Funzioni Analitiche. Chapter 1. Complex numbers, functions, Cauchy-Riemann equations, harmonic functions, conformal mapping, irrotational fluid motion. Chapter 2. Cauchy's integral theorem, residues, Cauchy's integral formula, Dirichlet's problem, mean value theorems. Chapter 3. Infinite series, the Taylor and Laurent expansions, poles and isolated essential singular points. Chapter 4. Analytic continuation, Riemann surfaces, the elementary transcendental functions, Mittag-Leffler's theorem, Weierstrass's theorem.

Funzioni Ellittiche. Chapter 1. Historical introduction, periodicity, the Weierstrass π, ζ, and σ functions. Chapter 2. Elliptic integrals. (This is a particularly good treatment of the subject.) Chapter 3. The sn, cn, and dn functions of Jacobi, Jacobi's theta functions. Chapter 4. The π functions related algebraically, transformations of elliptic functions, automorphic functions, Landen's transformation. Chapter 5. Applications: rectification of the ellipse and hyperbola, geodesics on an ellipsoid of revolution, loaded elastic columns, simple pendulum, a problem in conformal mapping arising in aerodynamics. Table of principal formulas.

G. E. RAYNOR

Random Variables and Probability Distributions. By Harald Cramer. (Cambridge Tracts in Mathematics and Mathematical Physics, no. 36.) London, Cambridge University Press; New York, Macmillan, 1937. 8+121 pp.

The two customary and time-honored approaches to the theory of probability start from the a priori definition of probability in terms of equally possible cases (Laplace) on the one hand, and from an empirical formulation of probability in terms of relative frequencies (von Mises) on the other. The former approach, while lending itself readily to a discussion of games of chance, fails inevitably to justify the application of the theory to physical science; the latter runs into analytical troubles in connection with the existence of certain limits essential to the theory. The present treatise, following chiefly the work of Kolmogoroff, avoids the difficulties of the two extreme attitudes by placing the meaning of probability on an axiomatic footing, regarding it merely as a given number, subject to certain limitations, associated with an event. The question as to the legitimacy of this association, which looms alarmingly in other treatments, is simply decided by a pragmatic appeal to its success. Thus the theory of probability becomes a branch of the theory of completely additive set functions.

The method of analysis used throughout the book is that of Fourier-Stieltjes transforms, which renders the work elegant and concise. The treatment is limited in so far as the author restricts himself to probability distributions in spaces of a finite number of dimensions, and foregoes practically all applications of interest to physical science. Clear and lucid in style and arrangement of material, Cramer's book is destined to prove of value not only for the mathematician who seeks a brief authoritative exposition of the fundamentals of probability theory, but also for the student of applied science who wishes to inform himself of the basic ideas of so useful a calculus.

HENRY MARGENAU

Structure of Atomic Nuclei and Nuclear Transformations. By G. Gamow. Oxford, Clarendon Press, 1937. 12+270 pp.

This book is a second edition of the book *Constitution of Atomic Nuclei and Radioactivity* which was reviewed in this Bulletin, vol. 39, p. 487 (1933). Unlike most second editions, the book is completely new, since the neutron was discovered after the writ-

ing of the previous edition. This discovery led to the theory according to which protons and neutrons are regarded as the bricks with which all atomic nuclei are built, and the present book, written by one of the leaders in his field, gives an authoritative and readable account of the theory of nuclear structure and of the experimental results in this field. The book is divided into three parts and the following chapter headings clearly indicate the topics treated. Part I: Stable nuclei. 1. Elementary particles and constituent parts of nuclei. 2. Nuclear binding energy and stability limits. 3. Spins and magnetic moments of nuclei. 4. Electromagnetic radiation of nuclei. Part II: Spontaneous nuclear transformations. 5. Spontaneous α-disintegration. 6. γ-ray emission following α-disintegration. 7. Spontaneous β-disintegration. 8. γ-ray emission following β-disintegration. Part III: Nuclear transformations by collisions. 9. Collisions without disintegration. 10. Nuclear reactions. 11. Nuclear reactions essentially involving radiation. 12. Relative abundance and origin of the elements.

F. D. MURNAGHAN

Lectures on the Mathematical Theory of Electricity. By F. B. Pidduck. Oxford, Clarendon Press, 1937. 8+110 pp.

This little book, which does not pretend to constitute either a complete or a balanced treatment of electromagnetism, is in the main a collection of very concise solutions of mathematical problems of experimental interest. As with many other British texts, most of the book is devoted to electrostatics and magnetostatics. In fact the law of electromagnetic induction does not appear until page 68, and the complete set of field equations are not stated until within twelve pages of the end of the book. The point of view is that of the generally discarded ether theory. Except for eight exercises for the student, the book contains no problems. References are mostly to Maxwell, A. G. Webster, and the author's *Treatise on Electricity*.

This book provides the student with a useful set of solutions of specific problems, but does not take him far into modern electromagnetic theory.

LEIGH PAGE

Differentialgeometrie. Vol. 1. *Raumkurven und Anfänge der Flächentheorie.* By R. Rothe. (Sammlung Göschen, no. 1113.) Berlin and Leipzig, de Gruyter, 1937. 132 pp.

This is intended to be the first volume of a set. The first hundred pages deal with space curves, and the last thirty with surfaces. The book closes with Meusnier's theorem and with some examples of applicability. The line element is introduced, but the second fundamental form and curvatures of surfaces are left to a second volume.

The book is written for students of the maturity of first year graduate students. Discussions and computations are given in enough detail, there are many applications to special cases and it is easy for the reader to see the geometrical meaning of the formulas. Vector notation is used from the start, but nothing more than a knowledge of scalar and vector products is assumed.

The book is not designed as an introduction to the study of quadratic differential forms or of tensor analysis, and everything is in three dimensions. Both the writer and the printer did their work with great care.

K. W. LAMSON

Projektive Liniengeometrie. By Robert Sauer. (Göschens Lehrbücherei, group 1, reine und angewandte Mathematik, vol. 23.) Berlin, de Gruyter, 1937. 194 pp.

This book was written with the specific purpose of interesting young mathema-