

receives a long discussion. An extensive knowledge of the forms of cubic surfaces is presupposed, the author constantly referring to his own book on this subject.

The chapter on involutorial transformations is an enumeration of a number of the better known cases, such as generalized quadratic inversion, the polarity of a cubic surface from a point upon it, the harmonic conjugate of a point with regard to the points of intersection of a line through it and cutting a given cubic curve twice, and the pairs of associated points defining a bundle in a system of  $\infty^3$  quadric surfaces passing through six fixed points, this last case being the Geiser transformation of space. The peculiarities of the fifteen lines joining the six points by twos and the cubic curve passing through all of them are discussed in detail. These lines are interesting as furnishing the first example of a principal curve of the second kind. The more general investigations of Montesano are not considered in the present volume.

The last chapter treats of multiple correspondences in space of three dimensions. It begins with the determination of the number of coincidences, and confirms the result by numerous simple illustrations. A short discussion is devoted to correspondences in line space; the general formula for the number of coincidences is derived and a simple illustration given. As in the case of the plane, the next section considers more in detail the (2, 1) correspondence first studied by Paolis. Most of the results are directly analogous in space to those obtained above for the plane, but to follow the proofs a knowledge of the author's treatise on line geometry is necessary. This interesting section is followed by two cases of (2, 2) quaternary correspondences, and a generalization of the duality defined by a linear complex (höhere Nullverwandtschaft). A short appendix completes the proofs of a few theorems in the preceding volumes and extends a few results to more general cases.

VIRGIL SNYDER.

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#### NOTES.

THE Annual Register of the AMERICAN MATHEMATICAL SOCIETY is now in preparation and will be issued in January. Blanks for furnishing necessary information have been sent to the members. Early notice of any changes since the issue of the last Register will greatly facilitate the work of the Secretary. The

Register is widely circulated and it is desirable that the information which it contains should be accurate and reliable.

THE concluding (October) number of volume 11 of the *Transactions of the American Mathematical Society* contains the following papers: "Conjugate line congruences contained in a bundle of quadric surfaces," by V. SNYDER; "On the fundamental number of the algebraic number-field  $k(\sqrt[p]{m})$ ," by J. WESTLUND; "Volterra's integral equation of the second kind, with discontinuous kernel," by G. C. EVANS; "Ein Seitenstück zur Möbius'schen Geometrie der Kreisverwandtschaften," by H. BECK; "Vector interpretation of symbolic differential parameters," by L. INGOLD; "Surfaces with isothermal representation of their lines of curvature and the transformations (second memoir)," by L. P. EISENHART; "On the base of a relative number-field, with an application to the composition of fields," by G. E. WAHLIN; "The strain of a non-gravitating sphere of variable density," by L. M. HOSKINS.

THE concluding (October) number of volume 32 of the *American Journal of Mathematics* contains the following papers: " $q$ -difference equations," by F. H. JACKSON; "On the relation between the sum-formulas of Hölder and Cesàro," by W. B. FORD; "Sur un exemple de fonction analytique partout continue," by D. POMPIEU; "Symmetric binary forms and involutions," by A. B. COBLE; "Systems of tautochrones in a general field of force," by A. W. REDDICK; "The general transformation theory of differential elements," by E. KASNER.

THE opening (October) number of volume 12 of the *Annals of Mathematics* contains the following papers: "The straight line solutions of the problem  $n$  bodies," by F. R. MOULTON; "On semi-analytic functions of two variables," by MAXIME BÔCHER; "Some theorems concerning systems of linear partial differential expressions," by W. J. BERRY; "Some circles associated with coneylic points," by J. L. COOLIDGE; "On a method for the summation of series," by R. E. GLEASON.

AT the annual meeting of the Cambridge philosophical society on October 31 Mr. G. H. HARDY read a paper on "Fourier's double integral and the theory of divergent integrals."

THROUGH the gift of Mr. John Claffin the College of the City of New York has acquired the library of the late SIMON NEWCOMB, consisting of 4,000 books and 6,000 pamphlets.

ON September 4 more than a hundred participants founded

the Swiss mathematical society as a section of the Society of Swiss naturalists. The affairs of the society will be conducted by a council of three members, elected for a term of two years. The present council consists of Professor R. FUETER, of Basel, chairman, Professor H. FEHR, of Geneva, and Professor M. GROSSMAN, of Zürich, secretary. The first session was held September 6, at which the following papers were read: M. GROSSMAN, Zürich: "A geometric problem of photogrammetry." R. FUETER, Basel: "Principles of classification of algebraic numbers." F. PRÁSEL, Zürich: "Graphical methods in hydrotechnical problems." O. SPIESS, Basel: "Geometric considerations." D. MIRIMANOFF, Geneva: "The last theorem of Fermat." H. FEHR, Geneva: "Report of the international commission." E. MEISSNER, Zürich: "Concerning a surface not in tetrahedral position." F. RUDIO, Zürich: "Report on the publication of the works of Euler." R. LAEMNEL, Zürich: "Mathematics and biology."

THE firm of B. G. Teubner in Leipzig will celebrate the completion of its first century on March 3, 1911. A memorial address for the occasion is being prepared by Dr. F. SCHULZE; it will contain a biography of the founder of the firm, an account of its early activity in literature, and a detailed presentation of the scientific development of the publishing house since 1850.

AN excellent heliographic reproduction has been made of the photograph of Dirichlet mentioned in the BULLETIN, volume 15, page 318. Copies can be had for 3.35 marks by applying directly to Frl. Lotte Nelson, Darmstadt, Landskronstrasse 39.

UNIVERSITY OF PARIS. The following mathematical courses are announced for the semester beginning November 3, 1910:— By Professor G. DARBOUX: Infinitesimal geometry, cartography, two hours.— By Professor E. GOURSAT: Differential and integral calculus, elements of the theory of analytic functions, two hours.— By Professor E. BOREL: Integral functions, one hour.— By Professor P. APPELL and M. C. GUICHARD: General laws of equilibrium and motion, two hours.— By MM. CARTAN and BLUTEL: General mathematics, first part, two hours.— By Professor H. POINCARÉ: Cosmogonic hypotheses, two hours.— By Professor J. BOUSSINESQ: Mechanical theory of light, two hours.— By Professor G. KOENIGS: General theory of mechanisms, two hours.

Conferences will be conducted by Professor KOENIGS and MM. GUICHARD, CARTAN, BLUTEL, SERVANT, and ROUBAUDI.

In the Ecole Normale. By Professor J. TANNERY : Differential and integral calculus.—By Professor E. BOREL : Theory of functions.

MR. J. M. DODDS of Peterhouse, Mr. J. B. PEACE of Emmanuel College, and Mr. P. C. GAUL of Trinity College have been appointed examiners for Part I of the mathematical tripos at Cambridge for 1911.

ON the invitation of the committee of the Wolfskehl foundation, Professor H. A. LORENTZ, of the University of Leyden, delivered a course of lectures on the development of our ideas of the ether at the University of Göttingen during the week of October 24–29.

DR. E. FANTA has been appointed docent in mathematics and insurance at the German technical school at Brünn.

DR. H. MOHRMANN has been appointed docent in mathematics at the technical school of Karlsruhe.

DR. ROTHE has been appointed docent in mathematics at the technical school of Vienna.

DR. V. N. ROSEVARE has accepted the professorship of mathematics in the University of South Africa at Natal.

MR. H. BATEMAN, fellow of Trinity College, Cambridge, and reader in mathematical physics at the University of Manchester, has been appointed lecturer in mathematics at Bryn Mawr College.

AT Ohio Wesleyan University Professor G. N. ARMSTRONG has been promoted to a full professorship of mathematics.

DR. H. A. CONVERSE has been appointed head of the department of mathematics in the Baltimore Polytechnic Institute.

AT Harvard University Professor E. B. WILSON, of the Massachusetts Institute of Technology, has been appointed lecturer in mathematics for the second half of the present academic year. He will give a course on the "Applications of probabilities to theoretical physics." Dr. F. J. DOHMEN has been appointed instructor in mathematics.

AT the University of Colorado Professor S. EPSTEEN has been promoted to a full professorship of mathematics.

PROFESSOR R. B. McCLENON, of Iowa College, has been promoted to an associate professorship of mathematics.

AT Bryn Mawr College Dr. ISABEL MADDISON has been appointed to the office of recording dean.

AT the College of the City of New York Dr. F. M. PEDERSEN has been promoted to an assistant professorship of mathematics.

DR. ALEXANDER PELL of the Armour Institute has been promoted from an assistant professorship to an associate professorship of mathematics.

DR. H. W. STAGER, of the University of California, has been appointed instructor in mathematics at Fresno Junior College.

DR. E. W. SHELDON, of Yale University, has been appointed assistant professor of mathematics in the University of Alberta.

MR. MEYER GABA, of the University of Kansas, has been appointed instructor in mathematics in the school of mines of the University of Missouri, Rolla, Mo.

DR. H. F. MACNEISH, of Princeton University, has been appointed instructor in mathematics in the Sheffield Scientific School of Yale University.

MR. H. PRITCHARD and Mr. J. PITMAN have been appointed assistants in mathematics at Swarthmore College.

MR. R. DUHADWAY has been appointed instructor in mathematics at the University of Iowa. Mr. F. EATON has resigned his instructorship to accept a position in the new government college at Peking.

MR. R. L. CARY has been appointed instructor in mathematics at Princeton University.

AT the University of Georgia Dr. R. P. STEPHENS has been promoted from an adjunct professorship to an associate professorship of mathematics. Professor J. F. MESSICK, late of Randolph Macon College, has been appointed adjunct professor of mathematics.

DR. J. K. LAMOND, of Yale University, has been appointed instructor in mathematics at Wesleyan University.

AT Brown University Dr. R. C. ARCHIBALD has resumed his academic work after a year's absence in Paris. Mr. F. W. BEAL has been appointed instructor in mathematics. Mr. C. H. CURRIER has a year's leave of absence for study at Göttingen.

MISS IDA M. SCHOTTENFELS has been appointed head of the department of mathematics in Toledo University.

DR. A. E. HAYNES, professor of engineering mathematics in the University of Minnesota, has been granted a year's leave of absence. Professor Haynes has taught consecutively for thirty-five years, fifteen years at Hillsdale College, three years in the Michigan College of Mines, and seventeen years in the University of Minnesota.

PROFESSOR G. A. OSBORNE, of the Massachusetts Institute of Technology has been made professor emeritus.

PROFESSOR A. B. NELSON, of Central University, has retired from active service.

PROFESSOR J. LÜROTH, of the University of Freiburg, died September 14, at the age of 66 years.

PROFESSOR W. THOMÉ, of the University of Greifswald, died October 1, at the age of 69 years.

PROFESSOR P. WEINMEISTER, of the academy of forestry at Tharandt, died August 27, at the age of 62 years.

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## NEW PUBLICATIONS.

### I. HIGHER MATHEMATICS.

- AHRENS (W.). Latein oder Deutsch? Die Sprachenfrage bei der Herausgabe der Werke Leonhard Eulers. Magdeburg, Peters, 1910. 8vo. 4 + 76 pp. M. 1.60
- BACHMANN (P.). Zahlentheorie. Versuch einer Gesamtdarstellung dieser Wissenschaft in ihren Hauptteilen. In 6 Teilen. Teil 1: Die Elemente der Zahlentheorie (1892). Anastatischer Neudruck. Leipzig, Teubner, 1910. M. 7.20
- BARBETTE (E.). Les sommes de  $p^{\text{mes}}$  puissances distinctes égales à une  $p^{\text{me}}$  puissance. Avec une table des 5000 premiers nombres triangulaires. Liège, Gnosé, 1910. 4to. 154 pp. Fr. 12.50
- BIANCHI (L.). Vorlesungen über Differentialgeometrie. Uebersetzt von M. Lukat. 2te vermehrte und verbesserte Auflage. Leipzig, Teubner, 1910. 8vo. 18 + 721 pp. Cloth. M. 24.60
- BOGRAD (J.). Die Astroidenfläche. (Diss.) Bern, Suter, 1909. 4to. 40 pp. Fr. 1.00
- BURALI-FORTI (C.) ET MARCOLONGO (R.). Eléments de calcul vectoriel avec de nombreuses applications à la géométrie, à la mécanique et à la physique mathématique, traduit de l'italien par S. Lattés. Paris, Hermann, 1910. 8vo. 229 pp. Fr. 8.00
- BURGGRAF (G.). Die  $\lambda$ -Funktion für komplexe Argumente. Schluss. (Progr.) Brünn, 1910. 8vo. 29 pp.
- CARNOY (H.). Sur les travaux mathématiques de M. Ernest Lebon (Grands dictionnaires biographiques internationaux). Paris. Pouget, 1910. 16mo. 55 pp.