

NOTES.

A NUMBER of copies of the first five volumes of the *Transactions* of the Society, the covers of which have become soiled with dust, but which are otherwise in good condition, are offered to members of the Society at \$2.50 per volume. Orders should be sent to the Secretary.

THE April number (volume 10, number 2) of the *Transactions of the American Mathematical Society* contains the following papers: "General theory of modular invariants," by L. E. DICKSON; "Beiträge zur Theorie der Gruppen linear homogener Substitutionen," by I. SCHUR; "Projective differential geometry of curved surfaces (fourth memoir)," by E. J. WILCZYNSKI; "Natural families of trajectories; conservative fields of force," by E. KASNER; "Plane fields of force whose trajectories are invariant under a projective group," by G. W. HARTWELL; "On the order of primitive groups," by W. A. MANNING; "Existence and oscillation theorem for a certain boundary value problem," by G. D. BIRKHOFF; "On the regions of convergence of power series which represent two dimensional harmonic functions," by M. BÔCHER.

THE April number (volume 31, number 2) of the *American Journal of Mathematics* contains: "Rational reduction of a pair of binary quadratic forms; their modular invariants," by L. E. DICKSON; "Surfaces and congruences derived from the cubic variety having a double line in four-dimensional space," by V. SNYDER; "Finite groups which may be defined by two operators satisfying two conditions," by G. A. MILLER; "Symmetric binary forms and involutions," by A. B. COBLE.

THE April number (volume 10, number 3) of the *Annals of Mathematics* contains: "A method of investigating numbers of the form $6^ns \pm 1$," by L. L. DINES; "The solution of algebraic equations by partial differential equations," by H. A. SAYRE; "The in- and circumscribed quadrilateral," by W. E. BYERLY; "Applications of probabilities to mechanics," by E. B. WILSON.

AT the meeting of the London mathematical society held on March 11 the following papers were read: By J. LARMOR, "The kinetic image of a convected electric system in a conducting plane sheet"; by G. H. HARDY, "On an integral equation"; by H. BATEMAN, "Transformation of electrodynamic equations

and the laws of motion"; by E. CUNNINGHAM, "Transformation of electrodynamic equations of moving bodies."

THE Smith prizes of Cambridge University for the year 1909 were awarded to N. W. TURNBULL (Trinity), for his essay: "The irreducible concomitants of two quadrics in n variables," and to G. N. WATSON (Trinity), for his essay: "The solution of the linear homogeneous difference equation of the second order and its application to the theory of linear differential equations of the Fuchsian type."

THE following members of the International Commission on the Teaching of Mathematics, established by the International Congress of Mathematicians held at Rome in April, 1908, have thus far been appointed: Austria, E. Czuber, R. Suppant-schitsch, W. Wirtinger; Denmark, P. Heegaard; France, P. Appell, C. Bourlet, C. A. Laisant; Germany, F. Klein, P. Staedel, P. Treutlein; Greece, K. Stephanos; Great Britain, Sir G. Greenhill; Holland, J. Cardinaal; Hungary, E. Beke, G. Rados; Italy, G. Castelnuovo, F. Enriques, G. Vailati; Portugal, G. Teixeira; Russia, N. J. Sonin, B. M. Kojalovič, M. Vogt; Spain, Z. G. de Galdeano; Switzerland, H. Fehr, C. F. Geiser; United States, W. F. Osgood, D. E. Smith, J. W. A. Young. The United States section has organized and elected Professor D. E. Smith chairman, and a preliminary report has been issued. The work in this country will be carried on by means of a number of committees and subcommittees soon to be appointed.

THE publishing house of Ginn and Company, of New York and Boston, announce a treatise on differential geometry by Professor L. P. EISENHART, of Princeton University, now in press and to appear during the early summer.

THE firm of Martin Schilling, manufacturer of mathematical models and apparatus announces that following the death of Mr. Schilling its address is changed to Leipzig, Kantstrasse 12. Its affairs will be conducted by a competent scientific director, as heretofore. A large number of new models for use in descriptive geometry, theory of curves and surfaces, theory of functions, algebra, and mechanics are being prepared, most of which will appear this spring.

WITH the April number of the *American Mathematical Monthly*, Professor L. E. Dickson retires from the board of

editors; the staff now consists of Professors B. F. FINKEL, G. A. MILLER and H. E. SLAUGHT. The place of publication has been transferred to Chicago.

THE following courses in mathematics are offered during the summer semester of 1909 :

UNIVERSITY OF BERLIN. — By Professor H. A. SCHWARZ : Problems in maxima and minima treated by methods of elementary geometry, two hours ; Integral calculus, four hours ; with exercises, two hours ; Theory of analytic functions, I, four hours ; Colloquium, two hours ; Seminar, two hours. — By Professor G. FROBENIUS : Theory of algebraic equations, II, four hours ; Seminar, two hours. — By Professor F. SCHOTTKY : Theory of elliptic functions, four hours ; Theory of potential, two hours ; Seminar, two hours. — By Professor G. HETTNER : Theory of probabilities and errors of observation, two hours. — By Professor J. KNOBLAUCH : Analytic geometry, four hours ; Theory of surfaces and space curves, four hours ; Congruences, one hour. — By Professor R. LEHMANN-FILHÈS : Differential calculus with exercises, four hours. — By Dr. I. SCHUR : Introduction to the theory of ordinary differential equations, four hours ; Theory of algebraic numbers and ideals, four hours.

UNIVERSITY OF BONN. — By Professor E. STUDY : Applications of the calculus to geometry, four hours ; Introduction to the theory of invariants, one hour. — By Professor E. LONDON : Differential and integral calculus, four hours ; Axonometry and perspective, two hours ; Seminar, two hours. — By Professor G. KOWALEWSKI : Theory and applications of determinants, three hours ; Differential equations, four hours ; Method of an infinite number of variables, one hour. — By Professor C. CARATHÉODORY : Calculus of variations, four hours ; Seminar, two hours. — By Dr. F. HESSENBERG : Theory of algebraic equations, four hours.

UNIVERSITY OF LEIPZIG. — By Professor C. NEUMANN : Theory of potential and spherical harmonics, four hours ; Seminar, two hours. — By Professor K. ROHN : Projective geometry, two hours ; Plane analytic geometry, four hours ; Seminar, two hours. — By Professor O. HÖLDER : General theory of functions of a complex variable, four hours ; Higher algebra, three hours ; Seminar, two hours. — By Professor F. HAUSDORFF :

Theory of numbers, three hours ; Theory of determinants, two hours.—By Professor H. LIEBMANN : Differential equations with exercises, six hours.

THE following courses in mathematics are announced for the year 1909–1910 :

UNIVERSITY OF CHICAGO (summer quarter, June 21 to September 3, 1909).—By Professor E. H. MOORE : General analysis, four hours ; Synthetic geometry, four hours ; Graphical algebra, four hours, all first term.—By Professor L. E. DICKSON : Theory of numbers, four hours ; Solid analytic geometry, five hours.—By Professor J. W. A. YOUNG : Critical review of secondary mathematics, four hours ; Limits and series, four hours.—By Professor J. B. SHAW : Elliptic integrals and Fourier series, four hours ; College algebra, five hours ; Trigonometry, five hours.—By Professor O. D. KELLOGG : Theory of functions of a complex variable, four hours ; Integral calculus, five hours ; Analytic geometry, five hours.—By Dr. A. C. LUNN : Vector analysis, four hours ; Differential calculus, five hours.—By Professor K. LAVES : Analytical mechanics, four hours.—By Dr. W. D. MACMILLAN : Introduction to celestial mechanics, five hours.

COLUMBIA UNIVERSITY.—By Professor T. S. FISKE : Advanced calculus, introduction to the theory of functions of a real variable, three hours ; Theory of functions of a complex variable, three hours.—By Professor F. N. COLE : Theory of groups, three hours ; Theory of invariants, three hours.—By Professor JAMES MACLAY : Application of the calculus to the theory of surfaces, three hours.—By Professor D. E. SMITH : History of mathematics, two hours.—By Professor C. J. KEYSER : General theory of assemblages, three hours ; Modern theories in geometry, three hours.—By Professor H. B. MITCHELL : Geometrical analysis, three hours.—By Professor EDWARD KASNER : Geometry of dynamical systems, two hours ; Contact transformations and applications, two hours.—By Professor G. H. LING : Theory of numbers, three hours ; Modern higher algebra, three hours.

CORNELL UNIVERSITY.—By Professor J. MCMAHON : Vector analysis, two hours ; Applications of vector fields, two hours ; Theory of probabilities, two hours.—By Professor J. H. TANNER : Teachers' course (assisted by Dr. F. W. OWENS),

three hours. — By Professor J. I. HUTCHINSON : Differential geometry, three hours (first term). — By Professor V. SNYDER : Algebraic curves, three hours. — By Professor W. B. FITE ; Theory of functions of a real variable, two hours. — By Dr. F. R. SHARPE : Introduction to mathematical physics, three hours. — By Dr. A. RANUM : Algebra, three hours (first term). — By Dr. D. C. GILLESPIE : Series, three hours (first term) ; Linear differential equations, three hours (second term). — By Dr. C. F. CRAIG : Analytic geometry, three hours. — By Dr. F. W. OWENS : Differential equations, two hours. — By Mr. J. V. MCKELVEY : Projective geometry, three hours. The Oliver mathematical club will meet weekly.

UNIVERSITY OF ILLINOIS. (All courses are three hours a week.) — By Professor S. W. SHATTUCK : Differential equations (first semester) ; calculus of variations (second semester). By Professor E. J. TOWNSEND : Theory of functions of a complete variable. — By Professor G. A. MILLER : Theory of groups (second course). — By Professor E. J. WILCZYNSKI : Projective differential geometry. — By Professor H. L. RIETZ : Theory of statistics. — By Professor C. N. HASKINS : Fourier series ; advanced calculus. — By Professor J. W. YOUNG : Theory of automorphic functions. — By Dr. C. H. SISAM : Theory of invariants and higher plane curves. — By Dr. A. R. CRATHORNE : Partial differential equations of physics. — By Professor YOUNG or Dr. R. L. BÖRGER : Projective geometry and linear transformations.

YALE UNIVERSITY. — By Professor J. PIERPONT : Theory of functions of a complex variable, two hours. — Advanced theory of functions, two hours ; Elliptic functions, two hours. — By Professor P. F. SMITH : Transformations of space, two hours ; Differential geometry, two hours. — By Professor E. W. BROWN : Mechanics, two hours ; Advanced calculus, three hours ; Hydromechanics, two hours. — By Professor H. E. HAWKES : Projective geometry, two hours ; Advanced algebra, two hours. — By Dr. W. A. GRANVILLE : Elementary differential geometry, two hours. — By Dr. W. R. LONGLEY : Differential equations, two hours. — By Dr. G. M. CONWELL : Elementary differential equations, one hour ; Foundations of geometry, two hours ; Invariants, two hours. — By Dr. E. G. BILL : Integral equations, one hour ; Analytic geometry, two hours.

AT the technical school of Zurich Drs. DU PASQUIER, KIENAST, and MEISSNER have been appointed docents in mathematics.

DR. O. SPIESS, of the University of Basel, has been promoted to an associate professorship of mathematics.

PROFESSOR G. LORIA, of the University of Genoa, has been elected foreign member of the royal Bohemian academy of sciences.

DR. ZORETTI has been appointed lecturer under the conditions of the Peccot foundation at the Collège de France. The subject of his course is singular points of analytic functions.

PROFESSOR G. HERGLOTZ, of the technical school at Vienna, has accepted a professorship of mathematics at the University of Leipzig, as successor to the late Professor W. Scheibner.

PROFESSOR F. SCHILLING, of the technical school at Danzig, has declined the professorship of mathematics at the technical school at Dresden made vacant by the resignation of Professor Disteli.

DR. A. THAER has been appointed docent in mathematics at the University of Jena.

PROFESSOR W. LUDWIG, of the technical school at Braunschweig, has accepted the professorship of descriptive geometry at the technical school at Dresden.

PROFESSOR V. VOLTERRA, of the University of Rome, has been elected corresponding member of the imperial academy of sciences of St. Petersburg.

PROFESSOR P. BURGATTI, of the University of Bologna, has been elected to membership in the Bologna academy of sciences.

DR. E. E. LEVI has been appointed associate professor of the calculus at the University of Genoa.

AT Columbia University, Dr. G. H. LING has been promoted to an associate professorship of mathematics.

AT Stanford University Professor H. C. MORENO and Professor S. D. TOWNLEY have been promoted to associate professorships of applied mathematics.

MR. J. V. MCKELVEY has been appointed instructor in mathematics at Cornell University.

THE alumni association of Columbia University gave a dinner to Dean J. H. VAN AMRINGE, on April 3, to celebrate his birthday and a half century of teaching in Columbia College.

PROFESSOR J. J. BROWNE, of the Colorado School of Mines died February 20, at the age of 42 years.

NEW PUBLICATIONS.

I. HIGHER MATHEMATICS.

- BÜCHER, neue, über Naturwissenschaften und Mathematik. Mitgeteilt Winter 1908-09. Leipzig, Hinrich. 8vo. Pp. 65-86. M. 0.30
- BURKHARDT (H.). See ENZYKLOPÄDIE.
- CASTELLS VIDAL (P.). Balanza algebraica para obtener las raíces reales de las ecuaciones algebraicas ó trascendentes, con una incógnita. Conferencia dada en el Instituto de Ingenieros Civiles el día 28 de Octubre de 1908. Madrid, 1909. 22 pp. P. 1.00
- CORREALE (E.). Principali formole di geometria analitica in coordinate biangolari. Napoli, De Rubertis, 1908. 16mo. 23 pp.
- ENZYKLOPÄDIE der mathematischen Wissenschaften mit Einschluss ihrer Anwendungen. Vol. II: Analysis. In 3 Teilen. Redigiert von H. Burkhardt und W. Wirtinger. 3ter Teil. 1tes Heft. Leipzig, Teubner, 1909. 8vo. Pp. 1-46. M. 1.50
- HOFFMANN (C.). Das Abelsche Theorem für die elliptischen Integrale. (Diss.) Tübingen, 1909. 8vo. 47 pp.
- JUNKER (F.). Höhere Analysis. 1er Teil: Differentialrechnung. 3te, verbesserte Auflage. Neudruck. (Sammlung Göschen, 87). Leipzig, Göschen, 1908. 8vo. 204 pp. Cloth. M. 0.80
- KOESTLER (W.). Beiträge zu Reihen-Entwicklungen nach Bessel'schen Zylinder-Funktionen. (Diss.) Bern, 1907. 8vo. 110 pp.
- LAISANT (C. A.). See LEFEBVRE (L. C.).
- LEFEBVRE (L. C.). Notions fondamentales de la théorie des probabilités. Préface de C. A. Laisant. Paris, Dulac, 1909. 8vo. 3 + 181 pp.
- NEUMANN (A.). Ueber quadratische Verwandtschaften in Ebene und Raum, insbesondere Kreis- und Kugelverwandtschaft. (Diss.) Königsberg, 1908. 8vo. 82 pp.
- PAGLIANO (C.). Sulle varietà algebriche formate da una semplice infinità di spazi. Cuneo, 1908. 4to. 10 pp.
- PEZZO (P.). Lezioni di geometria proiettiva, dettate nell' università di Napoli nell' anno 1908-09. Napoli, De Rubertis, 1908. 8vo. 354 pp. L. 12.00
- SCHMIDT (R.). Ueber zweite Polarflächen einer allgemeinen Fläche 4ter Ordnung. (Diss.) Breslau, 1908. 8vo. 96 pp.
- WIRTINGER (W.). See ENZYKLOPÄDIE.