

number of positions of that kind. Thus the required number is the coefficient of $t^n/n!$ in

$$\exp(t + t^2/2 + t^3/6 + t^4/8 + \dots),$$

that is, in

$$\exp(t/2 + t^2/4) \cdot \exp\{-\frac{1}{2} \log(1-t)\},$$

that is, in

$$\exp(t/2 + t^2/4) / \sqrt{1-t},$$

which is the result obtained by Cayley. See Salmon's Higher Algebra, art. 45 of the third edition.

HAVERFORD COLLEGE, PA.

NOTES.

A REGULAR meeting of the NEW YORK MATHEMATICAL SOCIETY was held Saturday afternoon, February 3, at half-past three o'clock, the president, Dr. McClintock, in the chair. The following persons having been duly nominated, and being recommended by the council, were elected to membership: Professor L. C. Walker, St. Lawrence University; Miss Ruth Gentry, Bryn Mawr College; Miss Frances Hardcastle, University of Chicago. Professor Fine made some remarks upon the continuity of the number system, and Dr. Fiske described several different demonstrations of Weierstrass's theorem that only algebraic and periodic functions can possess an algebraic addition theorem.

THE address of Professor Newcomb on "Modern mathematical thought," which appeared in the BULLETIN for January, has been published in full in *Nature* of February 1, 1894, pp. 325-329.

A PORTION of the mathematical models and charts exhibited at Chicago by the German universities was secured by the department of mathematics of Columbia College. This portion, the principal part of which came originally from the institute of technology at Munich, is illustrative of theory of functions, analysis situs, plane curves and their singularities, surfaces, their singularities and curvature, and line-geometry.

THE last number of the *Rendiconti del Circolo Matematico di Palermo*, vol. 7, No. 6 (November-December, 1893) devotes 58 pages to lists of the mathematical articles contained in the recent volumes of 106 periodical publications. A supplement to the same number contains an index by authors to the first six volumes of the *Rendiconti*, a symbol being affixed to the title of each article in accordance with the notation adopted in the "Répertoire bibliographique des sciences mathématiques."

AT the University of Königsberg Professor H. Minkowski, recently of Bonn, has been made professor of mathematics, and Dr. V. Eberhard has been made professor extraordinarius of the same subject.

AMONG the courses announced at the *Sorbonne* by the Faculté des Sciences for the first semester of the present scholastic year are the following: Appell, Composition of forces and general laws of equilibrium and motion. Boussinesq, Interior friction of fluids; gradual extinction of waves. Darboux, Theory of rectilinear congruences and of the infinitesimal deformation of surfaces. Picard, Theory of differential equations; case of real variables and functions. Poincaré, Analytical theory of the conduction of heat. Tisserand, Theories relative to the figure of heavenly bodies. Supplementary courses and conferences upon mathematical subjects are also given by Andoyer, Königs, Painlevé, Pellat, Puiseux, and Raffy. Among the courses during the same semester at the *Collège de France* are one by Jordan on Elliptic functions and one by M. Lévy on the Theory of the tides.

T. S. F.

AT the mathematical club and seminar of the University of Chicago the following papers have been given since last October: (1) On the history of the addition theorem of elliptic integrals, Professor Bolza. (2) Concerning Del Pezzo's five-cusped plane quintic curve, Professor Moore. (3) A study of certain special cases of the hypergeometric differential equation, Dr. Boyd. (4) The existence of transcendental quantities, Dr. Young. (5) A configuration of 140 lines in space representing the substitution-group of 7 letters, Professor Maschke. (6) Cantor on the existence of transcendental numbers, Professor Bolza. (7) Hölder's proof that the function $I(x)$ satisfies no algebraic differential equation, Professor Moore. (8) A theorem of Runge in the theory of functions of a complex variable, Mr. Slaught. (9) The canonical coördinates of Hamilton-Jacobi in the differential equations of the problem of three bodies, Dr. Laves. (10) The singu-

larities of surfaces with illustrations from the models of the department, Professor Maschke.

At the University of Chicago during the summer quarter of 1894 the following courses in higher mathematics will be offered : Professor Moore : (1) Elliptic functions ; based on Weber, and presupposing a knowledge of the elements of the general theory of functions of a complex variable. (2) Theory of functions of a complex variable ; based on Forsyth. (3) Special seminar on functions ; fortnightly ; in connection with and a part of courses (1) and (2). Dr. Young : (4) Theory of numbers. (5) Elements of the theory of invariants with applications to higher plane curves.

The departmental club and seminar meets fortnightly. These announcements are preliminary and subject to change to meet more exactly the wishes of prospective students. It is important that those expecting to attend should give early notice. Revised announcements will appear in the May calendar of the university.

E. H. M.

A NEW journal is to be published by the Association for the Improvement of Geometrical Teaching. It will appear three times a year, under the name *The Mathematical Gazette*. The editor is Mr. E. M. Langley. The first number will contain, besides questions and solutions, articles on the following subjects: (1) Boscovich's treatment of the conic by means of the eccentric angle; (2) Herbart's view of the place of mathematics in education; (3) Greek geometers antecedent to Euclid; (4) Arithmetical approximation.

EUGÈNE CATALAN, professor of higher analysis in the University of Liège, Belgium, died at Liège on the 14th of February.

A. Z.

IN the preface to the recently published third volume of Lie's "Theory of transformation groups," edited by Engel, is a notice of two new works which Lie proposes to undertake. One is to give a detailed account of all his geometrical investigations and will relate to group theory, contact transformations, and differential equations. This is to be edited by Dr. Scheffers.

The other is to be edited by Professor Engel. It will present an independent theory of differential invariants, and, taking this as a basis, will attempt to develop in a perfectly complete and general manner the theory of continuous groups defined by differential equations. In this treatment infinite and finite groups will be equally considered. In the theory of differential equations the following problems will be dis-

cussed: first, the establishment of integrable canonical differential equations; second, the determination of criteria by which the possibility of reducing a given differential equation to a canonical form may be proved; third, a method of performing this reduction. A thorough investigation will be given also of those problems in integration which can be reduced to the integration of a complete system admitting known infinitesimal transformations. E. M. B.

NEW PUBLICATIONS.

I. HIGHER MATHEMATICS.

- BIANCHI (L.).** Lezioni di geometria differenziale. Parte I., pp. 1-256. Pisa, 1893. 8vo. Complete in two parts. Fr. 21.00
- CAJORI (F.).** A history of mathematics. New York, Macmillan, 1894. 8vo. 14 and 422 pp. Cloth. \$3.50
- CESÀRO (E.).** Corso di analisi algebrica con introduzione al calcolo infinitesimale. Torino, Bocca, 1894. 8vo. 8 and 499 pp. Illustrated. Fr. 12.00
- DIRICHLET**, see **LEJEUNE-DIRICHLET (P. G.)**.
- FOURET (G.).** Notions géométriques sur les complexes et les congruences de droites. Paris, Gauthier-Villars, 1893. 8vo. 74 pp.
- JACOB (J.).** Zur Lehre von der Theilbarkeit der Zahlen. [Progr.] Mährisch-Neustadt, 1893. 8vo. 7 pp.
- KILLING (W.).** Einführung in die Grundlagen der Geometrie. Vol. I. Paderborn, Schöningh, 1894. 8vo. 10 and 357 pp. Illustrated. Mk. 7.00
- LEJEUNE-DIRICHLET (P. G.).** Vorlesungen über Zahlentheorie. Herausgegeben und mit Zusätzen versehen von R. Dedekind. 4te, umgearbeitete und vermehrte Auflage. Braunschweig, Vieweg, 1894. 8vo. 17 and 657 pp. Mk. 14.00
- LINDENTHAL (E.).** Die Sprache der Mathematik. [Progr.] Wien, 1893. 8vo. 19 pp.
- LORIA (G.).** Della varia fortuna di Euclide in relazione con i problemi dell'insegnamento geometrico elementare. Roma, Tip. Elzeviriana, 1893. 8vo. 37 pp.
- LUCAS (ED.).** Récréations mathématiques. Vol. III. Paris, Gauthier-Villars, 1893. 8vo. 200 pp. Fr. 6.50