The work naturally contains little to interest the student of pure mathematics, but it can be highly recommended to the physicist and forms an acceptable addition to electrical literature.

S. J. BARNETT.

NOTES.

THE annual meeting of the AMERICAN MATHEMATICAL SOCIETY will be held on Thursday and Friday, December 28–29. The Council will meet on Thursday morning, and the annual election of officers and other members of the Council will close on Friday morning. The usual informal dinner will be arranged for Thursday evening.

THE Chicago Section will hold its eighteenth regular meeting at the University of Chicago, on December 29–30. Titles and abstracts of papers to be presented at this meeting should be in the hands of the Secretary of the Section, Professor THOMAS F. HOLGATE, 617 Library Street, Evanston, Ill., not later than December 5.

THE concluding (October) number of volume 6 of the *Transactions* of the AMERICAN MATHEMATICAL SOCIETY contains the following papers: "Sur l'écart de deux courbes et sur les courbes limites," by M. FRÉCHET; "On a certain system of conjugate lines on a surface connected with Euler's transformation," by J. EIESLAND; "Surfaces of constant curvature and their transformations," by L. P. EISENHART; "Volumes and areas," by N. J. LENNES; "On a problem including that of several bodies and admitting of an additional integral," by E. O. LOVETT; "On the stability of the motion of a viscous liquid," by F. R. SHARPE; "Ueber die vollständig reduciblen Gruppen, die zu einer Gruppe linearer homogener Substitutionen gehören," by A. LOEWY; "On the Cayley-Veronese class of configurations," by W. B. CARVER. Also, Notes and Errata, volumes 5–6; and table of contents, volume 6.

THE October number (volume 7, number 1) of the *Annals of Mathematics* contains: "Concerning Green's theorem and the Cauchy-Riemann differential equations," by M. B. PORTER; "On the singularities of tortuous curves," by P. SAUREL; "On the twist of a tortuous curve," by P. SAUREL; "The continuum as a type of order: an exposition of the modern

theory, V–VI. With an appendix on the transfinite numbers," by E. V. HUNTINGTON; "A problem in analytic geometry with a moral," by M. BÔCHER.

THE concluding (October) number of volume 27 of the *American Journal of Mathematics* contains: "Concerning certain 4-space quintic configurations of point ranges and congruences, and the sphere analogues in ordinary space," by C. J. KEYSER; "Some relations between number theory and group theory," by G. A. MILLER; "The differential invariants of space," by J. E. WRIGHT; "An arithmetic treatment of some problems in analysis situs," by L. D. AMES; "On the definition of reducible hypercomplex number systems, II," by H. B. LEONARD.

THE last number (double number 8 and 9, volume 14) of the *Jahresbericht der deutschen Mathematiker-Vereinigung* contains a good portrait of Sir W. R. Hamilton, together with an appreciative estimate of his scientific work by Professor E. STUDY. The address of the editor, Professor Dr. A. GUTZMER, is now Halle a. S., Martinsberg 8 I.

THE mathematical section of the California teachers association will hold its first regular meeting at the University of California on December 26. Professors I. STRINGHAM and J. B. CLARKE will read papers before the section.

THE publishing house of B. G. Teubner, in Leipzig, announces that the following books are in press: H. BRUNS, Wahrscheinlichkeitsrechnung und Kollektivmasslehre; N. NIELSEN, Handbuch der Theorie der Gammafunktionen; FR. ROGEL, Das Rechnen mit Vorteil; E. J. WILCZYNSKI, Projective differential geometry of curves and ruled surfaces (in English).

THE technical schools named below offer the following courses in mathematics for the present winter semester:

AACHEN. — By Professor F. JÜRGENS: Higher mathematics, I. — By Professor F. KÖTTER: Descriptive geometry; Graphical statics. — By ——— (Successor to Professor L. Heffter): Higher mathematics, II, with exercises; Seminar. — By Professor A. SOMMERFELD: Mechanics, I and II.

BERLIN. — By Professor O. DZIOBEK: Analytic geometry Differential and integral calculus. — By Professor E. HAENTZ-

SCHEL: Analytic geometry; Differential and integral calculus. — By ——— : Descriptive geometry, I. — By Professor H. HERZEN: Descriptive geometry, I. — By Professor G. HETTNER: Analytic geometry; Differential and integral calculus; Theory of surfaces and twisted curves. — By Professor S. ZOLLES: Descriptive geometry, I; Graphical statics. — By Professor E. LAMPE: Analytic geometry; Differential and integral calculus; Definite integrals and differential equations. — By Professor E. STEINITZ: Theory of potential; Theory of functions; Algebra. — By Professor G. HESSENBERG: Descriptive geometry, II. — By Professor S. KALISCHER; Elements of the theory of potential. — By Dr. R. MÜLLER: Differential and integral calculus.

BRÜNN. — By Professor E. WÄLSCH: Elementary mathematics, seven hours; Vector analysis, one hour. — By Professor O. BIERMANN: Selected chapters of higher mathematics, three hours; Approximation methods, two hours; Calculus of variations, one hour. — By Dr. E. FISCHER; Fourier's series, two hours; Theory of elimination, two hours; Exercises in higher mathematics, one hour. — By Professor O. RUPP: Descriptive geometry, six hours; with exercises, eight hours. — By Dr. F. OBENRAUCH: History of geometry, one hour.

BRUNSWICK. — By Professor R. DEDEKIND: Theory of numbers; Fourier's series. — By Professor R. FRICKE: Analytic geometry and algebra; Differential and integral calculus; Selected chapters of higher mathematics. — By Professor R. MÜLLER: Descriptive geometry with exercises; Theory of surfaces and twisted curves; Geometry of position.

DANZIG. — By Professor H. v. MANGOLDT: Higher mathematics, II. — By Professor F. SCHILLING: Descriptive geometry. — By Professor J. SOMMER: Higher mathematics, I.

DARMSTADT. — By Professor F. DINGELDEY: Higher mathematics, I and II. — By Professor P. FENNER: Trigonometry. — By Professor F. GRAEFE: Repertorium of higher mathematics; History of mathematics. — By Professor S. GUNDELFINGER: Higher mathematics, I. — By Professor L. HENNEBERG: Mechanics. — By Professor G. SCHEFFERS: Higher mathematics, I.; Descriptive geometry, I. — By Professor H. WIENER: Descriptive geometry, I and II. — By Dr. K. GAST: Practical geometry. — By Dr. W. SCHLINK: Selected chapters of analytic mechanics; Vector analysis.

DRESDEN. — By Professor M. KRAUSE: Differential calculus with exercises, five hours; Introduction to the theory of infinite processes, four hours; Seminar, one hour. — By Professor A. FUHRMANN: Applications of the calculus, two hours; Theory of surveying, two hours; Geodetic drawing, two hours. — By Professor G. HELM: Analytic geometry, II., four hours; Analytic mechanics, two hours. — By Professor M. DISTELI: Descriptive geometry, three hours; with exercises, four hours; Theory of surfaces and twisted curves, two hours. — By Professor E. NAETSCH: Selected chapters of the theory of partial differential equations, two hours.

GRAZ. — By Professor F. HOČEVAR: Algebra and analytic geometry, six hours; with exercises, two hours; Spherical trigonometry, one hour. — By Professor L. PEITHNER: Applications of the calculus to surfaces and twisted curves, four hours; with exercises, two hours. — By Professor K. STELZEL: Higher mathematics, four hours. — By Professor R. SCHÜSSLER: Descriptive geometry, four hours; with exercises, six hours; Theory of conics, three hours.

HANOVER. — By Professor L. KIEPERT: Differential and integral calculus, I, six hours; Geometry of position, three hours; Differential and integral calculus, III, two hours; Theory of differential equations and calculus of variations, two hours. — By Professor P. STÄCKEL: Differential and integral calculus, II, five hours; Elements of higher mathematics for architects and chemists, I, four hours; Analytic geometry of two and three dimensions, three hours. — By Professor C. RODENBERG: Descriptive geometry, I, nine hours; Descriptive geometry, II, nine hours. — By Dr. O. PETZOLD: Algebraic analysis and trigonometry, three hours; Exercises in the adjustment of errors, one hour.

KARLSRUHE. — By ——— (successor to Professor R. Haussner, who is now professor in Jena): Plane analytic geometry, three hours; Arithmetic and algebra, three hours; Trigonometry, three hours; Surfaces and twisted curves, two hours. — By Professor K. HEUN: Mechanics, I and II, six hours; Elementary mechanics, two hours. — By Professor A. KRAZER: Higher Mathematics, II, three hours; Exercises in hyperelliptic functions, two hours. — By Professor F. SCHUR: Descriptive geometry, four hours; with exercises, four hours;

Graphical statics, with exercises, four hours. — By Professor L. WEDEKIND: Higher mathematics, I, six hours; with exercises, two hours. — By Dr. G. HAMEL: Exercises in higher mathematics, one hour; Vector analysis with applications, two hours; Elements of mechanics, four hours.

MUNICH. — By Professor S. FINSTERWALDER: Higher mathematics, I, with exercises; Noneuclidean geometry. — By Professor A. v. BRAUNMÜHL: Elements of higher mathematics, III, with exercises; Seminar. — By Professor W. v. DYCK: Higher mathematics, I, with exercises; Theory of functions; Seminar. — By Professor L. BURMESTER: Descriptive geometry, I, with exercises.

PRAGUE (German). — By Professor K. ZSIGMONDY: Mathematics, I, six hours; Differential and integral calculus, two hours. — By Professor A. GRÜNWALD: Mathematics, II, five hours; Differential equations, two hours. — By Professor E. JANISCH: Descriptive geometry, four hours; with exercises, eight hours; Geometry of position, three hours. — By Dr. A. ADLER: Graphical calculation, two hours; Elements of geometry of motion, two hours.

STUTTGART. — By Professor R. MEHMKE: Descriptive geometry with exercises; Analytic mechanics with exercises; Seminar. — By Professor K. REUSCHLE: Discussion of curves; Analytic geometry of space with exercises; Invariants; Differential and integral calculus, II and III, with exercises; Seminar. — By Professor E. WÖLFFING: Elements of differential and integral calculus: Theory of functions, I. — By Dr. W. BRETSCHNEIDER: Review of elementary mathematics. — By Dr. J. STÜBLER: Elementary analysis.

THE Royal institute of Venice announces the following prize problem, for the solution of which it offers the Querini Stampalia prize of 3000 lire:

"To perfect in some important point the projective geometry of algebraic surfaces of two dimensions in space of n dimensions."

Competing memoirs should be written in Italian, French, English or German, and submitted to the secretary of the institute under the usual conditions before December 31, 1906.

PROFESSOR F. SEVERI, of Pisa, has been appointed professor of geometry at the University of Parma.

PROFESSOR C. SOMIGLIANA, of Pavia, has been appointed professor of mathematical physics at the University of Turin.

DR. H. BOURGET, master of mathematical conferences at the University of Toulouse, has been appointed professor of mathematics at the same institution.

DR. R. LEVAVASSEUR has been appointed master of mathematical conferences at the University of Lyons.

ON the occasion of the inauguration of President James of the University of Illinois, the honorary degree of doctor of laws was conferred upon Professor T. F. HOLGATE, of Northwestern University.

AT New York University, Dr. T. N. EDMONDSON, associate professor of physics, has been appointed professor of mathematics to succeed Professor P. LADUE, resigned. Dr. A. SCHULTZE, of the New York High School of Commerce, has been appointed assistant professor of mathematics.

DR. G. A. ARMSTRONG takes the place of Professor W. D. Cairns in the department of mathematics at Oberlin College during the latter's absence in Europe, and Mr. J. S. HAUCKEY has been appointed instructor in mathematics.

PROFESSOR ELEANOR DOAK has been made associate professor of mathematics at Mount Holyoke College, and granted a leave of absence for the present year. Miss CHRISTINE BUSBEE has been made instructor in mathematics in the same institution.

MR. C. R. MACINNIES and Mr. E. B. MORROW have been appointed instructors in mathematics at Princeton University.

MR. R. H. LEE has been appointed professor of mathematics at the Rhode Island State College.

MR. H. N. DAVIS has been appointed instructor in mathematics in Harvard University.

DR. J. V. WESTFALL has resigned the assistant professorship of mathematics in the State University of Iowa to accept an actuarial position in New York. Mr. W. E. BECK has resigned an instructorship in mathematics at the same university, having been appointed assistant in the computing division of

the United States coast and geodetic survey. Mr. R. P. BAKER and Mr. C. M. THORNE have been appointed to fill the vacancies thus created.

MR. W. H. SHERK, of Oberlin College, has been appointed professor of mathematics at Buchtel College, Akron, Ohio.

MR. G. I. GAVETT, of Stanford University, has been appointed instructor in civil engineering at Cornell University.

MR. W. V. N. GARRETSON and Mr. C. E. LOVE have been appointed instructors in mathematics in the University of Michigan.

DR. H. B. LEONARD has been appointed instructor in mathematics at the University of Colorado.

DR. R. B. MCCLENON, of Yale University, has been appointed instructor in mathematics at Iowa College, Grinnell, Iowa.

THE following have been appointed instructors in mathematics at the Pennsylvania State College: Mr. H. H. HIGLEY, of the East Stroudsburg Pennsylvania Normal School, Mr. G. A. WHITTEMORE, of Harvard University, and Mr. J. W. BEAL, of Colgate University.

MR. P. CAPRON, of Dummer Academy, has been appointed instructor in mathematics at Williams College, Williamstown, Mass.

MR. D. J. CRITTENBERGER and Mr. C. HASEMAN have been appointed assistants in mathematics at the University of Indiana.

MR. ARTHUR RANUM, formerly professor of mathematics in the University of Washington, has been appointed assistant in mathematics at Stanford University.

PROFESSOR FLORIAN CAJORI, of Colorado College, has received a half-year leave of absence, which he is spending at New York and Washington in collecting materials for his work as collaborator in extending Cantor's History of Mathematics through the period 1759–1799. Readers of the BULLETIN will be interested to learn that Professor Cajori has found in the New York Public Library (Lenox Branch) and in the

Columbia University Library copies of E. S. Bring's dissertation on the transformation of the quintic (Lund, 1786). Mr. Harley (*Quarterly Journal of Mathematics*, volume 6 (1863), page 43), could not learn of a complete copy outside of Sweden, except one at the Pulkova Observatory. Mr. C. Hill (*Öfersigt af Kongl. Vetenskaps-Acadamiens Förhandlinger*, 1861, page 317) speaks of its rarity even in Sweden.

DR. W. F. WISLICENUS, editor of the *Astronomisches Jahresbericht*, died October 3, at the age of 46 years.

NEW PUBLICATIONS.

I. HIGHER MATHEMATICS.

ARRIGHI (G. L.). La storia della matematica in relazione con lo sviluppo del pensiero. Torino, Paravia, 1905. 16mo. 13 + 133 pp. L. 1.50

BÄHR (E.). Abbildung einer unendlichen Ebene, die durch Aufschlitzen längs zweier senkrecht zu einander stehenden Strecken zu einem zweifach zusammenhängenden Bereiche gemacht wird, auf ein Rechteck und einen Kreisring. (Diss.) Jena, 1905. 8vo. 40 pp.

BLYTHE (W. H.). On models of cubic surfaces. Cambridge, University Press (New York, Macmillan), 1905. 12mo. 12 + 106 pp. Cloth. $1.25

BOLYAI DE BOLYA (W.). Tentamen iuventutem studiosam in elementa matheseos purae elementaris ac sublimioris methodo intuitiva evidentiaque huic propria introducendi, cum appendice triplici. Editio secunda. Tomus II: Elementa geometriae et appendices. Mandato Academiae scientiarum hungaricae suis adnotationibus adiectis ediderunt J. Kürschák, M. Réthy, B. Tötössy de Zepethnek, Academiae scientiarum hungaricae sodales. Pars prima: Textus. 63 + 437 pp. Pars secunda: Figurae. 8 pp., 82 plates. Leipzig, Teubner, 1904. 4to.

BRICARD (R). Matematika terminaro kaj krestomatio. Paris, Hachette, 1905. 16mo. 61 pp. (Kolekto esperanta.)

CARSLAW (H. S.). Introduction to the infinitesimal calculus. Notes for the use of science and engineering students. London, Longmans, 1905. 8vo. Cloth. 5s.

DOSTOR (G.). Eléments de la théorie des déterminants, avec application à l'algèbre, la trigonométrie et la géométrie analytique dans le plan et dans l'espace, à l'usage des classes de mathématiques spéciales. 2e édition (nouveau tirage). Paris, Gauthier-Villars, 1905. 8vo. 33 + 362 pp. Fr. 8.00

FREY (H.). Ueber das Vorzeichen gewisser bestimmter Integrale. (Diss.) Heidelberg, 1905. 8vo. 47 pp.

GMEINER (J.). See STOLZ (O.).

GRAF (J. H.) Briefwechsel von Ludwig Schläfli mit Arthur Cayley. Mit dem Facsimile eines Briefes von A. Cayley. Festgabe der Universität Bern für das 50-jährige Jubiläum des eidgenössischen Polytechnikums in Zürich. 1855–1905. Bern, 1905. 8vo. 42 pp.