

matter of observational astronomy the book contains an introductory chapter on numerical calculation, including the theory of interpolation and the method of least squares. The last chapter is an exposition of Gauss's method for determining the elements of an elliptic or parabolic orbit from three complete observations.

The material in the book is not new, but its careful selection and clear presentation make it valuable to the instructor of beginning classes in practical astronomy.

W. R. LONGLEY.

NOTES.

AT the Colloquium of the AMERICAN MATHEMATICAL SOCIETY, to be held at Princeton University, September 15-17, courses of lectures will be delivered by Professor G. A. BLISS, on "Fundamental existence theorems," and Professor EDWARD KASNER on "Geometric aspects of dynamics." Professor J. H. JEANS having resigned his position at Princeton, the course of lectures announced to be given by him has been cancelled.

THE seventy-ninth annual meeting of the British Association for the Advancement of Science will be held in Winnipeg during the week August 25 to September 1. Sir J. J. THOMSON is president of the association for this meeting and Professor E. RUTHERFORD is president of Section A (Mathematics, Physics and Astronomy). Low rates are quoted by the Canadian railroads and there will be a number of excursions including one to the Pacific coast. Abstracts of papers, which the authors desire to have printed for use at the meetings, should be in the hands of the Secretary of Section A, Professor J. C. FIELDS, University of Toronto, early in June. For information other than that connected with the programme, application should be made to the "Local Secretaries of the British Association," Winnipeg, Manitoba.

AT the meeting of the London mathematical society held on April 22 the following papers were read: By F. TAVANI, "The general principles of the theory of integral equations"; by H. R. HASSÉ, "The equations of electrodynamics and the null influence of the earth's motion on optical and electrical

phenomena"; by S. N. WATSON, "The solution of a certain transcendental equation"; by H. BATEMAN, "The physical applications of certain conformal transformations of a space of four dimensions and the representation of a space time point by means of a sphere"; by A. E. WESTERN, "Some criteria for the residues of eighth and other powers"; by W. H. YOUNG, "On the discontinuities of a function of one or more real variables."

KING LEOPOLD, of Belgium, offers a prize of \$5,000 to the author of the best work on the subject: "Describe the progress of aerial navigation and the best means to encourage it." Competing memoirs may be written in any of the better known languages of Europe. They should be sent to the minister of sciences and arts at Brussels before March 1, 1911.

THE council of the American federation of teachers of the mathematical and the natural sciences met in Baltimore December 28, 1908. Reports were heard from the local organizations, and a memorial presented to Congress, urging that the board of education be given more extensive power. Professor H. W. TYLER, of the Massachusetts Institute of Technology, was elected president, and Professor C. R. MANN, of the University of Chicago, secretary-treasurer for the present year.

The following advanced courses in mathematics are announced for the year 1909-1910:

HARVARD UNIVERSITY.—Each course is three hours per week.—By Professor W. E. BYERLY: Introduction to modern geometry and modern algebra; Advanced calculus; Trigonometric series (with Professor Peirce).—By Professor W. F. OSGOOD: Theory of functions, I; Linear differential equations.—By Professor C. L. BOUTON: Theory of numbers (first half year); Elementary differential equations (second half year); Geometric transformations.—By Professor J. K. WHITTEMORE: Differential geometry of curves and surfaces (first half year); Properties of polynomials and invariants (second half year); Celestial mechanics (first half year).—By Professor J. L. COOLIDGE: Probability; Algebraic plane curves.—By Professor E. V. HUNTINGTON: Fundamental concepts of mathematics (second half year).—By Dr. H. N. DAVIS: Elements of mechanics.—By Mr. G. C. EVANS: Vector analysis

and quaternions. Courses of reading and research are offered by Professors Byerly, Osgood, Bouton, Whittemore, and Coolidge. A seminary in geometry will be conducted by Professors Bouton, Whittemore, and Coolidge.

JOHNS HOPKINS UNIVERSITY. — By Professor F. MORLEY: Higher geometry, two hours; Theory of functions, two hours (first half year); Vector analysis, two hours (second half year). — By Dr. A. COHEN: Differential equations, two hours; Elementary theory of functions, two hours. — By Dr. A. B. COBLE: Theory of groups, two hours; Theory of probabilities, two hours (first half year).

UNIVERSITY OF PENNSYLVANIA (Summer School, July 6 to August 17, 1909). Each course one hour daily. — By Professor I. J. SCHWATT: Infinite series and products. — By Professor G. H. HALLETT: Modern analytic geometry. — By Professor F. H. SAFFORD: Differential equations. — By Dr. O. E. GLENN: Invariant algebra.

PROFESSOR H. E. TIMERDING, of the University of Strassburg, has accepted a professorship of mathematics at the technical school of Braunschweig.

DR. W. VOGT has been appointed docent in mathematics at the technical school at Karlsruhe.

DR. W. KUTTA, of the technical school at Munich, has accepted an associate professorship of mathematics at the University of Jena.

AT the meeting of the National academy of sciences held at Washington April 22–24 the following mathematicians and physicists were elected to membership: J. S. AMES, of Johns Hopkins University; MAXIME BÔCHER, of Harvard University; OSKAR BOLZA, of the University of Chicago; H. CREW, of Northwestern University.

PROFESSOR W. F. OSGOOD, of Harvard University, has been elected corresponding member of the Mathematical Society of Charkow.

DR. C. L. E. MOORE, of the Massachusetts Institute of Technology, has been promoted to an assistant professorship of mathematics.

AT Williams College Dr. F. L. GRIFFIN has been promoted to an assistant professorship of mathematics.

MR. L. L. SILVERMAN, of the University of Missouri, has been appointed instructor in mathematics at Cornell University.

PROFESSOR MAXIME BÔCHER, of Harvard University, has been granted a leave of absence for the academic year 1909-1910; he will spend the year in study in Europe.

PROFESSOR H. v. STAHL, of the University of Tübingen, died April 6, at the age of 65 years.

RECENT second-hand catalogues of mathematical works: A. Hermann & Fils, 6, rue de la Sorbonne, Paris, Bulletin No. 97, about 1,500 titles.—Conrad Skopnik, Prinz Louis Ferdinandstrasse 1, Berlin, N. W., Catalogue No. 43, 731 titles in mathematics, physics, and astronomy.

NEW PUBLICATIONS.

I. HIGHER MATHEMATICS.

BÜCHEL. See MITTEILUNGEN.

FINKE (P.). Ueber Scharen von ∞^5 Kurven im gewöhnlichen Raume. (Diss.) Berlin, Frenkel, 1909. 8vo. 36 pp. M. 2.00

GROSS (T.). See STURM (C.).

HOFFMANN (F.). Der Satz von Fermat. Strassburg, 1909. 8vo. M. 0.50

HOPPE. See MITTEILUNGEN.

MELLOR (J. W.). Higher mathematics for students of chemistry and physics. London, Longmans, 1909. 8vo. 664 pp. Cloth. 15s.

MITTEILUNGEN der mathematischen Gesellschaft in Hamburg. Vol. IV. 9tes Heft. Redigiert von Hoppe, Büchel und Umlauf. Leipzig, Teubner, 1909. 8vo. Pp. 403-456. M. 1.60

OSGOOD (W. F.). Differential and integral calculus: a first course. Revised edition. New York, Macmillan, 1909. 12mo. 15 + 462 pp. \$2.00

STURM (C.). Lehrbuch der Analyse (Cours d'analyse). Uebersetzt von T. Gross. Neue Ausgabe. Berlin, 1909. 8vo. M. 10.00

STURM (R.). Die Lehre von den geometrischen Verwandtschaften. Dritter Band: Die eindeutigen linearen Verwandtschaften zwischen Gebilden dritter Stufe. Leipzig and Berlin, Teubner, 1909. 8vo. 8 + 574 pp. Cloth. M. 20.00

UMLAUF. See MITTEILUNGEN.

VLACHOS (C.). Der Beweis des Fermat'schen Satzes. Berlin, Gottheiner, 1908. 8vo. 7 pp. M. 0.75

VOGT (H.). *Éléments de mathématiques supérieures à l'usage des physiciens, chimistes et ingénieurs et des élèves des facultés de sciences.* 5e édition. Paris, Vuibert, 1909. 8vo. 8 + 708 pp.