

NOTES.

THE Toulouse Academy of Sciences announces for the year 1901 the following subject for its mathematical prize of five hundred francs :

“ The investigation of the families of surfaces possessing the property that all their orthogonal trajectories are plane curves, from one of the following points of view : 1° In order that all the surfaces defined in rectangular coördinates by the equation $\rho = f(x, y, z)$, where ρ is a parameter varying from one surface of the family to another, may have plane orthogonal trajectories, it is necessary that f should satisfy a partial differential equation of the third order. The study of this equation is proposed. 2° The perimorphic method may be employed, reference being made to the ‘ Mémoire sur la théorie générale des surfaces courbes ’ of Ribaucour (*Liouville's Journal*, ser. 4, vol. 7), particularly to chapter 13, entitled ‘ Recherches des trajectoires orthogonales planes des surfaces. ’ ”

Manuscripts may be written in French or Latin and must be deposited with the Secretary of the Academy before January 1, 1901. The usual conditions as to anonymity prevail.

AMONG the prize subjects announced by the Belgian Academy of Sciences for the year 1900 are two of mathematical character : 1° The history and theory of the variation of latitude. 2° The algebra and geometry of n -linear forms where $n > 3$. The prizes are gold medals of the value of six hundred francs each. Manuscripts may be written in French or Dutch, and must be sent to the Secretary of the Academy before August 1, 1900.

The second volume of the second edition of Professor H. WEBER'S *Lehrbuch der Algebra* has just appeared from the press of Vieweg und Sohn.

THE seventy-first meeting of the German association of naturalists and physicians will be held at Munich, September 18-23, 1899.

THE UNIVERSITY OF CHICAGO. During the four quarters (*su, a, w, sp*) of the year July, 1899-June, 1900, the following advanced mathematical courses (four or five hours weekly) will be offered :—By Professor MOORE : Algebraic numbers (introductory course, followed by a seminar) (*w*,

sp); Advanced algebra (a, w); Advanced integral calculus I (a); Functions of a complex variable I (sp).—By Professor BOLZA: Hyperelliptic functions (w); Seminar on hyperelliptic functions (w); Theory of groups (su); Functions of a complex variable I (su).—By Professor HATHAWAY (of the Rose Polytechnic Institute): Quaternions (su).—By Associate Professor MASCHKE: Linear differential equations (sp); Functions of a complex variable II (a); Theory of invariants (a); Twisted curves and surfaces (w, sp); Advanced integral calculus II (w).—By Assistant Professor YOUNG: Theory of numbers (a), Pedagogy of mathematics ($\frac{1}{2} su$), Determinants ($\frac{1}{2} su$).—By Dr. BOYD: Twisted curves and surfaces (su), Solid analytics (sp).—By Dr. SLAUGHT: Differential equations (su, sp).

The Mathematical Club, with fortnightly meetings, is under the direction of the departmental faculty.

COLUMBIA UNIVERSITY. During the academic year 1899–1900 the following advanced courses will be given by the department of mathematics, each course occupying three hours a week throughout the year:—By Professor FISKE: Advanced calculus; Theory of functions of a complex variable.—By Professor COLE: Theory of invariants; Theory of groups.—By Dr. MACLAY: Analytical theory of curves of double curvature and curved surfaces.—By Mr. KEYSER: Differential equations.

HARVARD UNIVERSITY. During the year 1899–1900 Professor OSGOOD will be absent in Europe on leave. During the first half of the academic year Professor PIERPONT, of Yale University, will give a course on Algebraic Numbers. The other advanced courses offered are:—By Professor J. M. PEIRCE: Quaternions (first course); Algebraic plane curves; and *either* Quaternions (second course) *or* Linear associative algebra. †.—By Professor ASAPH HALL (U. S. N.): Theory of planetary motions.—By Professor BYERLY: Dynamics of a rigid body. †.—By Professors BYERLY and B. O. PEIRCE: Fourier's series, spherical harmonics, potential function.—By Professor B. O. PEIRCE: Hydromechanics.—By Professor BÔCHER: Infinite series and products; † Higher algebra; † Linear differential equations.—By Dr. BOUTON: Theory of equations and invariants; † Theory of functions (first course).—By Mr. WHITTEMORE: Modern geometry; Differential and integral calculus (second course); Calculus of variations. †

These courses will each involve three lectures a week throughout the year, except those marked †, which involve

about half this number of lectures. The following courses of reading and research are also offered:—By Professor HALL: Selected topics in celestial mechanics.—By Professor BÔCHER: Linear differential equations.—By Dr. BOUTON: Continuous groups.

A mathematical conference will meet twice a month.

YALE UNIVERSITY. The following graduate courses in mathematics are announced for the session of 1899–1900: By Professor CLARK: Determinants and theory of equations, two hours, first term; Differential equations, two hours, second term.—By Professor GIBBS: Vector analysis, three hours; Electricity and magnetism, one hour; Thermodynamics and properties of matter, two hours.—By Professor BEEBE: Computation of orbits, two hours.—By Professor PIERPONT: Differential equations, three hours; Elliptic functions, two hours; Algebraic numbers and functions, two hours.—By Professor SMITH: Theory of transformations in space, two hours; Algebraic curves and surfaces, two hours.—By Dr. WESTLUND: Advanced calculus, three hours.—By Dr. STRONG: Higher algebra, three hours, first term.—By Mr. HAWKES: Modern analytic geometry, three hours, second term.—By Dr. STARKWEATHER: Mechanics, two hours.

THE number of the *Bolletino di bibliografia e storia delle scienze matematiche* for April, May, and June contains an appreciative account by Professor Segre of SOPHUS LIE and his work.

THE initial number of the current volume of the *American Journal of Mathematics* is accompanied by a photo-engraving of the portrait of Professor SIMON NEWCOMB, which was recently presented to Johns Hopkins University. Portraits of Sylvester, Cayley, Hermite, Klein, Poincaré, Fuchs, Lie, Halphen, and Darboux have appeared in previous volumes.

Professor THOMAS CRAIG, of Johns Hopkins University, has withdrawn from the editorship of the *American Journal of Mathematics* after seventeen years' service as associate editor and editor. The *Journal* is now in charge of Professor SIMON NEWCOMB.

LORD RAYLEIGH and Professor G. H. DARWIN have been elected honorary members of the New York Academy of Sciences.

PROFESSOR CHARLOTTE ANGAS SCOTT, of Bryn Mawr College, has been elected an honorary member of the Amsterdam Mathematical Society.

At the University of Göttingen Dr. GEORG BOHLMANN has been promoted to a professorship of mathematics, and Drs. J. SOMMER and E. ZERMELO have been appointed docents in mathematics.

DR. FLORIAN CAJORI, formerly professor of physics at Colorado College, has been made professor of mathematics in the same institution, and Dr. S. J. BARNETT has been promoted to the professorship of physics.

DR. L. A. BAUER has resigned his position as assistant professor of mathematics and mathematical physics at the University of Cincinnati, having been appointed chief of the new division of terrestrial magnetism in the U. S. Coast Survey. Dr. F. H. SAFFORD, instructor in mathematics at Harvard University, has been appointed to the position formerly held by Dr. Bauer.

DR. F. C. FERRY, of Clark University, has been elected assistant professor of mathematics in Williams College.

NEW PUBLICATIONS.

I. HIGHER MATHEMATICS.

- BERGER (A.). Undersökningar öfver nagra aritmetiske Funktioner. Stockholm, 1898. 8vo. 41 pp. M. 1.50
 — Om de konvexa Polyedrarne. Stockholm, 1898. 8vo. 26 pp. M. 1.20
- BITELLI (G.). L'insegnamento delle misure lineari superficiali volumetriche. Bologna, 1899. 12mo. 50 pp. Fr. 1.50
- BRUN (F. DE). Einige neue Formeln der Theorie der elliptischen Functionen. Theil II. Stockholm, 1898. 8vo. 9 pp.
- BURKHARDT (H.). Funktionentheoretische Vorlesungen. Zweiter (Schluss-) Theil. Elliptische Funktionen. Leipzig, Veit & Co., 1899. 8vo. 16 and 373 pp. M. 10.00
- ENCYKLOPÄDIE der mathematischen Wissenschaften. Erster Theil, Band I., zweites Heft. Leipzig, Teubner, 1899. M. 3.40
- ESCHERICH (G. v.). Die zweite Variation der einfachen Integrale. Mittheilung 1-3. Vienna, 1899. 8vo. 60, 60, 48 pp. M. 3.10