

and is naturally the most mathematical and difficult of the whole book. It should be stated, however, that the author nowhere shuns the use of that small amount of mathematics which is really essential to the proper development of his subject.

From this brief summary, it may be gathered that the range of topics which is treated is not large but that the treatment given is thorough, highly competent, open minded, and impartial. In short the book is just what it claims to be—a monograph in which the most important if not all of our knowledge, whether theoretical or experimental, on the equation of state is collected and carefully edited. For those who are interested in this subject the book appears to be well nigh indispensable, and for those who are not yet interested it would offer a pleasant day's reading in one of the most entertaining fields of modern physics. It would not do to close this review without mentioning the extensive bibliographical lists which follow many of the chapters. These will save the student from many unhappy hours spent in trying to find the important literature of the subject.

E. B. WILSON.

NOTES.

THE Fifteenth Summer Meeting of the AMERICAN MATHEMATICAL SOCIETY will be held at the University of Illinois, on Thursday and Friday, September 10–11, 1908.

THE following additional associate editors of the *Transactions* of the AMERICAN MATHEMATICAL SOCIETY have been appointed: Professor G. A. BLISS, of Princeton University; Professor F. R. MOULTON, of the University of Chicago; Professor E. J. WILCZYNSKI, of the University of Illinois.

AT the meeting of the London mathematical society held on February 13, the following papers were read: By H. A. DE S. PITTARD, "Proof that every algebraic equation has a root"; by W. H. YOUNG, "On the uniform approach of a continuous function to its limit"; by F. H. JACKSON, "Note on q -differences"; by A. E. WESTEN, "An extension of Eisenstein's law

of reciprocity (second paper)"; by E. CUNNINGHAM, "Conformal representation and the transformation of Laplace's equation."

A REGULAR meeting of the Syracuse section of the association of teachers of mathematics in the middle states and Maryland was held at the Syracuse high school, February 22. After a word of greeting by Principal HARPER, the following papers were read: By W. G. RAPPEYE, "The teaching of elementary mathematics from a rational standpoint"; by G. R. STALEY, "The purpose of problems in plane geometry." The following officers were elected for the current year: President, W. G. RAPPEYE; secretary and treasurer, D. PRATT. The time and place of the next meeting have not yet been definitely fixed. Sixty-nine names were added to the list of members.

THE subject of Professor POINCARÉ's conference at the Rome congress has been announced as "Les mathématiques de l'avenir." On account of his health, Professor KLEIN has decided not to attend the congress. His address "Ueber die mathematische Encyklopädie," will be delivered by Professor v. DYCK.

THE following Americans expect to attend the Rome Congress: E. W. Davis, T. S. Fiske, A. B. Frizell, J. G. Hardy, C. L. E. Moore, E. H. Moore, C. A. Noble, G. D. Olds, D. E. Smith, J. M. Van Vleck, and W. D. A. Westfall.

THE committee on methods of instruction which was proposed at the Dresden meeting of the Mathematiker-Vereinigung to investigate and rearrange the courses of study in the German secondary schools has now been organized and a definite plan of procedure adopted. The committee, which consists of one or two representatives of nearly every scientific society of Germany, will consider the whole field of instruction in mathematics and the natural sciences.

THE next meeting of the British association for the advancement of science will be held at Dublin, September 2-9, under the presidency of Mr. FRANCIS DARWIN. Dr. W. N. SHAW is chairman of section A, mathematics and physics.

THE academy of sciences of Vienna has advanced M. 1000 to assist in the publication of the writings of the late Professor L. BOLTZMANN.

IN order to obtain as complete an edition of the mathematical works of PAOLO RUFFINI as possible, a general request is expressed that any letters, documents, and notices of every kind, that relate to his life, be forwarded to Professor B. G. Guccia in Palermo.

ON the occasion of the dedication of the new buildings of the physical society of Frankfurt it was announced that the heirs of the late EUGEN TORNOW had presented to the academy (Akademie für Sozial- und Handelswissenschaften) the sum of 470,000 marks, to be used for advancing instruction in mathematics and the natural sciences.

THE publishing house of B. G. Teubner in Leipzig announces that the second edition of the German translation of Pascal's *Repertorium der höheren Mathematik* is in the press. The first volume, which will soon appear, has been fundamentally revised with the assistance of the author and various other mathematicians under the general editorship of Dr. P. EPSTEIN, of the University of Strassburg.

DURING the year 1907 the following candidates received the degree of doctor of science with mathematics as the major subject at the University of Paris: M. FATON, "Séries trigonométriques et série de Taylor"; M. TRAYNARD, "Sur les fonctions thêta de deux variables et les surfaces hyperelliptiques"; M. MONTEL, "Sur les suites infinies de fonctions"; M. LAMBERT, "Sur les coefficients du développement de la fonction perturbatrice."

THE following advanced courses in mathematics are announced for the academic year 1908-1909:

COLUMBIA UNIVERSITY. — By Professor T. S. FISKE: Advanced calculus; introduction to the theory of functions of a real variable, three hours; Functions defined by linear differential equations, three hours. — By Professor F. N. COLE: Introduction to the theory of functions, three hours; Theory of plane curves, three hours. — By Professor James MACLAY: Elliptic functions, three hours; Application of the calculus to the theory of surfaces and curves in space, three hours. — By Professor D. E. SMITH: History of mathematics, two hours. — By Professor C. J. KEYSER: The principles of mathematics, three hours; Modern theories in geometry, three

hours. — By Professor H. B. MITCHELL: Differential equations, two hours; Geometrical analysis, three hours. — By Professor Edward KASNER: Geometry of dynamical systems, two hours. — By Dr. G. H. LING: Theory of numbers, three hours, first half year; Advanced theory of numbers, three hours, second half year.

HARVARD UNIVERSITY. — By Professor W. E. BYERLY: Introduction to modern geometry and modern algebra, three hours; Trigonometric series (with Professor Peirce), three hours. — By Professor B. O. PEIRCE: Methods in mathematical physics, Elasticity, two hours. — By Professor W. F. OSGOOD: Differential and integral calculus (second course), three hours; Infinite series and products (first half year), three hours; Galois's theory of equations (second half year), three hours; Theory of functions (advanced course). — By Professor M. BÔCHER: Theory of functions (introductory course) three hours; The linear differential equations of physics, three hours. — By Professor C. L. BOUTON: Hydromechanics (second half year), three hours; Differential equations, Lie's theory of continuous groups, three hours. — By Professor J. K. WHITTEMORE: Elements of mechanics, three hours; Differential geometry of curves and surfaces (first half year), three hours. — By Professor E. V. HUNTINGTON: The fundamental concepts of mathematics, three hours. — By Dr. J. L. COOLIDGE: Line geometry (first half year) three hours. — By Dr. H. N. DAVIS: Dynamics of a rigid body, three hours.

Courses of reading and research are offered by Professors BYERLY, OSGOOD, BÔCHER, BOUTON, and WHITTEMORE; and a seminary in geometry will be conducted by Professor BOUTON, Professor WHITTEMORE, and Dr. COOLIDGE during the second half year.

PRINCETON UNIVERSITY. — All courses are three hours a week. The Roman numerals refer to the first (I) and second (II) term. — By Professor H. B. FINE: Theory of algebraic functions, I. — By Professor H. D. THOMPSON: Historical readings in infinitesimal geometry, I. — By Professor J. H. JEANS: Electricity and magnetism, I, II; Molecular dynamics and the kinetic theory, I, II. — By Professor G. A. BLISS: Linear differential equations, I; Partial differential equations, II. — By Professor L. P. EISENHART: Differential geometry, I, II. — By Professor W. GILLESPIE: Theory of substitutions,

I; Theory of invariants, II. — By Professor O. VEBLEN: Projective geometry, I, II. — By Professor J. W. YOUNG: Theory of functions of a complex variable, I, II; Theory of numbers, I. — By Professor BLISS or VEBLEN: Theory of functions of a real variable, I, II. — By Dr. J. G. HUN: Analytic projective geometry, I, II. — By Dr. C. R. MAC-INNES: Elliptic functions, II. — By Dr. R. L. MOORE: Foundations of geometry, II. — By Dr. C. E. STROMQUIST: Calculus of variations, II. — By Dr. E. SWIFT: Theory of capillarity, II.

THE following courses are announced for the summer semester of 1908:

UNIVERSITY OF MUNICH. — By Professor F. LINDEMANN: Integral calculus, five hours; Conformal representation and linear differential equations, four hours; Foundations of geometry, two hours; Seminar, one and one half hours. — By Professor H. v. SEELINGER: Theory of probabilities and method of least squares, two hours. — By Professor A. VOSS: Analytic geometry of space, four hours; Analytic mechanics, II, four hours; Seminar, two hours. — By Professor A. PRINGSHEIM: Selected chapters in the theory of analytic functions, four hours; Elementary theory of ordinary differential equations, three hours. — By Professor K. DOEHLEMANN: Descriptive geometry, II, with exercises, five hours; Synthetic geometry, II, four hours; Imaginary elements of geometry, one hour. — By Professor H. BRUNN: Elements of higher mathematics, four hours. — By Dr. F. HARTOGS: Theory of finite groups and algebraic equations, four hours. — By Dr. O. PERRON: Solid geometry and spherical trigonometry, two hours; Calculus of variations, two hours.

UNIVERSITY OF STRASSBURG. — By Professor Th. REYE: Geometry of position, four hours; Seminar, two hours. — By Professor H. WEBER: Definite integrals and introduction to the theory of functions, four hours; Encyclopedia of elementary mathematics, two hours; Seminar, two hours. — By Professor J. WELLSTEIN: Introduction to the theory of invariants, four hours; Ultraelliptic functions, two hours; Seminar, two hours. — By Professor H. E. TIMERDING: Analytic geometry of space, four hours; with exercises, one hour; Mechanics, four hours. — By Dr. P. EPSTEIN: Introduction to the theory of

numbers, two hours. — By Professor M. SIMON : History of mathematics in ancient times, two hours.

MR. W. W. WALLACE has been appointed professor of mechanics at the University of Liverpool.

MR. D. K. PICKEN, of the University of Glasgow, has been appointed professor of mathematics at Victoria College, Wellington, New Zealand.

DR. R. FUETER, of the University of Marburg, has been appointed associate professor of mathematics at the University of Basel.

DR. E. MEYER has been appointed docent in projective and descriptive geometry at the technical school of Charlottenburg.

DR. F. DALWIGK, of the University of Marburg, has been promoted to an associate professorship of mathematics.

AT Columbia University Professor H. B. MITCHELL has been advanced to a full professorship of mathematics.

AT the University of Chicago, Professors J. W. A. YOUNG and H. E. SLAUGHT have been promoted to associate professorships of mathematics ; Professors K. LAVES and F. R. MOULTON have been promoted to associate professorships in astronomy.

MR. W. P. RUSSELL, of Pomona College, Claremont, Calif., has been promoted to an assistant professorship of mathematics.

DR. ROXANNA VIVIAN, of Wellesley College, who has been during the past two years professor of mathematics at the American College for Girls in Constantinople, has been promoted to an associate professorship of mathematics at Wellesley and will resume her work there next fall.

PROFESSOR HEINRICH MASCHKE, of the University of Chicago, died March 1, 1908, at the age of 55 years. He was born in Breslau, Germany, graduated from the University of Göttingen, and had been associated with the University of Chicago since 1892, having been made full professor of mathematics in 1907. He contributed extensively to the theory of linear groups and differential invariants. He had been a member of the AMERICAN MATHEMATICAL SOCIETY since 1893, and was a vice-president of the Society in 1907.

THE following catalogues of second-hand mathematical books have recently appeared: K. F. Koehler's Antiquarium, Leipzig, Kurprinzstrasse 6, catalogue No. 572, 2586 titles in pure and applied mathematics; catalogue No. 573, 546 titles of astronomical, mathematical and physical periodicals. — Buchhandlung Gustav Fock, Leipzig, Schlossgasse 7, catalogue No. 325, 2275 titles in mathematics, physics and astronomy. — W. Heffer and Sons, Cambridge, England, catalogue No. 35, 2825 titles in mathematics and physical sciences. — James Thin, Edinburgh, 54–55 South Bridge, catalogue No. 158, about 1000 titles in mathematics, astronomy, and physical science.

NEW PUBLICATIONS.

I. HIGHER MATHEMATICS.

- BERTRAND (G.). Sur une fonction déduite de la fonction O de M. Appell. Les rapports avec la fonction σ . (Thèse.) Paris, 1908. 8vo. 36 pp.
- CRATHORNE (A. R.). Das räumliche isoperimetrische Problem. (Diss.) Göttingen, 1907. 8vo. 59 pp.
- CUTRONI (F.). Alcuni teoremi di geometria negli spazii a n dimensioni. Nota I (Parallelismo e perpendicolarità). Messina, d'Angelo, 1908. 8vo. 10 pp.
- DANTSCHER (V. VON). Vorlesungen über die Weierstrasssche Theorie der irrationalen Zahlen. Leipzig, Teubner, 1908. 8vo. 6 + 80 pp. Cloth. M. 3.40
- ENCYCLOPÉDIE des sciences mathématiques pures et appliquées. Edition française publiée sous la direction de J. Molk. Tome I; deuxième volume; premier fascicule: Les fonctions rationnelles; exposé, d'après l'article allemand de E. Netto, par R. Le Vasseur. Paris, Gauthier-Villars, 1908. 8vo. 232 pp.
- GURSKI (V.). Ueber den Zusammenhang zwischen den partikulären Lösungen der einzelnen Gebiete bei der hypergeometrischen Differentialgleichung dritter Ordnung mit zwei endlichen singulären Punkten. Berlin, Trencel, 1907. 8vo. 60 pp. M. 2.00
- HANSEN (O.). Ueber die äquiforme Geometrie im Bündel. (Diss.) Kiel, 1907. 8vo. 49 pp.
- HEIBERG (J. L.) und ZEUTHEN (G. H.). Eine neue Schrift des Archimedes. Leipzig, Teubner, 1907. 8vo. 2 + 43 pp. M. 1.60
- HELLINGER (E.). Die Orthogonalinvarianten quadratischer Formen von unendlichvielen Variablen. (Diss.) Göttingen, 1907.
- HELLWIG (M.). Untersuchung über die Lage der Inzidenzpunkte bei Reflexion und Refraktion an Ebene, Kugel und Kreiszyylinder für zwei feste Punkte im Raum (Licht- und Augenpunkt). (Diss.) Rostock, 1906. 8vo. 30 pp.