

obsequies of Radau and Poincaré, who had both assisted for some years in the preparation of the *Annuaire*, an article on the application of wireless telegraphy to the distribution of the daily time by Commandant Ferrié, and a resumé by M. Bigourdan of the observations made during the solar eclipse of 1912, April 17. From these we learn that the line of totality was almost exactly midway between those predicted by the *Connaissance des Temps* and the *American Ephemeris*.

ERNEST W. BROWN.

NOTES.

THE twentieth summer meeting and seventh colloquium of the American Mathematical Society will be held at the University of Wisconsin, Madison, Wis., during the week beginning Monday, September 8, 1913. The first two days will be devoted to the regular sessions for the presentation of papers. The colloquium will open on Wednesday morning and will close on Saturday morning. Courses of lectures will be given as follows (the list of principal topics is appended):

PROFESSOR L. E. DICKSON: "Certain aspects of a general theory of invariants, with special consideration of modular invariants and modular geometry."

A function-theoretic basis for a general theory of invariants applicable to both algebraic and modular invariants; concrete examples.

Geometrical derivation of a fundamental system of invariants of a binary modular group; application to the invariantive classification of binary forms.

The so-called form problem for a modular group; solution in the simple, but typical, case of two variables. Finiteness of modular covariants; examples of fundamental systems.

General modular geometry; the projective geometry and covariant theory of a conic and of a quadric surface modulo 2; certain features of the modular geometry of cubic and quartic curves and surfaces.

PROFESSOR W. F. OSGOOD: "Topics in the theory of analytic functions of several complex variables."

The lectures will attempt to give a brief survey of what

has been accomplished in the study of some of the more important problems of this branch of analysis. The topics will be drawn mainly from the following, and the lectures will cover as wide a range as is practicable.

The problems which were first studied: the problem of inversion in the theory of the Abelian integrals; periodic functions and the Riemann-Weierstrass theta theorem; modular functions of several variables (Hilbert, Blumenthal).

The simplest singularities, and allied theorems relating to analytic continuation; Weierstrass, Cousin, Hahn, Hartogs. Weierstrass's condition in the space of analysis that a function be rational, or algebraic.

Residues of multiple integrals, and algebraic functions of two variables; Poincaré, Picard, Simart, Hensel.

Homogeneous variables and the Schottky-Klein prime function.

THE next meeting of the British association for the advancement of science will be held at Birmingham, September 10-17, under the presidency of Sir OLIVER LODGE. Dr. H. F. BAKER is chairman of Section A (mathematics and physics).

AT the meeting of the London mathematical society, held on March 13, the following papers were read: By J. PROUDMAN, "Some cases of tidal motion of rotating sheets of water"; by L. J. MORDELL, "Indeterminate equations of the third and fourth degree."

THE Paris academy of sciences announces the following problem for the subject of the Bordin prize, to be awarded in 1915:

"To make an important advance in the theory of curves of constant torsion; to determine, if possible, under what conditions such curves are algebraic, or at least when unicursal."

THE Swiss mathematical society held a special meeting March 9, 1913, at Neuchatel, to discuss the question of mathematical instruction in the Swiss universities, on the basis of the report of the Swiss sub-committee of the international commission. The next regular session will be held September 9, at Frauenfeld, under the presidency of Professor H. FEHR.

THE following doctorates in mathematics were conferred by the University of Paris in 1912. The subject of the thesis is appended.

P. HELBRONNER: "Résumé des opérations exécutées jusqu'à la fin de 1911 pour la description géométrique détaillée des Alpes françaises."

P. LEVY: "Sur les équations intégro-différentielles définissant des fonctions de lignes."

E. TURRIÈRE: "Sur les congruences des normales qui appartiennent à un complexe donné."

J. BOSLER: "Sur les relations des orages magnétiques et des phénomènes solaires."

H. GALBBUN: "Sur la représentation des solutions d'une équation linéaire aux différences finies pour les grandes valeurs de la variable."

C. NICOLAU: "Sur la variation dans le mouvement de la lune."

COLUMBIA UNIVERSITY. The following advanced courses in mathematics are announced for the summer session, July 7 to August 15. All courses are five hours a week. By Professor C. J. KEYSER: Modern theories in geometry; History and significance of central mathematical concepts.—By Professor JAMES MACLAY: Higher algebra; Elliptic functions.—By Professor EDWARD KASNER: Continuous groups.—By Professor W. B. FITE: Theory of functions of a real variable.

THE following courses in mathematics are announced for the academic year 1913-1914.

COLUMBIA UNIVERSITY. By Professor C. J. KEYSER: Modern theories in geometry, three hours; History and significance of central mathematical concepts, three hours.—By Professor T. S. FISKE: Differential equations, three hours, first half-year; Theory of functions of a real variable, three hours.—By Professor F. N. COLE: Theory of functions of a complex variable, three hours; Theory of groups, three hours.—By Professor JAMES MACLAY: Theory of numbers, three hours; Elliptic functions, three hours.—By Professor D. E. SMITH: History of mathematics, three hours.—By Professor

EDWARD KASNER: Seminar in differential geometry, three hours, first half-year.—By Professor W. B. FITE: Infinite series, three hours, second half-year.—By Professor H. E. HAWKES: Higher algebra, three hours, first half-year.—By Dr. H. W. REDDICK: Differential equations, three hours, second half-year.—By Dr. N. J. LENNES: Theory of point sets, three hours.

CORNELL UNIVERSITY.—By Professor J. McMAHON: Fourier series and spherical harmonics, three hours; Insurance and probabilities, two hours.—By Professor J. I. HUTCHINSON: Elliptic functions, two hours.—By Professor V. SNYDER: Geometry on an algebraic surface, two hours.—By Professor F. R. SHARPE: Differential equations, two hours; Vector analysis, three hours.—By Professor W. B. CARVER: Projective geometry, three hours.—By Professor D. C. GILLESPIE: Advanced calculus, three hours.—By Dr. C. F. CRAIG: Theory of linear differential equations, three hours.—By Dr. F. W. OWENS: Foundations of geometry, three hours.—By Dr. J. V. McKELVEY: Advanced analytic geometry, three hours.—By Dr. L. L. SILVERMAN: Theory of numbers, three hours (second term).—By Dr. W. A. HURWITZ: Theory of finite groups, three hours (first term); Algebraic equations, three hours (second term). The mathematical club will meet every Monday.

HARVARD UNIVERSITY.—By Professor B. O. PEIRCE: Potential function, two hours (first half-year).—By Professor W. F. OSGOOD: Advanced calculus, three hours; Dynamics, second course, three hours; Theory of functions, second course, three hours (second half-year); Theory of functions, first course, three hours, with Professor BÔCHER.—By Professor M. BÔCHER: Fourier's series, Bessel's and Legendre's functions, three hours (second half-year).—By Professor C. L. BOUTON: Differential equations, with Lie's theory, three hours; Introduction to modern geometry and modern algebra, three hours, with Mr. GRAUSTEIN.—By Professor J. L. COOLIDGE: Probability, three hours; Algebraic plane curves, three hours.—By Professor G. D. BIRKHOFF: Infinite series and products, three hours (first half-year); Problem of three bodies, three hours.—By Dr. D. JACKSON: Distribution of primes, three hours (second half-year).—By Dr. F. J. DOHMEN: History of mathematics, three hours (first half-year).—By

Mr. W. C. GRAUSTEIN: Advanced algebra, three hours (first half-year); Differential geometry, three hours (second half-year).

Various courses in reading and research are also offered on special topics, and Professor Birkhoff and Dr. Jackson will conduct a fortnightly seminar in analysis.

THE following courses in mathematics are announced for the present semester:

UNIVERSITY OF PARIS.—By Professor P. APPELL; Analytic mechanics, two hours.—By Professor E. PICARD: Analytic functions and integral equations, two hours.—By Professor E. GOURSAT: Differential equations, two hours.—By Professor C. GUICHARD: General laws of motion, two hours.—By Dr. VESSIOT: Elements of analysis and of mechanics, two hours.—By Professor H. ANDOYER; Theoretic astronomy, two hours.—By Professor J. BOUSSINESQ: Theory of waves, two hours.—By Professor G. KOENIGS: Theory of thermic motors, two hours.—By Dr. L. CAHEN: Theorem of Fermat, two hours. Conferences.—By Dr. L. LEBESGUE: Geometric applications of integral calculus, two hours.—By Professor J. DRACH: Rational mechanics, two hours.—By Professor H. ANDOYER; astronomy, one hour.—By Dr. L. SERVANT: Graphical statics, one hour.

PROFESSOR F. ENGEL, of the University of Greifswald, has accepted a call to the University of Giessen, as successor to Professor E. NETTO.

DR. H. JUNG, of Hamburg, has been appointed professor of mathematics in the University of Kiel.

DR. H. CHATELET has been appointed associate professor of mechanics at the University of Toulouse.

DR. C. GUICHARD has been appointed professor of general mathematics at the University of Paris.

DR. H. MOHRMANN, of the technical school at Karlsruhe, has accepted the professorship of mathematics at the mining academy of Clausthal.

DR. TH. PÖSCHL, of the technical school at Graz, has been appointed associate professor of mathematics at the German technical school of Prague.

PROFESSOR E. HELLEBRAND has been appointed professor of mathematics at the agricultural institute of Vienna.

DR. T. v. KÁRMÁN, of the University of Göttingen, has been appointed professor of mechanics and aerodynamics at the technical school at Aachen.

PROFESSOR G. MAJCEN, of the University of Agram, has been elected corresponding member of the Bohemian academy of sciences.

DR. A. SIGNORINI has been appointed docent of rational mechanics at the University of Padua.

PROFESSOR A. R. FORSYTH, formerly of Cambridge University, has accepted the professorship of mathematics at the Imperial College of science and technology, London.

DR. H. B. HEYWOOD has been appointed assistant lecturer in mathematics at Bedford College for ladies at London.

MISS H. P. HUDSON, of Newnham College, Cambridge, has accepted the professorship of mathematics at the West Ham technical school.

THE following instructors in mathematics have been appointed at Harvard University for the academic year 1913-1914: F. J. DOHMEN, H. D. GAYLORD, J. S. MIKESH, W. E. MILNE, R. B. ROBBINS, C. E. WILDER, L. T. WILSON.

DR. T. H. GRONWALL has been appointed instructor in mathematics at Princeton University.

PROFESSOR P. F. SMITH, of Yale University, has been granted leave of absence during the first half of the academic year of 1913-1914.

PROFESSOR J. C. FIELDS, of the University of Toronto, has been elected to membership in the Royal society of London.

PROFESSOR R. W. PRENTISS, since 1891 head of the department of mathematics and astronomy at Rutgers College, died on April 5 at the age of fifty-six years. Professor Prentiss had been a member of the American Mathematical Society since 1892.

Professor MARIO PIERI, of the University of Parma, died February 28, at the age of 53 years.

NEW PUBLICATIONS.

I. HIGHER MATHEMATICS.

BALTIN (R.). See MÜLLER (H.).

BARBETTE (E.). *Les carrés magiques du m^{ème} ordre.* Liège, Pholien, 1912. 8vo. 244 pp. Fr. 7.50

— . *Les piles merveilleuses.* Liège, Pholien, 1912. 8vo. 16 pp.

BERNAYS (P.). *Ueber die Darstellung von positiven, ganzen Zahlen durch die primitiven, binären quadratischen Formen einer nicht-quadratischen Diskriminante.* (Diss.) Göttingen, 1912.

BIANCHI (L.). *Lezioni sulla teoria aritmetica delle forme quadratiche binarie e ternarie.* Pisa, 1912. 8vo. 11+701 pp. Lithographed.

BÔCHER (M.). *Introduction to higher algebra.* Prepared with the cooperation of E. P. R. Duval. New reprint. New York, Macmillan, 1912. 8vo. 315 pp. Cloth. \$1.90

BOIS-REYMOND (P. DU). *Zwei Abhandlungen über unendliche (1871) und trigonometrische (1874) Reihen.* Herausgegeben von P. E. B. Jourdain. 1te und 2te Abhandlung. (Ostwald's Klassiker der exakten Wissenschaften. Nr. 185.) Leipzig, Engelmann, 1912. 8vo. 115 pp. M. 3.75

— . *Abhandlung über die Darstellung der Funktionen durch trigonometrische Reihen (1876).* Herausgegeben von P. E. B. Jourdain. 3te Abhandlung. (Ostwald's Klassiker. Nr. 186.) Leipzig, Engelmann, 1912. 8vo. 140 pp. M. 5.00

BOUFFALL (S.-A.-F. DE). *Démonstration complète du grand théorème de P. Fermat.* Varsovie, 1912. 8vo. 5 pp.

— . *Deuxième démonstration complète du grand théorème de Fermat.* Varsovie, 1912. 8vo. 8 pp.

BRANDENBURG (H.). *Der grosse Fermatsche Satz und sein Beweis.* 2te Ausgabe. Leipzig, Lorentz, 1913. 8vo. 8 pp. M. 0.60

CAJORI (F.). *An introduction to the modern theory of equations.* New reprint. New York, Macmillan, 1912. 8vo. 239 pp. Cloth. \$1.75

CAMPBELL (D. F.). *The elements of the differential and integral calculus.* New reprint. New York, Macmillan, 1912. 12mo. 362 pp. Cloth. \$1.90

CLEMENT-JONES (A.). *Introduction to algebraical geometry.* London, 1912. 8vo. 548 pp. Cloth. 12s. 6d.