The reviewer feels that the volume under review is a valuable addition to the as yet rather restricted list of advanced mathematical treatises of high grade published in America.

R. L. MOORE.

NOTES.

AT a special meeting on April 23, 1920, the Council of the American Mathematical Society approved the formation of an American section of the international mathematical union and authorized its committee on the union to take the necessary steps to organize the section. The Council also adopted a resolution that the publication of a journal of mathematical abstracts is very desirable, and authorized its committee on bibliography to take steps toward securing the financial support necessary for such a journal. It was agreed that the representatives of the Society in the division of physical sciences of the National research council should present these projects before the division. Accordingly, at its meetings on April 28–29, 1920, the division adopted resolutions recommending to the National research council that the American section of mathematics organized under the auspices of the division be made the authorized agent of the council in the organization of the proposed international mathematical union, and its representative in that body when organized.

At the same meetings the Mathematical association of America was given the right to nominate one member of the division. The number of members at large was increased by one and Professor G. D. BIRKHOFF was elected as the additional member. Professor OSWALD VEBLEN was elected a member of the executive committee of the division.

The project for the publication of a journal of mathematical abstracts was approved and a committee consisting of Professors L. E. DICKSON, OSWALD VEBLEN, and H. S. WHITE was appointed to work out details and consult with the finance committee of the council as to securing the necessary funds.

A committee was also appointed to secure a revolving fund for the publication of important scientific books and papers commercially unattractive to regular publishing houses. Provision was made for the appointment of research committees

on algebraic numbers and statistics. The division approved a plan for establishing research fellowships in mathematics, to be administered by the division.

THE April number (volume 21, number 2) of the *Transactions of the American Mathematical Society* contains the following papers: "Differential equations containing arbitrary functions," by G. A. BLISS; "Functions of lines in ballistics," by G. A. BLISS; "On the summability of the developments in Bessel's functions," by C. N. MOORE; "One-parameter families and nets of ruled surfaces and a new theory of congruences," by E. J. WILCZYNSKI; "Nets of space curves," by G. M. GREEN; "A set of postulates for fields," by N. WIENER; "A theorem on modular covariants," by O. C. HAZLETT.

THE March number (volume 21, number 3) of the *Annals of Mathematics* contains: "A Green's theorem in terms of Lebesgue integrals," by H. E. BRAY; "Bilinear operations generating all operations in a rational domain Ω," by NORBERT WIENER; "On the enumeration of proper and improper representations in homogeneous forms," by E. T. BELL; "A proof of Jordan's theorem about a simple closed curve," by J. W. ALEXANDER; "Linear order in three dimensional euclidean and double elliptic spaces," by G. H. HALLETT, JR.; "Further properties of the general integral," by P. J. DANIELL; "Summability of double series," by L. L. SMAIL; "The fundamental theorem of celestial mechanics," by J. L. COOLIDGE,

AT the meeting of the National Academy of Sciences held at Washington, April 27, the following mathematical papers were read: By Professor L. E. DICKSON, "Recent notable progress in the theory of numbers"; by Professor EDWARD KASNER, "Geodesics and relativity." Professor H. F. BLICHFELDT, of Stanford University, has been elected a member of the academy, and Professor CAMILLE JORDAN, of the Collège de France, a foreign associate.

THE following university courses in mathematics are announced:

COLUMBIA UNIVERSITY. The list of courses announced for

the academic year 1920–1921 in the May BULLETIN should, have included the following:—By Professor C. J. KEYSER: Philosophy of mathematics, four hours.

CORNELL UNIVERSITY (academic year 1920–1921).—By Professor J. H. TANNER: Mathematics of finance, two hours.— By Professor VIRGIL SNYDER: Algebraic geometry, three hours; Symposium of mathematics, two hours.—By Professor F. R. SHARPE: Fourier series and the potential theory, three hours (first term).—By Professor W. B. CARVER: Metric geometry, three hours.—By Professor ARTHUR RANUM: Theory of numbers, three hours (second term).—By Professor D. C. GILLESPIE: Differential equations, three hours.—By Professor W. A. HURWITZ: Differential equations of mathematical physics, three hours.—By Professor C. F. CRAIG: Theory of functions of a complex variable, three hours. —By Professor F. W. OWENS: Advanced calculus, three hours.—By Dr. F. W. REED: Celestial mechanics, three hours.—By Dr. H. B. OWENS: Projective geometry, three hours.—By Dr. G. M. ROBISON: Infinite series, three hours.—By Mr. H. S. VANDIVER: Modern algebra and theory of equations, three hours.—By Dr. H. C. M. MORSE: Differential geometry, three hours.

HARVARD UNIVERSITY (academic year 1920–1921).—All courses meet three times a week throughout the year, except those marked *, which meet for half a year.—By Professor W. F. OSGOOD: Dynamics (second course); The theory of functions (second course, part I): functions on an algebraic configuration*.—By Professor C. L. BOUTON: Introduction to modern geometry and algebra; Geometrical transformations, with special reference to the work of Sophus Lie.—By Professor C. L. COOLIDGE: Probability*; Properties of polynomials and invariants*; Line geometry.—By Professor E. V. HUNTINGTON: The fundamental concepts of mathematics*.—By Professor O. D. KELLOGG: Introduction to the theory of potential functions and Laplace's equation*.—By Professor D. R. CURTISS (of Northwestern University): The analytical theory of heat and problems in elastic vibrations*; The theory of functions (second course, part II): functions defined by linear differential equations of the second order*.—By Professor G. D. BIRKHOFF: Differential and integral calculus

(advanced course); Developments in series*; Difference equations*.—By Professor W. C. GRAUSTEIN: The theory of functions (introductory course); Differential geometry of curves and surfaces.

Professors KELLOGG and BIRKHOFF will conduct a fortnightly seminar in analysis. Courses of research are also offered by Professor OSGOOD in the theory of functions, by Professor BOUTON in the theory of point transformations, by Professor COOLIDGE in geometry, by Professor KELLOGG in the theory of potential functions, by Professor BIRKHOFF in the theory of differential equations, and by Professor GRAUSTEIN in geometry.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY (summer session).—By Professor F. S. WOODS: Analytic geometry.—By Mr. L. H. RICE: Elements of differential equations.—By Professors C. L. E. MOORE, H. B. PHILLIPS, F. L. HITCHCOCK, and DOUGLASS; Theoretical mechanics (introductory course).

UNIVERSITY OF CALIFORNIA (academic year 1920–1921).—By Professor M. W. HASKELL: Higher plane curves, three hours.—By Professor D. N. LEHMER: Geometry of four dimensions, three hours (first term).—By Professor FLORIAN CAJORI: History of mathematics, two hours; Teachers' course, three hours (first term).—Bv Professor T. M. PUTNAM: Partial differential equations, three hours (first term); Special analytic functions, three hours (second term).—By Professor W. D. McDONALD: Functions of a complex variable, three hours.—By Professor B. A. BERNSTEIN: Logic of mathematics, two hours.—By Professor FRANK IRWIN: Introduction to higher algebra, three hours.—By Dr. PAULINE SPERRY: Differential geometry, three hours (second term).

UNIVERSITY OF WISCONSIN (summer session).—By Professor E. P. LANE: Differential equations, five hours; Modern analytic geometry, three hours.—By Professor H. W. MARCH: Mechanics, five hours; Differential equations of mathematical physics, five hours.—By Professor E. B. SKINNER: Differential geometry, five hours; Special topics in algebra, three hours.—By Professor ARNOLD DRESDEN: Elliptic integrals, five hours; Theory of point sets, five hours.

UNIVERSITY OF STRASBOURG.—The reorganized University of Strasbourg announces that it is now in a position to offer a complete course of research for the doctorate in mathematics and mathematical physics, as well as the usual introductory courses in analysis, mechanics and astronomy. The following research courses will be given during the academic year 1920–1921: First semester (November 1, 1920–February 28, 1921).—By Professor BAUER: Quanta theory and the structure of atoms, three hours.—By Professor FRÉCHET: Theory of chance, two hours; Integral equations, one hour. Second semester (March 1, 1921–June 30, 1921).—By Professor BAUER: Statistical applications of quanta theory, three hours. —By Professor FRÉCHET: Applications of the theory of chance, one hour; Functions of lines, two hours.—By Professor VILLAT: The motion of a solid in a viscous fluid, two hours.—By Professor PÉRÈS: Transformations of surfaces applicable to quadrics, two hours.—By Professor VALIRON: Dirichlet's series and factorial series, two hours.

Further information with regard to mathematics courses may be obtained from M. le Directeur de l'Institut de Mathématiques de l'Université, Strasbourg, Bas-Rhin, France, and details concerning lodgings, etc., and courses in the French language for foreign students given during the summer of 1920 by the Faculty of letters, from the Comité de Patronage des Etudiants étrangers, Université, Strasbourg.

PROFESSOR PAUL APPELL, honorary dean of the faculty of sciences of the University of Paris, has been made rector of the Paris academy, as successor to the late LUCIEN POINCARÉ.

SIR THOMAS MUIR has recently presented his collection of about 2,500 mathematical books and pamphlets to the South African Public Library at Capetown. It consists largely of sets of periodicals, some of them now very rare, and of a special library on the theory of determinants and allied subjects that is probably the most complete in existence.

PROFESSOR D. R. CURTISS, of Northwestern University, has been granted leave of absence to accept the position of lecturer in mathematics at Harvard University during the coming academic half-year.

PROFESSOR L. E. DICKSON, of the University of Chicago, has been elected a member of the American Philosophical Society.

ASSISTANT professor S. LEFSCHETZ, of the University of Kansas, has been promoted to an associate professorship of mathematics.

AT the University of Oklahoma, associate professor E. P. R. DUVAL has resigned, and Mr. E. E. COWAN has been appointed instructor in mathematics.

AT Adelbert College, Western Reserve University, Dr. W. G. SIMON has been promoted to an assistant professorship of mathematics. Dr. C. A. NELSON, of the University of Kansas, has been appointed instructor in mathematics.

ASSISTANT professor J. V. MCKELVEY, of Iowa State College, has been promoted to an associate professorship of mathematics.

DR. I. A. BARNETT, Benjamin Peirce instructor at Harvard University during the academic year 1919–1920, and Mr. H. R. BRAHANA, of Princeton University, have been appointed instructors in mathematics at the University of Illinois.

DR. C. N. REYNOLDS, of Wesleyan University, has been appointed instructor in mathematics at Dartmouth College.

NEW PUBLICATIONS.

I. HIGHER MATHEMATICS.

CASTELNUOVO (G.). Lezioni di geometria analitica. Puntata 1. 4a edizione. Milano-Roma-Napoli, soc. ed. Dante Alighieri, di Albrighi, Segati e C. (Città di Castello, S. Lapi), 1919. 8vo. 8 + 320 pp.
L. 30.00

FOWLER (R. H.). The elementary differential geometry of plane curves. (Cambridge Mathematical Tracts, No. 20.) Cambridge, University Press, 1920. Demy 8vo. 7 + 105 pp.   6s.

GANGULI (S.). Lectures on the theory of plane curves delivered to post-graduate students in the University of Calcutta. Parts 1 and 2. Calcutta, University of Calcutta, 1919. 10 + 140 + 14 + 212 pp. + 16 plates.