

Series XXIV. Twelve kinematic models by Professor F. Schilling illustrating the generation of epitrochoids and hypotrochoids with fixed and with clamped centers, ellipses, cycloids and the inversors of Peaucellier, of Hart, and of Kempe. They are made of brass and celluloid and mounted on wood which has the generated curve traced on its surface (marks 545).

Series XXV. Seven thread models by Professor H. Wiener of the forms of cubic cones according to the classification of Möbius (marks 128). The accompanying memoir (not contained in the catalogue) of 34 pages contains an excellent synthetic discussion of the forms of plane cubic curves.

Series XXVI. *A*, ten laboratory pieces by Professor G. Hauck and *B*, eighteen special pieces by Professor F. Schilling, for illustration in descriptive and projective geometry (marks 264). The second group includes an ingenious apparatus for generating an ellipse by means of two projective pencils of lines.

Series XXVII. Three stereometric wire models of electric lines of potential and lines of force, by Professor O. Wiener (marks 200).

Series XXVIII. Six models of the twisted cubic curve, by Dr. W. Ludwig (marks 160). In this series is included an excellent thread model of the quartic developable surface.

Series XXIX. Three models to illustrate the theory of the top, by Professor H. Grassmann (marks 265).

In the buildings of the university at Göttingen ample and well equipped rooms are set apart for the construction and exhibition of models. Model-making is not only a fine art but an important discipline.

VIRGIL SNYDER.

#### NOTES.

THE fourth regular meeting of the San Francisco Section of the AMERICAN MATHEMATICAL SOCIETY was held at the University of California on Saturday, December 19. A report of the meeting will appear in an early number of the BULLETIN.

THE staff of associate editors of the *Transactions* of the AMERICAN MATHEMATICAL SOCIETY, as constituted for the year 1904, will consist of Professor E. B. VAN VLECK, Professor H. S. WHITE, Dr. C. L. BOUTON, Professor L. E. DICKSON,

Professor J. I. HUTCHINSON, Dr. EDWARD KASNER, and Dr. E. B. WILSON.

THE issue of the January number of the *American Journal of Mathematics* will be somewhat delayed, owing to a serious fire in the printing office.

AN ANNUAL conference of academies and high schools was held at the University of Chicago on November 13–14. Professor H. E. SLAUGHT was chairman of the mathematical section. A paper on “The teaching of elementary mathematics from the standpoint of the teacher of physics” was presented by Dr. E. C. WOODRUFF.

THE Central association of science and mathematics teachers held its third meeting at the Northwestern University Professional School in Chicago, November 27–28. The following papers were presented before the mathematical section: “A partial presentation of some experimental work correlating mathematics and physics, by Professor G. W. MYERS; “What mathematics shall be taught in the eighth school year?”, by Professor G. H. HOWE; “Current events of interest to teachers of mathematics,” by Professor C. E. COMSTOCK; “What mathematics has the teacher of physics a right to expect of his students?”, by Professor W. J. RISLEY. Professor MYERS exhibited some inexpensive and easily handled apparatus for illustrating problems in algebra, especially in solving equations and in variation. Professor C. E. COMSTOCK was elected chairman of the section.

THE Association of teachers of mathematics in the Middle States and Maryland was formally organized at Columbia University on November 28, 1903, with a membership of about 250. The programme announced in the December BULLETIN was carried out, and the following officers were elected for the ensuing year: President, Professor D. E. SMITH; Vice-president, Professor H. B. FINE; Secretary and Treasurer, Dr. ARTHUR SCHULTZE.

THE recommendations made by the committee on college entrance requirements of the AMERICAN MATHEMATICAL SOCIETY have been adopted by the College entrance examination board and will be made the basis of the board's examinations in mathematics on and after June, 1905.

THE National academy of sciences held its annual meeting at Chicago on November 17–19. No mathematical papers were presented.

AT the annual meeting of the London mathematical society held on November 12, the following papers were read: By Mr. W. H. YOUNG, "On sequences of sets of intervals containing a given set of points"; by Mr. H. HILTON, "On spherical curves"; by Dr. H. F. BAKER, "On the Weddle quartic surface"; by the Rev. F. H. JACKSON, "A formal generalization of Maclaurin's theorem"; by Mr. W. H. JACKSON, "Diffraction"; by Mr. H. S. HARDY, "A general theorem concerning absolutely convergent series"; by Professor J. D. EVERETT, "Note on Borgnet's method of dividing an angle in an arbitrary ratio"; by Mr. E. T. WHITTAKER, "On an expression of the electromagnetic field by means of two scalar potential functions"; by Professor A. E. H. LOVE, "The propagation of wave-motion in an isotropic elastic solid medium"; by Professor R. W. GENESE, "Notes on quaternions, including a simple construction for  $V\alpha\beta\gamma$ ."

UNIVERSITY OF PARIS.—The following mathematical courses are given during the first semester of the present academic year, opening November 9, 1903:—By Professor G. DARBOUX: Higher geometry, two hours.—By Professor E. GOURSAT: Advanced calculus and elements of analytic functions, two hours.—By Professor P. PAINLEVÉ: Mechanics of equilibrium and of motion, two hours.—By Professor P. APPELL: General introduction to higher mathematics, with particular regard to the applications, two hours.—By Professor H. POINCARÉ: Perturbations of the planetary orbits, two hours.—By Professor G. KOENIGS: Kinematics, two hours.—By Professor J. BOUSSINESQ: Thermomechanical properties of fluids and solids, two hours. Mathematical conferences will be held as follows:—By Professor S. RAFFY: Infinitesimal geometry and calculus.—By Professor P. PUISEUX: Mechanics.—By Professor H. ANDOYER and Mr. BLUTEL: General conferences for students of mathematics.

TEACHERS in the lycées of France must have passed the state examination (l'agrégation), which is independent of any particular school or college. The Normal School in Paris was founded to prepare students for these competitive examinations, and the quality of the scholarship of the candidates from this

institution has been such that a very high standard in the examinations has been maintained. Of late however, both the Normal School and the University of Paris have been seriously trenching on each other's field of work. In order to adjust this condition and to effect a unity of effort between the two institutions, the Normal School is to be intimately affiliated with the University after November 1, 1904.

THE Royal Institute of Venice announces the following prize problem :

“To complete in some important point the projective geometry of algebraic surfaces of two dimensions in space of  $n$  dimensions.”

Competing memoirs may be written in Italian, French, German, or English and must be sent to the secretary of the Institute, under the usual conditions, before December 31, 1906. The amount of the prize is 3000 lire.

THE Accademia Pontaniana of Naples announces as its prize subject for 1904: “An important contribution to the general intrinsic theory of curves.”

THE metric system has been adopted by New Zealand, to be exclusively employed from January, 1906.

TWO new lectureships in mathematics, of the value of £200 a year, have been established at the University of Cambridge by an unknown donor. They are to be known as the Cayley and the Stokes lectureships respectively, and have been filled by the appointment of Dr. E. W. HOBSON, of Christ's College and Dr. H. F. BAKER, of St. Johns.

PROFESSOR HUDSON'S lectures on the teaching of mathematics at King's College, Cambridge, have been postponed to next term, beginning January 23, 1904.

PROFESSOR J. LARMOR has been nominated by the council as one of the Secretaries of the London royal society.

PROFESSOR G. DARBOUX, L. BOLTZMANN, and H. POINCARÉ have accepted the official invitation to deliver addresses before the mathematical department of the congress of arts and science to be held in connection with the St. Louis exposition.

AT the University of Paris, Professor P. PAINLEVÉ has been appointed to the newly established chair of mathematics, and Professor H. ANDOYER has been transferred to the chair of physical astronomy.

PROFESSOR H. POINCARÉ has been elected a corresponding member of the Vienna academy of sciences.

THE honorary degree of doctor of science was bestowed upon Lord KELVIN on November 13, 1903, by the University of Wales.

DR. G. W. HILL has been elected a corresponding member of the Paris academy of sciences, section of astronomy, to succeed Professor G. SCHIAPARELLI, who has been elected a foreign associate of the Academy.

PROFESSOR M. SIMON, of the Lyceum at Strassburg, has been appointed honorary professor of mathematics in the University of Strassburg.

PROFESSOR J. CLAIRIN, of Dijon, has been appointed master of conferences in the University of Lille.

PROFESSOR R. LE VAVASSEUR, of Toulouse, has been appointed master of conferences in the University of Lyons, to succeed Professor E. CARTAN, who has been called to a similar position in the University of Nancy.

PROFESSOR J. DRACH, of Lille, will deliver a course of lectures on rational mechanics at the University of Poitiers during the present semester.

PROFESSOR E. LACOUR, of Nancy, has been appointed professor of pure mathematics in the University at Rennes.

MR. B. HOPKINSON, of Trinity College, has been elected professor of mechanism and applied mechanics at Cambridge University, in place of Professor J. A. EWING, resigned.

DR. K. PETR, of the Bohemian technical high school at Brünn, has been appointed associate professor of mathematics in the Bohemian University of Prague.

DR. G. B. HALSTED has been appointed professor of mathematics at Kenyon College, Gambier, Ohio.

DR. H. C. DE MOTT has been appointed professor of mathematics in the Illinois Wesleyan University.

THE following academic appointments are also announced: Mr. W. R. RANSOM and Mr. E. E. FROELICH as instructors in mathematics in Harvard University; Mr. W. E. MACDONALD and Mr. B. H. CAMP as instructors in mathematics

in the Massachusetts Institute of Technology ; Mr. F. E. KNOWLES as instructor in mathematics in the University of Oklahoma ; Mr. W. O. BEAL as instructor in mathematics in Illinois College ; Mr. O. S. STETSON as instructor in mathematics in Syracuse University ; Mr. J. W. BRISTER as associate professor of mathematics in the University of Nashville ; Mr. M. A. MACKENZIE, of Trinity College, Toronto, as associate professor of mathematics in the University of Toronto.

THE following catalogues of second-hand mathematical works have recently been issued : B. Quaritch, 15 Piccadilly, London, catalogue No. 225, 114 numbers, mostly very rare works ; Theodor Ackermann, Promenadenplatz 10, Munich, catalogue 175a, 2 pages ; J. Halle, Ottostrasse 3a, Munich, catalogue 33, 317 works on mathematics, mostly rare early editions, also 443 works on applied mathematics ; Anton Creutzer, Aachen, catalogue 82, mathematics and astronomy ; F. L. Dames, Landgrafenstrasse 12, Berlin W., catalogue 81, mathematics and physics ; Max Weg, Leplaystrasse 1, Leipsic, catalogue 91, 1581 numbers, including works in applied mathematics and 129 portraits.

MARCUS BAKER, cartographer of the U. S. Geological Survey and assistant secretary of the Carnegie Institution, died at Washington, December 12. Mr. Baker had been a member of the AMERICAN MATHEMATICAL SOCIETY since 1891.

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## . NEW PUBLICATIONS.

### I. HIGHER MATHEMATICS.

- BALL (R. S.). On the reflection of screw-systems and allied questions. Dublin, 1903. 4to. (*Transactions of the Royal Irish Academy*, Vol. 32, section A, part 6, pp. 101-154.) 1s. 6d.
- BLICHFELDT (H. F.). On the order of linear homogeneous groups. (*Transactions of the American Mathematical Society*, Vol. 4, pp. 387-397.)
- BOOLE (M. E.). Lectures on the logic of arithmetic. Cambridge, Macmillan and Bowes, 1903. 8vo. Cloth. 2s.
- BOWDEN (J.). Elements of the theory of integers. New York, Macmillan, 1903. 12mo. 10 + 258 pp. Cloth. \$1.25
- BUGAIEV (N. V.). Introduction to analysis and to the differential calculus. Moscow, 1902. 8vo. 204 pp., 1 plate. (Russian.)
- FIEDLER (W.). See SALMON (G.).