## NOTES.

THE regular October Meeting of the AMERICAN MATHE-MATICAL SOCIETY, which was to be held on October 31st, will be omitted, and in its place a special meeting will be held at Princeton University on Saturday, October 17th, at quarter past three. Professor FELIX KLEIN, of Göttingen, and Professor J. J. THOMSON, of Cambridge, will both be present at this meeting and it is expected that they will address the Society.

PROFESSORS KLEIN and THOMSON, who are delegates to the sesquicentennial celebration of the founding of Princeton University, will each deliver a course of lectures at Princeton during the week preceding the celebration. Professor KLEIN will deliver four lectures on the *Theory of the Top* on Monday, Tuesday, Wednesday and Thursday, October 12th to 15th, at eleven o'clock A. M. Professor THOMSON will deliver four lectures on the *Discharge of Electricity in Gases* on Tuesday, Wednesday, Thursday and Friday, October 13th to 16th, at nine o'clock A. M.

THE forty-fifth annual meeting of the American Association for the Advancement of Science was held at Buffalo, August 24–29, President EDWARD D. COPE, of Philadelphia, presiding. The attendance was quite small, only 330 members being registered. In the absence of Professor W. E. STORY, Professor ALEXANDER MACFARLANE, of South Bethlehem, Pa., was elected Vice-President of Section A. The Secretary of Section A was Professor E. B. FROST, of Hanover, N. H.

The following papers were read before Section A :

(1) An analogue to DeMoivre's theorem in a plane point system. By Professor E. W. HYDE.

(2) Rational scalene triangles. By Dr. ARTEMAS MARTIN.

(3) New elements of the variable R Comae, resulting from observations in July and August, 1896. By Mr. HENRY M. PARKHURST.

(4) Photometric observations of colored stars. By Mr. HENRY M. PARKHURST.

(5) Motion of the great red spot and equatorial belt on the planet Jupiter from 1879 to 1896. By Professor G. W. HOUGH.

(6) On the direct application of a rational differential equation to a series of points whose coördinates represent

observed physical properties. By Professor ROBERT B. WARDER.

(7) A proposed fundamental integral-transcendent. By Professor J. McMAHON.

(8) On the level of the sun-spots. By Professor EDWIN B. FROST.

(9) Sedenions. By Professor J. B. SHAW.

(10) On the distribution and the secular variation of terrestrial magnetism. No. IV: The component fields of the earth's magnetism. By Dr. L. A. BAUER.

(11) Determination of the weights of observations. By Professor J. R. EASTMAN.

(12) On the composition of simultaneous and successive vectors. By Professor ALEXANDER MACFARLANE.

The next annual meeting of the American Association will be held in Detroit during the week beginning August 9th. The meeting of the British Association will begin in Toronto on Wednesday of the following week, and it is expected that many of the members of the American Association will proceed to Toronto and join in welcoming the British Association to America. The President of the American Association for next year is Professor WOLCOTT GIBBS, of Cambridge. The officers of Section A for 1897 are: Vice-President, Professor W. W. BEMAN, of Ann Arbor, Secretary, Professor J. McMAHON, of Ithaca.

As announced in the last number of the BULLETIN (Vol. II., p. 339), the German Mathematical Society held its annual meeting September 21–26, at Frankfort-on-the-Main, in conjunction with Section 1 (Mathematics and Astronomy) of the German Association of Naturalists and Physicians. The preliminary programme sent out at the end of August, contains the following list of papers:

(1) A. BRILL (Tübingen): "The resolution of a ternary form into linear factors."

(2) R. FRICKE (Braunschweig): "Groups of birational transformations."

(3) A. GUTZMER (Halle): Subject to be announced later.

(4) L. HEFFTER (Giessen): Subject to be announced later.

(5) F. KLEIN (Göttingen): "On the elliptic formulæ of the motion of a top."

(6) G. KOHN (Vienna): "On the geometric interpretation of the invariants of doubly binary forms."

(7) G. LANDSBERG (Heidelberg): Subject to be announced later.

(8) F. MEYER (Clausthal) "On full systems in trigonometry."

(9) VOGEL (Barmen): "On the values of trigonometric expansions within certain limits."

(10) H. SCHAPIRA (Heidelberg): "On homoidal functions."

(11) H. SCHAPIRA: "On a cribrum algebraicum, or the cofunctional generation of prime numbers."

(12) F. SCHILLING (Aachen): "On circular-arc-triangles with branch-points on the sides."

(13) L. SCHLESINGER (Berlin): "On the transformation group of a linear homogeneous differential equation."

(14) A. SCHOENFLIES (Göttingen): "Transfinite numbers, the axiom of Archimedes, and projective geometry."

(15) E. STUDY (Bonn): "On invariants of motion."

(16) E. STUDY: "The problem of Apollonius."

(17) A. TAUBER (Vienna): "On a partial differential equation of the second order."

(18) A. WANGERIN (Halle): "Contributions to the theory of the potential."

The following papers are announced for a joint session with Section 2 (Physics and Meteorology):

(19) H. BURKHARDT (Göttingen): "On vector analysis."

(20) HEUN (Berlin): "On the mathematical and mechanical principles in their application to technical problems."

(21) O. RAUSENBERGER (Frankfort): "The discontinuities of fluid motions."

Two papers will be read at a joint session with Section 11 (The teaching of mathematics and the natural sciences):

(22) ISRAEL-HOLTZWART (Frankfort): "Proposition for extending the intuitive methods of mathematical instruction."

(23) SCHWALBE (Berlin): "On the preparation of teachers of mathematics and natural science in higher institutions according to the requirements of modern times."

The programme also announces that the proposition of holding, in 1897, an international mathematical congress at Zürich will be discussed at the meeting.

THE recent meeting of the British Association for the Advancement of Science at Liverpool was one of the largest in its history, the total number in attendance nearly reaching 3,200. The presidential address by Sir Joseph Lister dwelt principally with the application of biology to medicine. Professor J. J. Thomson, President of Section A, delivered an address devoted largely to the Roentgen rays.

Both of these addresses have since appeared in *Science*. The date of next year's meeting at Toronto was fixed for August 18th. The President-elect is Sir John Evans.

FACULTÉ DES SCIENCES. During the first semester of the academic year 1896–1897 the following mathematical courses are offered at the Sorbonne in Paris: By Professor Darboux: The principles of geometry and the theory of triple systems of orthogonal surfaces.—By Professor Picard: Theory of algebraic functions of two independent variables and its applications to certain questions of the integral calculus. —By Professor Appell: General laws of Equilibrium and of motion.—By Professor Tisserand : Motions of rotation of celestial bodies in general and in particular those of the Earth and the Moon.—By Professor Poincaré: Electrodynamics.—By Professor Boussinesq : Study of internal friction of fluids with applications to continuous flow and to the gradual extinction of sound and liquid waves. The following supplementary courses are also given : By Mr. Painlevé : Differential and integral calculus.—By Mr. Koenigs : Kinematics of a solid body.—By Mr. Andoyer: The motion of translation of the planets by the method of variation of parameters.—By Mr. Raffy : Mathematical theories introductory to the study of physics. Mathematical conferences are conducted by Messrs. Raffy, Puiseux, Painlevé, Andoyer and Blutel.

UNIVERSITY OF BERLIN. The mathematical courses announced for the winter semester are the following : By Professor Frobenius : Theory of algebraic equations.—By Professor Fuchs. Elliptic functions ; Linear differential equations.—By Professor Helmert : Least squares ; The influence of masses upon the Earth's surface on the shape of the sea level.—By Professor Schwarz: Theory of surfaces and curves in space ; Applications of elliptic functions with use of " Formeln und Lehrsätze ;" Calculus of variations ; Colloquium.—By Professor Hensel : Analytical geometry ; Theory of numbers.—By Professor Hettner: Analytical treatment of surfaces of the second order.—By Professor Knoblauch : Differential calculus ; Applications of elliptic functions.—By Professor Lehmann-Filhés : Least squares ; Hansen's method for the computation of absolute perturbations.—By Dr. Hoppe : Analytical geometry ; Differential calculus and theory of series.—By Dr. Kötter: Geometry of position ; Partial differential equations with physical applications.—By Dr. Pringsheim : Kinetic theory of gases. —By Dr. Rubens : Fluid motion.—By Dr. Schlesinger : In-

tegral calculus; Theory of potential.—By Dr. Wien: Integration of differential equations presenting themselves in physics.

UNIVERSITY OF LEIPZIG. During the coming winter semester the following mathematical courses will be offered: By Professor Scheibner: Theory of entire functions; Higher arithmetic.—By Professor C. Neumann: General theory of functions; Discussion of mathematical problems.—By Professor Bruns: Celestial mechanics; Least squares.—By Professor Lie: Introduction to projective geometry; Differential invariants; Seminar.—By Professor Mayer: Analytical mechanics.—By Professor von Oettingen: Synthetic Geometry.—By Professor Engel: Introduction to differential and integral calculus; Ordinary differential equations.—By Dr. Hausdorff: Analytical geometry; Insurance.

AMONG the forthcoming books of The Macmillan Company we notice J. M. PAGE, "Differential equations;" W. B. SMITH, "Infinitesimal analysis;" H. D. THOMPSON, "Elementary solid geometry;" J. B. LOCK, "Trigonometry for beginners, revised for use in American schools and colleges by J. A. Miller;" HALL and KNIGHT, "Elementary trigonometry, revised for American use by F. L. Sevenoak;" F. CAJORI, "A history of elementary mathematics;" A. G. WEBSTER, "The mathematical theory of electricity and magnetism;" C. CHRISTIANSEN, "Theoretical physics, translated by W. F. Magie;" R. CLAUSIUS, "On heat, translated by C. H. Bierbaum and edited by R. C. Carpenter;" D. C. JACKSON, "Alternating currents and alternating current machinery."

PROFESSORS W. W. BEMAN and D. E. SMITH are preparing an authorized English edition of F. KLEIN's "Vorträge über ausgewählte Fragen der Elementargeometrie," which will be published by Ginn & Co., of Boston, in the fall.

HENRI RESAL, a member of the French Academy of Sciences and for several years editor of the *Journal de Mathématiques pures et appliquées*, died on August 22d at the age of sixty-eight years.

DR. H. MINKOWSKI, professor of mathematics in the University of Königsberg, has been called to the Zürich Polytechnic Institute.

DR. GEORG SCHEFFERS, of the University of Leipsic, has been called to a professorship in the Polytechnic School at Darmstadt.

DR. ARNOLD MEYER, professor of mathematics in the University of Zürich, died at Zürich, July 7, 1896.

F. REULEAUX, professor of mechanical engineering in the Polytechnic School at Charlottenburg, near Berlin, has resigned his position. He has been engaged in teaching for 40 years.

W. VALENTINER, professor of astronomy in the Polytechnic School at Karlsruhe, has been called in the same capacity to the University of Heidelberg.

DR. L. CHRISTIAN WIENER, professor of descriptive geometry in the Polytechnic School at Karlsruhe, died July 31, at the age of 70.