

therewith connected are carefully explained. There is a treatment of the elements of Fourier series, from the practical rather than theoretical point of view. Single phase and multiple phase systems are discussed. At the close there are a few words about skin effect. The work will appeal to engineers more exclusively than many of the other texts in the series.

E. B. WILSON.

NOTES.

THE opening (January) number of volume 35 of the *American Journal of Mathematics* contains the following papers: "Groups containing a given number of operators whose orders are powers of the same prime number," by G. A. MILLER; "Normal congruences determined by centers of geodesic curvature," by F. W. BEAL; "A theory of geometrical relations—continued," by A. R. SCHWEITZER; "The double tangents of a binodal quartic," by H. BATEMAN; "Involutorial transformations," by F. M. MORGAN; "A theorem for the development of a function as an infinite product," by A. F. CARPENTER.

The frontispiece of the volume is a portrait of CAMILLE JORDAN.

AT the January meeting of the London mathematical society the following papers were read: By J. C. FIELDS, "Proofs of certain general theorems relating to orders of coincidence"; by W. E. H. BERWICK, "The reduction of ideal numbers"; by A. E. H. LOVE, "Notes on the dynamical theory of tides"; by W. H. YOUNG, "Uniform oscillation of the first and second kind"; by H. BATEMAN, "Some definite integrals occurring in the harmonic analysis connected with a circular ring."

THE United States Bureau of Education has just published a Bibliography of The Teaching of Mathematics covering the period from 1900 to 1912, by DAVID EUGENE SMITH and CHARLES GOLDZIEHER. This Bulletin gives 1849 titles of books and articles on the teaching of mathematics that have appeared since 1900. The Bulletin will be sent gratis upon application to the United States Commissioner of Education, Washington, D. C.

THE university court of the University of Edinburgh has made a grant of funds for the establishment of a laboratory for practical training in mathematics and also as a research institution. This laboratory, which is believed to be the first of its kind in a British university, will be under the direction of Professor E. T. WHITTAKER.

THE commission for the Wolfskehl foundation announces the following series of lectures in the field of the kinetic theory of matter, to be delivered in Göttingen during the week beginning April 21: M. PLANCK, "Gegenwärtige Bedeutung der Quantenhypothese für die Gastheorie." P. DEBYE, "Die Zustandsgleichung auf Grund der Quantenhypothese." W. NERNST, "Kinetische Theorie der festen Körper." M. v. SMOLUCHOWSKI, "Gültigkeitsgrenzen des zweiten Hauptsatzes der Wärmetheorie." A. SOMMERFELD, "Probleme der freien Weglänge." H. A. LORENTZ, "Anwendung der kinetischen Methoden auf Elektronenbewegung."

THE *Enseignement Mathématique* offers for sale enlarged copies (25 x 32 cm.) of the portrait of HENRI POINCARÉ which appeared in the January issue of that journal. The price is 3 fr. 25. Orders should be addressed to the *Enseignement Mathématique*, Florissant 110, Geneva, Switzerland.

THE Paris academy of science has divided its grand prize in the mathematical sciences between PIERRE BOUTROUX, JEAN CHAZY, and RENÉ GARNIER. The Lalande prize in theoretical astronomy was awarded to H. KOBOLD and C. W. WIRTZ for their work on the determination of the motion of nebulæ, and HENRI LEBESGUE received one of the Houleevigue prizes.

IN addition to its annual prizes in special and general fields, the Paris academy of science announces the following subjects for certain of its prizes: The grand prize in the mathematical sciences will be awarded in 1914 for the solution of the problem: "To perfect the theory of functions of one variable which may be represented by trigonometric series whose arguments are linear functions of the variable." Important applications in mathematical physics and celestial mechanics are desired. The Boileau prize for 1915 will be awarded for "researches on the theory of the motion of fluids, judged to contribute to progress in hydraulics."

A new annual prize of 2500 fr., to be known as the "Henri de Parville prize" will be awarded for the first time this year, for "the most worthy scientific work which has appeared: either a book on original science or scientific popularization."

THE University of St. Andrews has conferred its honorary doctorate on Professor G. CANTOR, of the University of Halle.

THE University of Oxford has conferred its honorary doctorate in science on Professor E. W. HOBSON, of the University of Cambridge.

DR. A. D. ROSS, of the University of Glasgow, has been appointed to the chair of mathematics and physics in the University of West Australia.

PROFESSOR P. STAECKEL, of Karlsruhe, has accepted a professorship in mathematics at the University of Heidelberg.

PROFESSOR R. FUETER, of Basle, has been appointed to succeed Professor Staeckel at Karlsruhe.

PROFESSOR H. REISSNER, of Aachen, has been appointed professor of mechanics and graphical statics in the technical school in Berlin.

PROFESSOR FRIEDRICH ENGEL, of the University of Greifswald, has accepted a call to the University of Kiel.

PROFESSOR J. HORN, of Darmstadt, has been appointed professor of mathematics at the University of Giessen, as successor of Professor E. NETTO, who has retired from active service.

PROFESSOR R. ROTHE, of Clausthal, has been appointed professor of advanced and applied mathematics in the technical school in Hannover.

At the University of Göttingen, Dr. O. TOEPLITZ has been promoted to an associate professorship in mathematics.

PROFESSOR F. ENRIQUES, of the University of Bologna, has been elected member of the Italian society of science (the XL) and Professor E. PICARD, of the University of Paris, has been chosen foreign associate of the same society.

PROFESSOR D. HILBERT, of the University of Göttingen, has been elected an associate member of the royal academy of Belgium.

By special invitation Dr. A. R. FORSYTH is delivering a course of sixteen lectures on the theory of functions of two or more complex variables at the University of Calcutta. It has been announced that the lectures will be published in book form later.

PROFESSOR OSKAR BOLZA, of the University of Freiburg, will give courses of lectures on the theory of functions and on linear integral equations at the University of Chicago throughout the coming summer quarter.

MR. W. C. GRAUSTEIN, now studying at Bonn as Sheldon fellow of Harvard University, has been appointed instructor in mathematics at Harvard for the academic year 1913-1914.

PROFESSOR J. H. TANNER, of Cornell University, has been granted leave of absence for the entire academic year 1913-1914.

PROFESSOR P. GORDAN, of the University of Erlangen, died December 21, 1912, at the age of 76 years. He had been professor of mathematics in the University of Erlangen since 1875 and an associate editor of the *Mathematische Annalen* since 1873.

PROFESSOR G. LAURICELLA, of the University of Catania, died on January 9, at the age of 45 years. He was a member of the Accademia dei Lincei, and was well known for his researches on the integration of the equations of mathematical physics and on integral equations.

PROFESSOR H. KINKELIN, formerly professor of mathematics in the University of Basel, died on January 2, at the age of 80 years.

NEW PUBLICATIONS.

I. HIGHER MATHEMATICS.

- BALL (W. W. R.). A short account of the history of mathematics. 5th edition. New York, Macmillan, 1912. 12mo. 24 + 536 pp. \$3.25
- CIANI (E.). Lezioni di geometria proiettiva ed analitica. Pisa, Spoerri, 1912. 8vo. 525 pp. L. 20.00
- DINGLER (H.). Ueber wohlgeordnete Mengen und zerstreute Mengen im allgemeinen. (Habilitationsschrift.) München, Ackermann, 1912. 8vo. 46 pp. M. 1.20
- ERNST (E.). Mathematische Unterhaltungen und Spielereien. 2ter Band. Ravensburg, Maier, 1912. 8vo. 84 pp. M. 1.00