ollendorff and K. Pohlhausen. Authorized translation by Alfred Herzenberg. Pp. x+189. (Cambridge, Mass.: Technology Press; Mass. Institute of Technology, 1933.) 3.50 dollars.

THE well-known German book, "Funktionentheorie und ihre Anwendung in der Technik", published in 1931, is now available in an English translation. The first section, written by R. Rothe of Berlin, is devoted to a mathematical discussion of the functions required in the solution of many advanced engineering problems. It deals with the complex variable, line integrals and their relationship to potential theory, complex integration, power series and Laurent's series, residue theorems and singularities.

The second section is concerned with the applications, and each problem is dealt with by an expert. Electric and magnetic fields are discussed by W. Schottky, two-dimensional fields of flow by K. Pohlhausen, field distribution in the neighbourhood of edges by E. Weber, the complex treatment of electric and thermal transient phenomena by F. Ollendorff, and the spreading of electric waves along the earth by F. Noether.

The text is well written though essentially brief, and it is claimed that the book is the first authoritative work on its subject in English. It should certainly be of great value to all who are interested in the study of those new practical problems to which the advance of science continually gives rise.

Cours de mécanique rationnelle. Par Jean Chazy. (Cours de la Faculté des Sciences de Paris.) Tome 1: *Dynamique du point matériel.* Pp. v+392. (Paris: Gauthier-Villars et Cie, 1933.) 70 francs.

THE book before us is the first volume of a course in mechanics given by the author at the Faculty of Science at Paris. In accord with its sub-title, it deals with vectors, the fundamental principles of dynamics, general theorems, the motion of a particle—rectilinear, curvilinear and upon a surface—and finally, with motion relative to the earth.

In characteristic French style, there are no exercises for the reader, whilst the text is mainly devoted to a discussion of general theorems, very few particular cases being deduced. The simple pendulum, for example, is first worked out as an ellpitic integral, whilst the simple case of replacing $\sin\theta$ by θ is disposed of in a short note at the end. The whole course is nevertheless very useful and interesting, but the price is somewhat high for the average British student.

Miscellany

(1) *Goethe als Chemiker und Techniker.* Von Paul Walden. Pp. 87. (Berlin: Verlag Chemie G.m.b.H., 1932.) 2 gold marks.

(2) *Gothes naturwissenschaftliches Denken und Wirken: drei Aufsätze herausgegeben von der Schriftleitung der Zeitschrift "Die Naturwissenschaften".* Pp. iii+99. (Berlin: Julius Springer, 1932.) 3.60 gold marks.

GOETHE'S interest in natural science is an outstanding characteristic of his all-embracing genius. His writings often display a detailed knowledge of the processes of Nature; and his intuitions in many instances are almost prophetic. When he was twenty years of age, he made experiments with the "Liquor Silicium" (1769) which led him to the view that a great deal can be discovered about the nature of the elements by paying attention to the geometrical arrangement of their particles. In 1795 he wrote to Humboldt, "you enquire into the mysteries of nature through its elements, whereas I do by watching their configuration". Indeed, this is the fundamental principle of the colloidal theory which developed later with such remarkable results. Already in 1786, Goethe had noticed that the crystals of common salt take various forms—an indication, he wrote, that they are not pure. So great was his faith in natural configuration that he proclaimed, in the same year, that mineralogy without chemistry cannot progress one inch. His interest in the science of matter remained with him throughout his life. In 1819, he was much puzzled by the constitution of coffee; and when he made the acquaintance of young Runge, who was later to discover aniline, Goethe gave him some coffee beans suggesting that their analysis might interest him. One year later, in 1820, Runge communicated to Goethe his discovery of cafein.

A score of interesting details about Goethe's scientific views and the state of science during his lifetime, will be found in the two pamphlets under review. Thus we are told how Goethe came to study chemistry and its technique, and what are his most original views on the subject. A supplement of thirty pages in the second pamphlet gives a short analysis of his main achievements in the various branches of physical science. T. G.