NOTES

The opening number of volume 30 of the Transactions of this Society (January, 1928) contains the following papers: *Simpler proofs of Waring's theorem on cubes, with various generalizations*, by L. E. Dickson; *Cubic curves and desmic surfaces*, second paper, by R. M. Mathews; *Possible orders of two generators of the alternating and of the symmetric group*, by G. A. Miller; *Optics in hyperbolic space*, by James Pierpont; *Geodesics on surfaces of genus zero with knobs*, by D. E. Richmond; *Concerning end points of continuous curves and other continua*, by H. M. Gehman; *The apportionment of representatives in Congress*, by E. V. Huntington; *Conditions for associativity of division algebras connected with non-abelian groups*, by John Williamson; *A generalization of Taylor's series*, by D. V. Widder; *A problem in the calculus of variations with an infinite number of auxiliary conditions*, by R. G. D. Richardson; *A contribution to the theory of fundamental transformations of surfaces*, by M. M. Slotnick.

The opening number of volume 50 of the American Journal of Mathematics contains: *Additive number theory for all quadratic functions*, by L. E. Dickson; *Démonstration de quelques propriétés des ensembles abstraits*, by M. Fréchet; *On certain points in the theory of Dirichlet series*, by J. F. Ritt; *On a theorem of Severi*, by O. Zariski; *On Gierster's classnumber relations*, by J. V. Uspensky; *Note on a theorem of Bôcher*, by G. C. Evans; *Generalized Neumann problems for the sphere*, by G. C. Evans; *On Taylor's series admitting the circle of convergence as a singular curve*, by J. J. Gergen and D. V. Widder; *A mathematical theory of depreciation and replacement*, by C. F. Roos.

The opening number of volume 29, series 2, of the Annals of Mathematics (December, 1927) contains: *Developments in Hermite polynomials*, by M. H. Stone; *A generalization of the calculus of finite differences to include the differential calculus*, by J. P. Ballantine; *Relations satisfied by coefficients of periodic solutions*, by W. J. Trjitzinsky; *An integral equation with an associated integral condition*, by L. Guggenbühl; *Partition polynomials*, by E. T. Bell; *A new formulation for general algebra*, by J. W. Young; *A determination of the groups of order* p^5, by H. A. Bender; *Representation of functions determined by their initial values*, by W. J. Trjitzinsky; *An integration method of summing series*, by G. James; *On groups of order* p^m, *p being an odd prime number, which contain an abelian subgroup of order* p^{m-1}, by H. A. Bender; *Osculating derivative of a ruled surface*, by D. Sun; *Chains of congruences for the numerators and denominators of the Bernoulli numbers*, by J. L. Bell.

A new journal, the Boletin Matematico, has been founded at Buenos Aires, under the editorship of Professor B. I. Baidaff. The first number appeared in January, 1928.

A committee of this Society, consisting of Professors T. S. Fiske (chairman), R. C. Archibald, J. L. Coolidge, L. E. Dickson, E. R. Hedrick, Dunham Jackson, James Pierpont, M. I. Pupin, R. G. D. Richardson, and Oswald Veblen, has been appointed to arrange for fitting activities to mark the fiftieth anniversary of the founding of the Society in 1888.

The Calcutta Mathematical Society will celebrate the twentieth anniversary of its foundation by publishing a Commemoration Volume in the fall of 1928.

At the Nashville meeting of the American Association for the Advancement of Science, the following officers (among others) were elected: president, Professor H. F. Osborn; vice-president of Section A, Professor R. C. Archibald; secretary of Section A, Professor C. N. Moore. Professor L. E. Dickson was elected a member of the Council, and Professors D. R. Curtiss, F. R. Moulton, M. I. Pupin, and Edwin B. Wilson members of the Executive Committee. Professor Oswald Veblen is a member of the Committee on Grants for Research.

Owing to the favorable reception which has been given to the Mémorial des Sciences Mathématiques, a similar series to be known as the Mémorial des Sciences Physiques is to be published under the auspices of the French Academy and several other Academies, under the direction of Professors Henri Villat and Jean Villey. A number of titles of forthcoming volumes have been announced.

The Carnegie Foundation has recently presented the sum of $10,000 to the American Philosophical Association as a revolving fund for the publication of a series of source books in the history of the sciences, under the general editorship of Professor G. D. Walcott of Hamline University. It is proposed that each volume of about 600 pages, shall contain extracts from the most important contributions to science from about 1500 to 1900. At least one of these volumes will relate to mathematics, and will be under the immediate charge of a committee consisting of Professors R. C. Archibald, Florian Cajori, and David Eugene Smith (chairman). The articles will be about 6–20 pages each, including photographs of the original text, a translation, and comments. Numerous suggestions of articles for reprinting have been made already, but further suggestions with precise references to the original articles will be welcomed. Volunteers to assist in preparing and editing specific articles are especially desired. Suggestions and offers of assistance may be sent to any member of the committee.

An informal conference on analysis situs was held at Princeton University on April 4–5, 1928, in order to provide a close contact and a thorough exchange of ideas among those particularly interested, in advance of the symposium on the same topic at the meeting of the Society in New York on April 6–7. Among those participating were Professors Alexander, Lefschetz, and Veblen, and Dr. Alexandroff and Dr. Hopf, of Princeton, Professor H. M. Morse of Harvard, Professor E. W. Chittenden of Iowa, and Professor Kline of Pennsylvania. On the first day, Professor Veblen

spoke at length on the development of the subject; on the second day, Professor Morse spoke at length on critical points of functions. There were numerous shorter talks and informal discussions.

The gold medal of the Royal Astronomical Society has been awarded to Professor R. A. Semple, for his theory of the four great satellites of Jupiter.

The Royal Society of London has awarded a royal medal to Professor J. C. McLennan, for his work in spectroscopy and atomic physics.

The Messel medal of the British Society of Chemical Industry has been awarded to Dr. R. A. Millikan, of the California Institute of Technology, in recognition of his achievement in measuring the electrostatic charge of the electron.

Professor M. I. Pupin has been given the Washington award of the Western Society of Engineers, in recognition of his work in long distance telephony and radio communication.

The Deutsche Gesellschaft für Wissenschaft und Kunst of Brünn has founded an endowment in memory of Professor Emil Waelsch, of the German Technical School at Brünn, for the establishment of scholarships in geometry at that Technical School.

The University of the Northern Caucasus (Rostov on the Don) and the Polytechnic Institute of the Don, with their associated scientific societies, held a meeting on April 22, 1928, in honor of Professor D. D. Mordoukhay-Boltovskoy, to celebrate his completion of thirty years of teaching.

M. Joseph Auclair has been elected a correspondent of the Paris Academy of Sciences in the section of mechanics.

The annual William Lowell Putnam Lecture was delivered on Wednesday, March 21, 1928, at Harvard University, by Professor Constantin Carathéodory, of the University of Munich. His subject was *Selected problems of the calculus of variations.*

Professor E. W. Brown, of Yale University, has been elected an associate of the Royal Academy of Belgium.

On the occasion of its semi-centennial celebration, the University of Colorado conferred a doctorate of laws on Professor R. A. Millikan, of the California Institute of Technology.

Dr. George Sauté, of Harvard University, has been awarded one of the fellowships of the Commission for Relief in Belgium Educational Foundation, for the study of mathematics in Belgium.

The academic jubilee of Professor Ch. J. de la Vallee Poussin was celebrated on May 13, 1928, at Louvain, Belgium, under the auspices of an international committee, by fitting academic exercises and by the presentation of a bust.

It is announced that Guggenheim fellowships in astronomy, mathematics, and physics have been awarded to the following persons: Professor Perry Byerly, of the University of California, for the study of mathematical geophysics; Professor Olive C. Hazlett, of the University of Illinois, for the study of the arithmetics of linear associative algebras together with their application and interpretation in other lines of mathematics, especially the theory of numbers; Professor J. J. Hopfield, of the University of California, to study the Zeemann effect of the infra-red spectrum of oxygen and nitrogen; Dr. R. J. Kennedy, of the California Institute of Technology, for research in the theory of radiation; Professor N. C. Little, of Bowdoin College, for the study of thermo-magnetic properties of gaseous molecules; Professor F. W. Loomis, of New York University, for the study of quantum mechanics; Professor L. E. Reukema, of the University of California, for the theoretical and experimental study of electric discharge in gases at high frequencies; Professor Otto Struve, of the University of Chicago, for a theoretical study of the distribution and physical properties of diffuse matter in interstellar space; Professor W. W. Watson, of the University of Chicago, for the study of molecular spectra.

The University of Göttingen announces the following courses in mathematics and mathematical physics for its summer session of 1928 (July 9 to August 4): Professor Hilbert, Foundations of mathematics; Professor Landau, Mapping with smooth functions; Professor Prandtl, Problems of aerodynamics; Professor Courant, Development of mathematics in the 19th century; methods of analysis; Professor Betz, Theory of hydro- and aerodynamics (with demonstrations); Dr. Schuler, The top in astronomy, physics, and technology (with demonstrations); Dr. Walther, New methods in applied mathematics; Dr. Grandjot, Infinite series in number theory; Dr. Neugebauer, Mathematics in antiquity. Lectures and courses in experimental and theoretical physics will be given by Professors Pohl, Reich, Born, Franck, Kienle, Coehn, and Oldenberg, and Drs. Sponer, Rupp, and Heitler. The subjects include electrical and optical phenomena, physical optics, electrons, band spectra, astronomy, physics of the atom, photo-chemistry, and electro-acoustics. These courses are intended especially for foreign students. Further particulars may be obtained from the Secretary of the University, Wilhelmsplatz (Aula), Göttingen, Germany.

Dr. Reinhold Fürth has been promoted to an associate professorship of theoretical physics at the German University of Prague.

Associate Professor Lothar Koschmieder, of the University of Breslau, has been appointed professor of mathematics at the German Technical School at Brünn.

Dr. Wolfgang Pauli, of the University of Hamburg, has been appointed professor of theoretical physics at the Zurich Technical School.

Dr. Hans Lewy has been admitted as privat docent in mathematics at the University of Göttingen.

Professor H. Mohrmann, of Basel, has been called to the professorship of descriptive geometry at the Darmstadt Technical School.

Dr. S. Mandelbrojt has been appointed "chargé de cours" in differential and integral calculus at the University of Lille.

Professor G. A. Gibson, of the University of Glasgow, has retired.

The following have been admitted as docents in European universities: Axel Schur, for mathematics, at Bonn; B. Segre, for analytic geometry, and G. Krall, for rational mechanics, at Rome; C. Poli, for rational mechanics, at Turin; O. Nikodym at Warsaw.

The following 41 doctorates with mathematics or mathematical physics as major subject were conferred by American universities during 1927; the university, month in which the degree was conferred, minor subject (other than mathematics), and title of dissertation are given in each case if available.

R. G. Archibald, Chicago, June, *Diophantine equations in division algebras.*

W. L. Ayres, Pennsylvania, June, *Concerning continuous curves and correspondences.*

F. R. Bamforth, Chicago, December, *A classification of boundary value problems for a system of ordinary differential equations of the second order.*

L. M. Blumenthal, Johns Hopkins, June, *Lagrange resolvents in euclidean geometry.*

W. F. Cheney, Jr., Massachusetts Institute of Technology, June, physics, *Infinitesimal deformation of surfaces in riemannian space.*

Alonzo Church, Princeton, June, *Alternatives to Zermelo's assumption.*

E. U. Condon, California, December, Physics, *Theory of intensity distribution in band systems.*

T. F. Cope, Chicago, December, *An analogue of Jacobi's condition for the problem of Mayer with variable end points.*

C. C. Craig, Michigan, June, *An application of Thiele's semi-invariants to the sampling problem.*

D. R. Davis, Chicago, June, *The inverse problem of the calculus of variations in higher space.*

D. A. Flanders, Pennsylvania, June, *Double elliptic geometry in terms of point, order, and congruence.*

P. A. Fraleigh, Cornell, June, physics, *Regular bilinear transformations of sequences.*

H. H. Germond, Wisconsin, June, physics, *The effect of space charge on a three element vacuum tube.*

Lois W. Griffiths, Chicago, June, *Certain quaternary quadratic forms and diophantine equations by generalized quaternion algebras.*

Laura Guggenbühl, Bryn Mawr, June, education, *An integral equation with an associated integral condition.*

D. C. Harkin, Chicago, September, *The duality and abstract identity of the theories of modular systems and ideals.*

Ruby U. Hightower, Missouri, June, physics and astronomy, *On the classification of the elements of a ring.*

Charles Hopkins, Illinois, May, physics, *Non-abelian groups whose groups of isomorphisms are abelian.*

C. G. Jaeger, Missouri, June, physics, *A character symbol for primes relative to a cubic field.*

Vern James, Stanford, June, statistics, *Primitive linear homogeneous groups of variety two or three.*

A. R. Jerbert, University of Washington, December, physics, *Projective differential geometry of a system of linear differential equations of the first order.*

G. W. Kenrick, Massachusetts Institute of Technology, March, electrical engineering, *A new method of periodogram analysis with illustrative applications.*

James McGiffert, Columbia, May, *Particular solutions in closed form of types of linear differential equations of second order.*

E. L. Mackie, Chicago, September, *The Jacobi condition for a problem of Mayer with variable end points.*

Florence M. Mears, Cornell, June, physics, *Riesz summability for double series.*

W. M. Miller, Illinois, May, astronomy, *On the variance of interpolated observations.*

T. W. Moore, Yale, June, *The complete system of invariants of the rational space quintic curve.*

J. S. Morrell, Illinois, May, physics, *Expansion of functions in series of functions generalizing the gamma function.*

J. H. Neelley, Yale, June, *Compound singularities of the rational plane quartic curve.*

F. C. Ogg, Illinois, May, physics, *Certain configurations on cubics.*

Hillel Poritsky, Cornell, June, physics, *Topics in potential theory.*

T. H. Rawles, Yale, June, *The invariant integral and the inverse problem in the calculus of variations.*

E. H. Reimer, California, May, astronomy, *A new Eddingtonian geometry, with applications to differential geometry.*

C. H. Richardson, Michigan, June, *The statistics of sampling.*

Edward Saible, Massachusetts Institute of Technology, October, physics, *Analytic and topological transformations of closed surfaces.*

Hazel E.Schoonmaker, Cornell, June, education, *Non-monoidal involutions having a congruence of invariant conics.*

H. C. Shaub, Cornell, September, astronomy, *Rational involutorial transformations in S_4 which leave invariant ∞^4 quadratic varieties.*

A. A. Shaw, California, December, analytic mechanics, *Solution of homogeneous linear difference equations by means of infinite determinants.*

I. M. Sheffer, Harvard, June, *On the theory of linear differential equations of infinite order.*

C. H. Smiley, California, May, astronomy, *On the number of solutions of Leuschner's direct method for determining parabolic orbits.*

E. P. Starke, Columbia, July, *Certain uniform functions of rational functions.*

W. J. Trjitzinsky, California, August, celestial mechanics, *The elliptic cylinder differential equation.*

H. S. Wall, Wisconsin, June, mathematical physics, *On the Padé approximants associated with the continued fraction and series of Stieltjes.*

A. K. Waltz, Cornell, June, physics, *The steady flow of liquid through a circular hole in an infinite plane.*

G. T. Whyburn, Texas, June, organic chemistry, *Concerning continua in the plane.*

W. M. Whyburn, Texas, June, physical chemistry, *Linear boundary value problems for ordinary differential equations and their associated difference equations.*

John Williamson, Chicago, June, *Conditions for associativity of division algebras connected with non-abelian groups.*

A. S. Winsor, Johns Hopkins, June, *The composition of homologies and of homographies.*

The following graduate courses in mathematics are announced for the summer of 1928:

UNIVERSITY OF CHICAGO, first term, June 18 to July 25; second term, July 26 to August 31.—By Professor L. E. Dickson: Topics in the theory of numbers.—By Professor E. T. Bell: Theory of functions of a complex variable; Applications of analysis to the arithmetic of quadratic forms.—By

Professor E. P. Lane: Synthetic projective geometry; Projective differential geometry I.—By Professor F. D. Murnaghan: Modern hydrodynamical theory.—By Professor M. I. Logsdon: Higher plane curves.—By Professor L. M. Graves: Modern theories of integration.—By Professor R. W. Barnard: Advanced calculus; Introduction to higher algebra.—By Professor Walter Bartky: Introduction to celestial mechanics II.—By Dr. F. R. Bamforth: Differential equations.

UNIVERSITY OF COLORADO, first term, June 18 to July 21; second term, July 23, to August 24.—By Professor Light: Teacher's course in mathematics; History of mathematics; Calculus of variations.—By Professor Kempner: Advanced teacher's course in mathematics; Differential equations; Group theory and introduction to Galois theory. Second term:—By Professor Light: Statistics; Theory of equations; Calculus of variations (continued).—By Professor Kempner: Advanced teacher's course (repeated); Differential equations (continued); Group theory and introduction to Galois theory (continued).

COLUMBIA UNIVERSITY, July 9 to August 17.—By Professor W. B. Fite: Differential equations; Theory of infinite series.—By Professor J. F. Ritt: Theory of functions of a complex variable.—By Professor K. W. Lamson: Differential geometry.—By Dr. B. O. Koopman: Introduction to modern geometry.

UNIVERSITY OF ILLINOIS, June 18 to August 11.—By Professor G. A. Miller: Introduction to higher algebra, based on Bôcher; Critical study of the history of mathematics.—By Professor J. B. Shaw: Functions of a real variable.—By Professor H. R. Brahana: Projective geometry.—By Dr. L. L. Steimley: Differential equations.—By Dr. H. W. Bailey: Teachers' courses in elementary mathematics.—By Mr. G. L. Edgett: Mathematical statistics for teachers.

UNIVERSITY OF IOWA, first term, June 7 to July 20.—By Dr. M. A. Nordgaard: Subject matter and teaching of mathematics.—By Dr. Conkwright: Ordinary differential equations; Theory of functions of a complex variable.—By Professor Wylie: Elementary mechanics; Mathematics of finance; Descriptive astronomy.—By Professor Woods: Advanced coordinate geometry; Elliptic integrals.—By Professor Reilly: Algebra for high school teachers; Disability theory applied to life insurance.—By Professor Chittenden: Advanced calculus; Functions of infinitely many variables. Second term, July 23 to August 24.—By Dr. Nordgaard: The history of mathematics.—By Dr. Ward: Elementary mechanics; Theory of functions of a complex variable.—By Professor Baker: Differential equations; Geometry of forces.—By Professor Reilly: The numerical solution of equations; Frequency distributions and correlation.

UNIVERSITY OF MICHIGAN, June 25 to August 17.—By Professor W. B. Ford; Advanced calculus; Infinite series with special reference to Fourier series.—By Professor L. C. Karpinski: Teaching of algebra; History of mathematics.—By Professor Peter Field: Vector analysis.—By Professor

T. R. Running: Graphical methods.—By Professor J. W. Bradshaw: Figures of solid geometry; Selected topics in projective geometry.—By Professor T. H. Hildebrandt: Theory of functions of a complex variable; Theory of the potential.—By Professor H. C. Carver: Advanced mathematical theory of statistics.—By Professor L. A. Hopkins: Elements of mechanics.—By Professor C. J. Coe: Integral equations.—By Professor Norman Anning: Differential equations; Determinants and theory of equations.—By Professor J. A. Nyswander: Theory of probability; Finite differences.—By Mr. O. J. Peterson: Solid analytic geometry.

UNIVERSITY OF MINNESOTA, first term, June 16 to July 28; second term, July 30 to September 1. First term:—By Assistant Professor Gibbens: Differential equations; Synthetic metric geometry.—By Professor Brink: Advanced calculus; Reading in advanced mathematics. Second term:—By Professor Underhill: Reading in advanced mathematics.

UNIVERSITY OF NEBRASKA, June 4 to July 13.—By Professor Brenke: Differential equations.—By Professor Gaba: Advanced euclidean geometry; Foundations of algebra and geometry.—By Professor Camp: Advanced algebra.—By Professor Pierce: Theory of equations.—By Mr. Harper: Elements of the mathematical theory of statistics.

OHIO STATE UNIVERSITY, June 18 to August 31.—By Professor C. L. Arnold: The teaching of mathematics; Differential equations.—By Professor C. C. Morris: Theory of equations; Mathematical statistics.—By Professor J. H. Weaver: Differential geometry; Introduction to higher algebra.

UNIVERSITY OF PENNSYLVANIA, July 2 to August 11.—By Professor H. H. Mitchell: Probability.—By Professor M. J. Babb: College geometry.—By Professor Arnold Dresden, of Swarthmore College: Elliptic functions; Differential equations.—By Professor J. R. Kline: Theories of integration.—By Professor J. M. Thomas: Introduction to tensor analysis.

STANFORD UNIVERSITY, June 21 to August 31.—By Dr. Alfred Errera (Belgium): Topics selected from the foundations of mathematics; Geometry and the elements of axiomatics.—By Professor E. Hille (Princeton): Differential equations; Theory of functions of a complex variable.

UNIVERSITY OF TEXAS, first term, June 5 to July 16.—By Professor R. L. Moore: Functions of real variables; Foundations of geometry.—By Professor E. L. Dodd: Infinite processes; Mathematical statistics.—By Professor H. J. Ettlinger: Boundary value problems; Ruler and compass constructions.—By Professor C. D. Rice: Differential geometry; Advanced calculus.—By Professor P. M. Batchelder: Teaching problems in mathematics.—By Professor C. M. Cleveland: Advanced calculus.—By Professor Goldie Horton: Theory of equations. Second term, July 16 to August 27.—By Professor H. J. Ettlinger: Boundary value problems; Definite integrals.—By Professor P. M. Batchelder: Teaching problems in mathematics.—By Professor C. M. Cleveland: Advanced calculus.—By Professor R. G. Lubben: Non-euclidean geometry.—By Professor G. T. Whyburn: Functions of real variables.

UNIVERSITY OF WISCONSIN, six weeks session, June 25 to August 3.—By Professor J. H. Taylor: Differential equations; Differential geometry.—By Professor E. B. Van Vleck: Modern geometrical concepts; The location of the roots of an algebraic equation. Special nine weeks course for graduates, June 25 to August 24.—By Professor R. E. Langer: Partial differential equations; Calculus of variations.—By Professor Warren Weaver: Theory of potential; Introduction to statistical mechanics.

Dr. Ethel L. Anderton, of Smith College, has been appointed assistant professor of mathematics at Mount Holyoke College.

Professor Léon Brillouin, of the Collège de France, has been appointed acting professor of theoretical physics at the University of Wisconsin, for the academic year 1927–28.

Mr. Alexander Cook, lecturer at the University of Alberta, has been promoted to an assistant professorship of mathematics.

Dr. H. N. Davis, professor of mechanical engineering at Harvard University, has been elected president of the Stevens Institute of Technology.

Assistant Professor Oystein Ore, of Yale University, has been made associate professor of mathematics.

Lieutenant Colonel A. J. C. Cunningham, known for his work in number theory and the preparation of factor tables, is dead. Colonel Cunningham had been a member of the American Mathematical Society since 1905.

Professor Krishna Prasad Dé, of University College, Rangoon, is dead. Professor Dé was a member of the American Mathematical Society.

Professor R. W. Genese, of the University College of Wales, Aberystwyth, died January 21, 1928, at the age of seventy-nine. Professor Genese was a member of the American Mathematical Society.

Professor J. L. Heiberg, of Copenhagen, known for his work in the history of Greek mathematics, died January 4, 1928, at the age of seventy-two.

Professor Hendrik Antoon Lorentz, of the University of Leyden, the distinguished physicist, died February 4, 1928, at the age of seventy-four.

Dr. W. C. Eglin, vice-president and chief engineer of the Philadelphia Electric Company and president of the Franklin Institute, died February 7, 1928.

William Wallace Payne, of the observatory of the National Watch Company, Elgin, Ill., the founder of Popular Astronomy, died January 29, 1928, at the age of ninety-one.