

a great success, the receipts for 1906 alone being over forty million dollars. The attitude of the authors throughout is that of practical as well as scientific actuaries.

E. B. WILSON.

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NOTES.

PROFESSOR KLEIN'S Evanston Colloquium Lectures on Mathematics, which have for some years been out of print, have been republished by the AMERICAN MATHEMATICAL SOCIETY and are now on sale at the nominal price of seventy-five cents per copy, postage free. The new edition is printed from the original plates, with correction of a few misprints. A brief preface by Professor W. F. OSGOOD has been added. The volumes are bound like the original. Orders should be addressed to the American Mathematical Society, 501 West 116th Street, New York, N. Y.

THE April number (volume 12, number 2) of the *Transactions of the American Mathematical Society* contains the following papers: "Biorthogonal systems of functions," by ANNA J. PELL; "Applications of biorthogonal systems of functions to the theory of integral equations," by ANNA J. PELL; "On the uniform convergence of the developments in Bessel functions," by C. N. MOORE; "Determination of the ordinary and modular linear groups," by H. H. MITCHELL; "General theory of linear difference equations," by G. D. BIRKHOFF.

THE April number (volume 33, number 2) of the *American Journal of Mathematics* contains: "On three-spreads satisfying four or more homogeneous linear partial differential equations of the second order," by C. H. SISAM; "Some properties of lines in space of four dimensions and their interpretation in the geometry of the circle in space of three dimensions," by C. L. MOORE; "On the geometry of line elements in the plane with reference to osculating circles," by G. F. GUNDELFINGER; "Binary modular groups and their invariants," by L. E. DICKSON; "The group of turns and slides and the geometry of turbines," by EDWARD KASNER.

AFTER the completion of the present volume, the *Annals of Mathematics* will be published under the auspices of Princeton University instead of Harvard University as heretofore. The

editorial staff will consist of Professors ORMOND STONE, of the University of Virginia, MAXIME BÔCHER, of Harvard University, and G. D. BIRKHOFF, L. P. EISENHART, E. SWIFT, OSWALD VEULEN, and J. H. MACLAGAN-WEDDERBURN, of Princeton University. Correspondence concerning the new volume should be addressed to the *Annals of Mathematics*, Princeton University, Princeton, N. J.

AT the meeting of the London mathematical society held on March 9 the following papers were read: By G. B. MATHEWS, "On the reduction and classification of binary cubic forms which have a negative determinant"; by A. E. H. LOVE, "The theory of the transmission of earthquake waves"; by P. A. MACMAHON, "The theory of partitions."

THE next annual meeting of the Deutsche Mathematiker-Vereinigung will be held at Carlsruhe in affiliation with the eighty-third convention of the society of German naturalists and physicians during the week beginning September 24. Titles and abstracts of papers to be presented should be sent to the secretary, Professor A. Krazer, Westendstrasse 57, Carlsruhe, before May 15.

THE arrangements for the next International congress of mathematicians, to be held at Cambridge, England in August, 1912, are well under way and it is expected that the details will be announced shortly.

THE eminent mathematician, Professor GASTON DARBOUX, of the University of Paris, is about to complete his fiftieth year of service as a teacher in the system of public instruction of France. For more than twenty-five years he has been a member of the Academy of Sciences and for the past ten years he has been its permanent Secretary. It is proposed by a large international group of his mathematical co-workers, friends, and former pupils to commemorate this anniversary by presenting to Professor Darboux a gold medal bearing his portrait, and an appropriate address signed by the participants. All mathematicians are invited to share in rendering this honor to Professor Darboux. Copies of the medal, in reduced size, will be struck. Subscribers of twenty-five francs will receive a copy in bronze, subscribers of fifty francs a copy in silver. Subscriptions should be sent to Professor Cl. Guichard, secretary of the Faculté des Sciences.

THE rector and faculties of the University of Naples propose that a commemorative tablet to the late Professor ALFREDO CAPELLI be placed in the Sala Battaglini. Those who wish to participate in the movement are invited to send their contributions to the director of the mathematical seminar, Professor Ernesto Pascal, Viale Elena 24, Naples.

THE subject of the Adams prize for 1914 will be "The theory of radiation."

THE royal academy of sciences of Belgium announces the following prize problem for 1912: "To systematize and complete the investigations made in the calculus of variations since 1850." Competing memoirs should be written in French or Flemish and sent to the permanent secretary of the academy before August 1, 1912.

THE following courses in mathematics are announced for the year 1911-1912:

CORNELL UNIVERSITY.—By Professor J. McMAHON: Mathematical physics, three hours.—By Professor J. H. TANNER: Teachers' course, three hours.—By Professor J. I. HUTCHINSON: Elliptic functions, three hours.—By Professor V. SNYDER: Projective geometry, three hours.—By Professor F. R. SHARPE: Mechanics, three hours.—By Professor W. B. CARVER: Theory of numbers, three hours (first term); Conjugate coordinates, three hours (second term).—By Dr. D. C. GILLESPIE: Theory of functions of a real variable, three hours.—By Dr. C. F. CRAIG: Algebraic curves, three hours.—By Dr. F. W. OWENS: Differential equations, two hours.—By Dr. J. V. McKELVEY: Analytic geometry, three hours.—By Dr. L. L. SILVERMAN: Infinite series, three hours (first term); Algebra, three hours (second term).—By Dr. W. A. HURWITZ: Differential equations of mathematical physics, three hours.—By Dr. E. J. MILES: Advanced calculus, three hours.

PRINCETON UNIVERSITY.—By Professor H. B. FINE: Theory of elimination, three hours (first term).—By Professor H. D. THOMPSON: Infinitesimal geometry, three hours; Coordinate geometry, three hours.—By Professor L. P. EISENHART: Mechanics, three hours; Partial differential equations, three hours (first term); Vector analysis, three hours (second term).—By Professor O. VEULEN: Projective geometry, three hours;

Theory of functions of real variables, three hours.—By Professor G. D. BIRKHOFF: Analysis, three hours; Linear differential equations, three hours.—By Professor W. GILLESPIE: Theory of substitutions, three hours (first term).—By Professor J. G. HUN: Analytic projective geometry, three hours (second term).—By Professor E. SWIFT: Differential equations, three hours; Calculus of variations, three hours (second term).—By Professor J. H. McL. WEDDERBURN: Theory of functions of a complex variable, three hours.

THE following courses in the German universities will be given during the present summer semester:

UNIVERSITY OF BERLIN.—By Professor H. A. SCHWARZ: Integral calculus, with exercises, six hours; Selected chapters of elliptic functions, two hours; Calculus of variations, four hours; Colloquium, two hours; Seminar, two hours.—By Professor G. FROBENIUS: Theory of algebraic equations, four hours; Seminar, two hours.—By Professor F. SCHOTTKY: Theory of functions, II, four hours; Theory of curvature of curves and surfaces, four hours; Seminar, two hours.—By Professor G. HETTNER: Introduction to the theory of determinants, two hours.—By Professor J. KNOBLAUCH: Analytic geometry, four hours; Theory of space curves, II, one hour; Theory of surfaces, II, four hours.—By Professor R. LEHMANN-FILHÉS: Differential calculus, four hours.—By Professor I. SCHUR: Ordinary differential equations, four hours; Introduction to the theory of functions, four hours.

UNIVERSITY OF BONN.—By Professor E. STUDY: Introduction to differential geometry, four hours; Seminar, two hours.—By Professor F. LONDON: Calculus, with exercises, four hours; Axonometry and perspective, two hours; Seminar, two hours.—By Professor F. HAUSDORFF: Theory of differential equations, four hours.—By Dr. J. O. MÜLLER: Calculus of variations, three hours.—By Dr. W. BLASCHKE: Algebraic equations, four hours.

UNIVERSITY OF GÖTTINGEN.—By Professor F. KLEIN: Introduction to differential and integral calculus, four hours; Seminar, two hours.—By Professor D. HILBERT: Mechanics of the continuum, four hours; Seminar, two hours.—By Professor E. LANDAU: Elements of the theory of numbers, four hours; Seminar, two hours.—By Professor C. RUNGE: Num-

erical calculation, six hours; Photogrammetry, three hours.—By Professor F. BERNSTEIN: Theory of probabilities, three hours; Calculus of insurance, with exercises, three hours.—By Dr. O. TOEPLITZ: Theory of functions of a real variable, two hours.—By Dr. H. WEYL: Analytic geometry, four hours.—By Dr. A. HAAR: Differential equations, four hours.

UNIVERSITY OF LEIPZIG.—By Professor K. ROHN: Projective geometry, two hours; Plane analytic geometry, four hours; Conic sections and quadric surfaces from the standpoint of invariants, two hours; Seminar, two hours.—By Professor O. HÖLDER: Algebraic equations, two hours; General theory of functions of a complex variable, four hours; Seminar, two hours.—By Professor G. HERGLOTZ: Selected chapters of the calculus, one hour; Boundary values in the theory of potential, two hours; Seminar, two hours.—By Professor P. KOEBE: Ordinary differential equations, with exercises, five hours; Algebraic analysis, two hours.

UNIVERSITY OF MUNICH.—By Professor F. LINDEMANN: Analytic geometry of space, five hours; Elliptic functions, five hours; Seminar, two hours.—By Professor A. VOSS: Introduction to the theory of partial differential equations, four hours; Introduction to the theory of invariants, three hours; Seminar, two hours.—By Professor A. PRINGSHEIM: Integral calculus, five hours; Geometric applications of differential calculus, two hours.—By Professor H. BRUNN: Elements of higher mathematics, three hours.—By Professor K. DOEHLEMANN: Descriptive geometry, with exercises, six hours; Theory of algebraic constructions, with exercises, five hours.—By Dr. F. HARTOGS: Algebra, II, four hours; Algebraic analysis, five hours.—By Professor L. v. SEELINGER: Theory of probabilities and least squares, four hours.—By Professor A. SOMMERFELD: Mechanics of continua with applications, five hours.

UNIVERSITY OF STRASSBURG.—By Professor H. WEBER: Definite integrals and introduction to the theory of functions, four hours; Theory of numbers, two hours; Seminar, two hours. By Professor F. SCHUR: General theory of curves and surfaces, four hours; Introduction to vector analysis, two hours; Seminar, two hours.—By Professor J. WELLSTEIN: Integral equations, three hours; Theory of invariants, three hours; Proseminar, two hours.—By Professor R. E. v. MISES: Descriptive geom-

etry, four hours ; with exercises, four hours ; Theory of probabilities, two hours ; Seminar, two hours.—By Professor P. EPSTEIN : Foundations of analysis, two hours.—By Professor M. SIMON : History of mathematics during the renaissance, two hours.

THE number of students of mathematics in the Prussian universities has increased from 1,440 in 1907–08 to 2,040 in 1910–11.

PROFESSOR TH. VAHLEN, of the University of Greifswald, has been promoted to a full professorship of mathematics.

DR. P. J. HEADWOOD has been appointed professor of mathematics at Durham University.

MR. R. D. CARMICHAEL, of Princeton University, has been appointed assistant professor of mathematics at Indiana University.

PROFESSOR J. ROSANES, of the University of Breslau, has retired from active service.

PROFESSOR F. A. SHERMAN, of Dartmouth College, will retire from active service at the close of the present academic year.

MR. A. R. MAXSON, for six years instructor in mathematics in Columbia University, died April 13, in his thirtieth year. He had been a member of the American Mathematical Society since 1905.

Recent catalogues of second hand mathematical books : A. Hermann et Fils, Paris, 6 rue de la Sorbonne, mathematics and sciences, about 150 titles in mathematics. — K. F. Koehler, Leipzig, Kurprinzstrasse 6, catalogue 586, mathematics, about 1200 titles. — G. E. Stechert, New York, 151 West 25th Street, catalogue 28, exact sciences, about 400 titles in mathematics.