

## NOTES

At a meeting held in New York City on December 27, 1928, a new scientific society, the Acoustical Society of America, was formed to bring together workers in all branches of pure and applied acoustics. Dr. Harvey Fletcher, of the Bell Telephone Laboratories, was elected president.

The Vienna Academy of Sciences has awarded its Lieben prize, for the best mathematical work by an Austrian during the preceding three years, to Professor Karl Menger, for his memoirs on the theory of dimensions.

The Accademia Pontificia dei Nuovi Lincei has announced that it will award a prize of 10,000 lire for an unpublished critical work on the theory of quanta. Competing manuscripts, which may be in English, French, German, Spanish, Italian, or Latin, should reach the Academy by October 30, 1929. Competition is open to all except members of the Academy.

The Royal Academy of Naples has awarded its biennial prize to Professor Enea Bortolotti, for his memoir entitled *Geometria degli spazi riemanniani*.

The gold medal of the Royal Astronomical Society has been awarded to Professor Ejnar Hertzsprung, of the Leyden Observatory, for his work in stellar astronomy.

The Royal Society of Edinburgh has awarded its Gunning Victoria Jubilee prize for the period of 1924–28 to Professor E. T. Whittaker, for his contributions to mathematical science and the promotion of mathematical research in Scotland.

Professors A. A. Michelson, of the University of Chicago, and R. A. Millikan, of the California Institute of Technology, were awarded gold medals by the Society of Arts and Sciences at a meeting in New York City, February 22, 1929.

The American Institute of Electrical Engineers has made the following awards: the Edison gold medal for achievement in electrical science to Dr. F. B. Jewett, for his pioneer research and development work in connection with the theory and practice of voice transmission; the Lamme medal to Mr. Allan Bertram Field "for the mathematical and experimental investigation of eddy current losses in large slot-wound conductors in electrical machinery."

Professor Aurel Stodola, of the Zurich Technical School, has been elected correspondent of the Paris Academy of Sciences in the section of mechanics.

Professors Oskar Perron and Heinrich Tietze, of the University of Munich, have received the title of Geheimer Regierungsrat.

Professor F. Hausdorff, of the University of Bonn, has been elected a member of the Moscow Mathematical Society.

The Council of the Royal Society of London has recommended for election as fellow Professor G. R. Goldsbrough, of Armstrong College, Newcastle-on-Tyne.

Mr. William Bowie, of the United States Coast and Geodetic Survey, has been elected correspondent of the Paris Academy of Sciences in the section of geography and navigation.

Dr. W. J. Humphreys, of the United States Weather Bureau, has been elected a corresponding member of the Meteorological Society of Hungary.

The University of Oxford has conferred the degree of doctor of science on Professor Oswald Veblen, of Princeton University.

Associate Professor Leopold Vietoris, of the University of Innsbruck, has been appointed professor of mathematics at the Vienna Technical School.

Professor Léon Brioullin, of the Collège de France, has been appointed to the newly established professorship of physical theories at the Sorbonne.

Dr. Maurice Fréchet, maître de conférences at the Sorbonne, has been appointed "professeur sans chair" by the Faculty of Sciences of the University of Paris.

Dr. Edwin Feyer, of the Breslau Technical School, has been promoted to an associate professorship.

Associate Professor R. Furch, of the University of Rostock, has been promoted to a professorship.

Dr. Ferenz Jüttner has been appointed to an associate professorship of theoretical physics at the University of Freiburg i. Br.

Associate Professor Wolfgang Krull, of the University of Freiburg i. Br., has been appointed professor of mathematics at the University of Erlangen.

Dr. Karl Loewner, of the University of Berlin, has been appointed an associate professor of mathematics at the University of Cologne.

Dr. B. L. van der Waerden, of the University of Göttingen, has been appointed professor of mathematics at the University of Groningen.

Professor Enea Bortolotti has been appointed professor of analytic projective geometry at the University of Cagliari.

Professor Luigi Brusotti, of the University of Cagliari, has been transferred to the professorship of analytic geometry at the University of Pisa.

Professor G. Juvet, of the University of Neuchâtel, has been appointed professor at the University of Lausanne, as successor to Professor L. Maillard, retired.

Professor R. Nevanlinna, of the University of Helsingfors, lectured at the Zurich Technical School during the year 1928-29, in place of Professor Hermann Weyl, on leave of absence in the United States.

The following have been admitted as docents: Dr. F. Löbell, at the Stuttgart Technical School; Dr. Robert Remak, at the University of Berlin.

The following graduate courses in mathematics are announced for the summer of 1929.

UNIVERSITY OF CALIFORNIA, BERKELEY, intersession, May 20-June 29.—By Professor T. M. Putnam: Theory of algebraic equations and of infinite series, Geometric introduction to the theory of functions.—By Professor D. N. Lehmer: Metric differential geometry. Summer session, July 1-August 10: Professor B. A. Bernstein: Elementary algebra for advanced students.—Professor E. R. Hedrick: Analytic geometry of space, Functions of a complex variable.—Professor James Pierpont: Non-euclidean geometry.—Professor Hermann Weyl: Representations of groups, applications and representations of groups to quantum physics.

UNIVERSITY OF CALIFORNIA AT LOS ANGELES, July 1-August 10.—Professor Harriet E. Glazier: Foundations of arithmetic.—Professor M. W. Haskell: Advanced geometry, Geometric introduction to the theory of functions.—Professor Sophia H. Levy: The Teaching of mathematics.

UNIVERSITY OF CHICAGO, first term, June 17-July 24; second term, July 25-August 30.—By Professor H. E. Slaughter: Differential equations, Elliptic integrals.—By Professor A. C. Lunn: Relativity, Lattices and crystal groups.—By Professor A. B. Coble (Illinois): Analytic projective geometry, Algebraic geometry.—By Professor L. M. Graves: Introduction to analysis, Functions of lines.—By Professor R. W. Barnard: Theory of equations, Metric differential geometry.—By Professor W. Bartky: Theoretical mechanics, Modern theories of analytic differential equations.—By Professor C. C. MacDuffee (Ohio State): Theory of numbers, Theory of algebraic numbers, Linear algebras.—By Professor H. S. Everett: Advanced calculus.

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; Partial differential equations.—By Professor Kempner: Algebraic analysis; Projective geometry; Differential equations. Second term.—By Professor Light: Statistics; Teacher's course (repeated); Partial differential equations (continued). —By Professor Kempner: Projective geometry (continued); Differential equations (continued).—By Professor Kendall: Theory of equations.

COLUMBIA UNIVERSITY, July 8 to August 16.—By Professor G. D. Birkhoff: Mathematical elements of art; Introduction to relativity.—

By Professor W. B. Fite: Differential equations.—By Professor J. F. Ritt: Theory of numbers.—By Professor B. O. Koopman: Functions of a real variable.

CORNELL UNIVERSITY, July 6 to August 16.—By Professor Virgil Snyder: Teachers' course; Projective geometry.—By Professor F. R. Sharpe: Advanced analytic geometry.—By Professor W. A. Hurwitz: Advanced calculus.—By Professor W. B. Carver: Theory of numbers.—By Professor C. F. Craig: Elementary differential equations. Reading and research will be directed by Professors J. I. Hutchinson, Snyder, Sharpe, Hurwitz, Carver, D. C. Gillespie, Craig, and C. F. Roos.

UNIVERSITY OF ILLINOIS, June 17 to August 10.—By Professor G. A. Miller: The theory of numbers.—By Professor R. D. Carmichael: Partial differential equations.—By Professor E. B. Lytle: Teachers' course; Theory of equations and determinants.—By Professor H. Levy: Geometric transformations.—By Dr. V. A. Hoersch: Advanced calculus.—By Dr. F. C. Ogg: Projective geometry.

UNIVERSITY OF INDIANA, June 13 to August 9.—By Professor S. C. Davisson: Theory of functions of a complex variable; Differential equations; Theory of equations.—By Professor D. A. Rothrock: Partial differential equations; Advanced calculus.—By Professor H. E. Wolfe: College geometry; Analytic mechanics.—By Professor C. B. Hennel: General mathematics; Analytic geometry.

UNIVERSITY OF IOWA, first term, June 8 to July 19.—By Dr. M. A. Nordgaard: Subject matter and teaching of mathematics.—By Dr. Conkright: Ordinary differential equations; Theory of numbers.—By Professor Wylie: Celestial mechanics; Mathematics of finance; Descriptive astronomy.—By Professor Ward: Modern geometry.—By Professor Chittenden: Advanced calculus; Orthogonal functions.—By Professor Rietz: Actuarial theory and practice; Statistics. Second term, July 22 to August 23.—By Mr. McCoy: Matrices and determinants.—By Dr. Nordgaard: The history of mathematics.—By Professor Ward: Modern geometry; Differential equations.—By Professor Reilly: Algebra for high school teachers; Linear difference equations.

JOHNS HOPKINS UNIVERSITY, July 1 to August 9.—By Dr. John Williamson: Theory of functions of a complex variable.

UNIVERSITY OF KANSAS, first term, June 12 to July 20.—By Professor C. H. Ashton: Advanced calculus; seminar.—By Professor U. G. Mitchell: Projective geometry I; Teachers' course in mathematics; seminar. Second term, July 22 to August 17.—By Professor Mitchell: Projective geometry II; History of mathematics; seminar.

UNIVERSITY OF MICHIGAN, June 24 to August 16.—By Professor J. W. Bradshaw: Higher algebra; Projective geometry.—By Professor P. Field: Vector analysis; Applied mathematics, engineering problems.—By Professor W. B. Ford: Advanced calculus; Infinite series with special reference

to Fourier series.—By Professor T. H. Hildebrandt: Theory of functions of a real variable; Partial differential equations.—By Professor L. C. Karpinski: Teaching of geometry; History of mathematics.—By Professor T. R. Running: Empirical formulas.—By Professor H. C. Carver: Advanced mathematical theory of statistics.—By Professor L. A. Hopkins: Analytic mechanics; Celestial mechanics.—By Professor N. H. Anning: Differential equations.—By Professor C. J. Coe: Integral equations.—By Professor J. A. Nyswander: Theory of probability; Finite differences.—By Professor R. L. Wilder: Foundations of mathematics.—By Mr. N. C. Fisk: Graphical methods.—By Mr. D. K. Kazarinoff: Aerodynamics.

UNIVERSITY OF MINNESOTA, first term, June 18 to July 27.—By Professor Dunham Jackson: History of ancient and modern mathematics.—By Professor Elizabeth Carlson: Differential equations.—By Professorial Lecturer J. V. Uspensky: Theory of numbers.—By Professor Jackson: Fourier, Legendre and Bessel series.—By Professors Raymond Brink, Dunham Jackson, and Professorial Lecturer J. V. Uspensky: Reading in advanced mathematics. Second term, July 29 to August 31.—By Professorial Lecturer J. V. Uspensky: Recent developments in the mathematical theory of probability.—By Professor A. L. Underhill and Professorial Lecturer J. V. Uspensky: Reading in advanced mathematics.

OHIO STATE UNIVERSITY, June 18 to August 30.—By Professor S. E. Rasor: The teaching of mathematics; Theory of functions of a complex variable; Advanced calculus.—By Professor A. D. Michal: Continuous groups; Tensor analysis.—By Professor Grace Bareis: Projective geometry.

UNIVERSITY OF PENNSYLVANIA, July 1 to August 10.—By Professor H. H. Mitchell: Galois theory of equations.—By Professor J. R. Kline: Functions of a complex variable.—By Professor F. D. Murnaghan, of Johns Hopkins University: Inversive geometry; Linear differential equations.—By Professor J. M. Thomas: Integral invariants.

UNIVERSITY OF PITTSBURGH.—By Professor K. D. Swartzel: Functions of a complex variable; Teaching of mathematics.—By Professor F. A. Foraker: Modern synthetic geometry; Solid analytic geometry.—By Associate Professor Taylor: Advanced calculus; Functions of a real variable.—By Assistant Professor Culver: Theory of equations.

STANFORD UNIVERSITY, June 20 to August 31.—By Professor W. A. Manning: Group theory; Theory of functions.—By Professor G. T. Whyburn (Texas): Point-set theory.

UNIVERSITY OF TEXAS, first term, June 4 to July 15.—By Professor R. L. Moore: Functions of real variables; Foundations of geometry.—By Professor E. L. Dodd: Probability; Analytic functions.—By Professor H. J. Ettlinger: Differential equations; Ruler and compass constructions.—By Professor H. S. Vandiver: Number theory; Advanced calculus.—By Professor A. E. Cooper: Advanced calculus; Theory of equations.—By Professor P. M. Batchelder: Teaching problems in mathematics. Second term, July 15 to August 26.—By Professor R. L. Moore: Functions of real vari-

ables (continued); Non-euclidean geometry.—By Professor H. J. Ettlinger: Partial differential equations; Definite integrals.—By Professor E. G. Keller: Advanced calculus.

UNIVERSITY OF WISCONSIN, July 1 to August 9.—By Professor R. W. Babcock: Vector analysis.—By Professor H. W. March: Differential equations; Definite integrals.—By Professor E. B. Skinner: Differential geometry; Finite groups; Infinite series. Special nine weeks session for graduates, July 1 to August 30.—By Professor M. H. Ingraham: Higher algebra; Theory of approximations.—By Professor Warren Weaver: Theory of relativity; Advanced electrodynamics; Complex variable theory. (Only one of the two last named courses will be given, the choice depending upon the demand.)—By Professor J. H. Van Vleck of the Department of Physics: Introduction to atomic theory and line spectra; Dielectric and magnetic media; Quantum mechanics and chemistry. (Only one of the two last named courses will be given, the choice depending upon the demand.)

The following forty-nine doctorates with mathematics or mathematical physics as major subject were conferred during 1928; 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.

A. A. Albert, Chicago, August, *Algebras and their radicals and division algebras*.

H. E. Arnold, Yale, June, *The rational space quintic curve of the second species and its relation to the rational plane quartic curve*.

May M. Beenken, Chicago, June, *Surfaces in five-dimensional space*.

T. C. Benton, Pennsylvania, June, *On continuous curves which are homogeneous except for a finite number of points*.

A. H. Blue, Iowa, July, *On the structure of sets of points of classes one, two, and three*.

G. B. Briggs, Princeton, June, *On types of knotted curves*.

P'ei Yuan Chou, California Institute of Technology, June, theoretical physics, *The gravitational field of a body with rotational symmetry in Einstein's theory of gravitation*.

L. W. Cohen, Michigan, June, *On subsets of separable metric space homeomorphic with subsets of the linear continuum*.

H. A. Davis, Cornell, June, physics, *Involutorial transformations belonging to a linear complex*.

H. A. DoBell, Cornell, February, industrial organization, *On the geometry of the triangle*.

D. C. Duncan, California, May, astronomy, *Rational quintic curves autopolar with respect to a finite number of conics*.

J. M. Earl, Minnesota, July, physics, *Polynomials of best approximation on an infinite interval.*

J. J. Gergen, Rice, June, *Generalized lacunae, On Taylor's series admitting the circle of convergence as a cut, On accessible points on the boundary of a three dimensional region.*

A. O. Hickson, Chicago, August, *An application of the calculus of variations to boundary-value problems.*

E. L. Hill, Minnesota, June, major physics, minor mathematics, *Quantum mechanics of the rotational distortion of spin multiplets in molecular spectra.*

Rosa L. Jackson, Chicago, August, *The boundary-value problem of the second variation for parametric problems in the calculus of variations.*

R. L. Jeffery, Cornell, June, physics, *The sequences of functions which define a definite integral containing a parameter.*

Marie M. Johnson, Chicago, August, *Tensors of the calculus of variations.*

B. W. Jones, Chicago, June, *Representation by positive ternary quadratic forms.*

E. G. Keller, Chicago, August, *On the origin of a planet from a ring system.*

G. H. Keuligan, Johns Hopkins, June, *Vibrations of an elongated U-bar.*

M. S. Knebelman, Princeton, June, *Collineations and motions in generalized spaces.*

Mark Kormes, Columbia, January, *On basis sets.*

Lincoln LaPaz, Chicago, August, *An inverse problem of the calculus of variations.*

W. T. MacCreadie, Cornell, February, physics, *On the stability of the motion of a viscous fluid.*

Morris Marden, Harvard, June, *On the location of the roots of the jacobian of two binary forms and of the derivative of a rational function.*

W. L. Moore, Illinois, June, mathematical physics, *On the geometry of the Weddle surface.*

D. C. Morrow, Chicago, June, *The determination of all quaternary quadratic forms which represent every positive integer.*

F. W. Perkins, Harvard, February, *On the oscillation of harmonic functions.*

J. W. Peters, Johns Hopkins, June, *Invariants of sets of points under inversion.*

O. J. Peterson, Michigan, June, *On the rational plane quintic with three cusps.*

C. G. Phipps, Minnesota, July, physics, *Problems in approximation by functions of given continuity.*

Allie W. Richeson, Johns Hopkins, June, *Pentagons inscribed in circles.*

W. C. Risselman, Minnesota, July, physics, *Approximation to a given function by means of polynomials in another given function.*

V. B. Rojansky, Minnesota, August, major physics, minor mathematics, *The Stark effect of hydrogenic atoms in the new quantum mechanics.*

W. E. Roth, Wisconsin, June, applied mathematics, *A solution of the matrix equation  $P(X) = A$ .*

C. A. Rupp, Chicago, June, *An extension of Pascal's theorem to space of  $r$  dimensions.*

N. E. Rutt, Pennsylvania, June, *Concerning the cut points of a continuous curve when the arc curve contains exactly  $n$  independent arcs.*

S. A. Schelkunoff, Columbia, May, *On certain properties of the metrical and generalized metrical groups in linear spaces of  $n$  dimensions.*

A. A. Shaghoian, California, May, analytical mechanics, *Solution of homogeneous linear difference equations by means of infinite determinants.*

C. D. Smith, Iowa, February, *On generalized Tchebycheff inequalities in mathematical statistics.*

F. E. Smith, Catholic, June, physics and philosophy, *The triangles in- and circumscribed to the triangular symmetric rational quartic curve.*

Dan Sun, Chicago, August, *Projective differential geometry of quadruples of surfaces with points in correspondence.*

E. L. Thompson, Chicago, June, *Systems of two differential equations from the Lie group standpoint.*

Morgan Ward, California Institute of Technology, June, physics, *The foundation of general arithmetic.*

Marie J. Weiss, Stanford, June, *Primitive groups which contain substitutions of prime order  $p$  and of degree  $6p$  or  $7p$ .*

C. O. Williamson, Chicago, August, *Stability of an airplane with rotating propeller.*

D. W. Woodard, Pennsylvania, June, *Two dimensional analysis situs, with special reference to the Jordan curve-theorem.*

Ko-Chuen Yang, Chicago, August, *Various generalizations of Waring's problem.*



Princeton University has received from its Class of '87 the sum of \$200,000 to endow the chair of astronomy held by Professor H. N. Russell, a member of that class. The class also presented a portrait of Professor Russell to the University.

Professor G. H. Hardy lectured at the University of Iowa, March 23, 1929, on *Hilbert's Logic*, and at Columbia University, April 17-18, on *Prime Numbers*.

Professor and Mrs. E. B. Van Vleck will sail from San Francisco on August 15, for a trip around the world. Professor Van Vleck will retire from active teaching in June, 1929.

Professor Hermann Weyl, of the Zurich Technical School, who was appointed Visiting Lecturer for this Society for the present year, has delivered lectures recently at Harvard University (April 29-May 3), Chicago (May 7), Illinois (May 8-10), The Rice Institute (May 20-22), California Institute of Technology (May 31-June 3), Stanford University (June 7-10). The subjects of his lectures have been: *Gravitation and the electron*, *Consistency of mathematics*, *The spherical symmetry of atoms*, *The theory of groups and quantum mechanics*, and *The symmetric and the linear group*.

Dr. Gregory Breit, mathematical physicist of the Department of Terrestrial Magnetism, has been assigned for a year to work in atomic physics in various laboratories and universities of Europe.

Dr. Elizabeth B. Cowley, of Vassar College, has been promoted to a professorship of mathematics.

Professor Werner Heisenberg, of the University of Leipzig, will lecture at the University of Chicago on theoretical physics, during the summer quarter.

Dr. A. O. Hickson, of Brown University, has been appointed assistant professor of mathematics at Duke University.

Dr. M. S. Knebelman has been appointed assistant professor of mathematics at Princeton University.

Mr. E. R. C. Miles, of Rice Institute, has been appointed assistant professor of mathematics at Duke University.

Professor C. H. Richardson, formerly of Georgetown College, now professor of mathematics at Bucknell University, was recently elected by the Faculty of Bucknell University to serve as head of the department of mathematics for the current academic year.

Dr. C. H. Smiley of the University of Illinois, has been appointed Guggenheim Fellow for 1929-30.

Dr. W. H. Taylor has been appointed head of the department of mathematics at Alabama College.

Associate Professor Robert Torrey, of the University of Mississippi, was granted leave of absence for the first semester of the present academic year. Professor Torrey was injured in a train wreck last June.

Professor G. T. Whyburn, recently appointed at Johns Hopkins, has been appointed Guggenheim Fellow for next year, and will have leave of absence from Johns Hopkins.

Professor J. Boussinesq, member of the section of mechanics of the Paris Academy of Sciences, died February 19, 1929, at the age of eighty-six.

Professor Luigi Carlini, of the Technical School of Udine, died December 28, 1928.

Mr. A. K. Erlang, of the Copenhagen Telephone Company, known for his work in the applications of mathematics to telephone problems, died February 3, 1929, at the age of fifty-one.

Professor Johannes von Kries, of Freiburg i. Br., the distinguished physiologist, editor of the German edition of Helmholtz's *Physiological Optics* and author of *Die Prinzipien der Wahrscheinlichkeitsrechnung*, died December 30, 1928, at the age of seventy-five.

Professor Samuel Oppenheim, of the department of astronomy of the University of Vienna, died August 15, 1928, at the age of seventy.

Professor P. H. Puiseux, honorary astronomer of the Paris Observatory, died September 28, 1928.

Professor Charles Riquier died at Caen in January, 1929, at the age of seventy-eight.

Professor Giovanni Russo, of the Technical School at Catanzaro, died June 4, 1928, at the age of seventy-seven.

Mr. W. B. Alcock, senior fellow of Emmanuel College, Cambridge, died January 18, 1929, at the age of seventy-one.

Professor A. W. Bickerton, of Canterbury College, Christchurch, New Zealand, known for his impact theory of cosmic evolution, died January 23, 1929, at the age of eighty-seven.

Mr. T. H. Blakesley, honorary secretary of the London Physical Society, known for his work in the theory of alternating currents, died February 13, 1929, at the age of eighty-one.

Mr. M. J. M. Hill, of University College, London, died January 11, 1929, at the age of seventy-two.

Mr. A. W. Prater, of the University of California at Los Angeles, died April 16, 1929.

Professor W. H. Sherk, of the University of Buffalo, died in January, 1929.