

mathematical terms employed are used correctly, and empirical processes are designated as such. The chapter on perspective begins with the definite problem of drawing the picture of a cube in given position. This is followed by a very brief outline of the general theory, each step being developed directly from the preceding illustration. The entire process is then compared with the treatment of the same problem by the method of double orthogonal projection. The last few pages of this chapter proceed along lines similar to those in the opening chapters of Cremona's *Projective Geometry*, but are much more condensed. The last chapter in the book contains a short introduction to photogrammetry. The use of the art in military operations is attested, suggesting that the author's notes had been very recently revised. The fundamental problem is explained in detail, and a few refinements mentioned. Perhaps this is sufficient to comply with the avowed purpose of the *Edinburgh Tracts*, but to the reviewer it seems much too brief to be of greatest service. The page is attractively made up, the type very clear and not offensively prominent, and the figures well drawn. The book certainly succeeds in teaching the essential features of descriptive geometry in a remarkably small compass.

VIRGIL SNYDER.

NOTES.

THE thirty-seventh regular meeting of the Chicago Section, being the sixth regular meeting of the Society at Chicago, will be held at the University of Chicago on Friday and Saturday, April 21-22. The twenty-eighth regular meeting of the San Francisco Section will be held at the University of California on Saturday, April 22. A regular meeting of the Society will be held at Columbia University on Saturday, April 29.

THE April number (volume 38, number 2) of the *American Journal of Mathematics* contains: "On the classification and invariantive characterization of nilpotent algebras," by OLIVE C. HAZLETT; "Determination of the order of the groups of isomorphisms of the groups of order p^4 , where p is a prime," by R. W. MARRIOTT; "Correspondences determined by the bitangents of a quartic," by J. R. CONNER; "Infinite groups

generated by conformal transformations of period two (involutions and symmetries)," by EDWARD KASNER; "On the solutions of linear homogeneous difference equations," by R. D. CARMICHAEL.

At the meeting of the London mathematical society held February 11 the following papers were read: By J. H. GRACE: "Theorems on straight lines intersecting at right angles," and "The classification of rational approximations"; by Mrs. G. C. YOUNG: "Infinite derivatives"; by E. H. NEVILLE: "The bilinear curvature and other functions of independent directions on a surface"; by D. BRODETSKY: "The attraction of equiangular spirals."

The following papers were read at the meeting of March 9: By P. A. MACMAHON: "Some applications of general theorems of combinatory analysis;" by H. F. BAKER: "Mr. Grace's theorem on six lines with a common transversal;" by H. E. J. CURZON: "The integrals of a certain Riccati equation connected with Halphen's transformation;" by HILDA P. HUDSON: "A certain plane sextic;" by W. P. MILNE: "The construction of co-apolar triads on a cubic curve;" by J. BONDMAN: "The dynamical equations of the tides."

At the meeting of the Edinburgh mathematical society on February 11 the following papers were read: By E. L. RICE: "On the continued fractions associated with the hypergeometric equation"; by A. MILNE: "Note on the Peano-Baker method of solving linear differential equations"; by D. GIBB: "On integral relations connected with the confluent hypergeometric function"; by E. M. HORSBURGH: "A simple form of integrometer."

THE Paris academy of sciences has announced the following prize problems in mathematics for the year 1917: The Francoeur prize (1000 fr.) for the most meritorious memoir in pure or applied mathematics; the Bordin prize (3000 fr.) for an improvement in some important point of the arithmetic theory of non-quadratic forms; the Poncelet prize (2000 fr.) for the French or foreign author of the most meritorious book or memoir on applied mathematics during the last ten years; the Vaillant prize (4000 fr.) for the determination and description of all surfaces which can in two ways be formed by the

displacement of an invariable curve; the Saintour prize (3000 fr.) for general mathematics; the Petit d'Ormay prize (10000 fr.) for the best contribution to pure or applied mathematics.

THE department of roads and canals of the technical school at Delft announces the following prize problem for the present year:

"An investigation is desired such that inaccuracies that appear in the calculation of the distribution of forces in a statically undetermined system may be lessened by the choice of an appropriate system of variables. Errors in the drawings and those arising by discarding too many places of decimals in numerical approximations should both be considered. Finally, a measure of the degree of accuracy secured should be devised." As literature, see in particular the prize memoir of J. Pirlet "Fehleruntersuchungen bei der Berechnung mehrfach statisch-unbestimmter Systeme," Aachen 1909 and various articles by the same author in *Der Eisenbau*, 1910-1915.

Competing memoirs should be sent, under the usual conditions, to Professor J. Nelemans, Delft, Holland, not later than October 31, 1916. The prize, a gold medal, will be awarded January 8, 1917.

The following university courses in mathematics are announced:

COLUMBIA UNIVERSITY (summer session, July 10-August 18).—By Professor M. W. HASKELL: Differential equations, five hours; Modern analytic geometry, five hours.—By Professor JAMES MACLAY: Theory of geometric constructions, five hours.—By Professor EDWARD KASNER: Theory of functions of a real variable, five hours.—By Professor W. B. FITE: Higher algebra, five hours.

CORNELL UNIVERSITY (summer session, July 6-August 16).—By Professor VIRGIL SNYDER: Geometric constructions for high-school teachers, five hours; Seminar in algebraic geometry.—By Professor W. A. HURWITZ: Mathematical analysis, five hours; Supplementary problems in algebra for high-school teachers, five hours; Seminar in integral equations.—By Professor F. W. OWENS: Projective geometry, five hours; Seminar in foundations of geometry.

UNIVERSITY OF ILLINOIS (summer session).—By Professor E. J. TOWNSEND: Advanced calculus (functions of two real variables), five hours.—By Dr. A. R. CRATHORNE: Calculus of variations, five hours.

UNIVERSITY OF WISCONSIN. The following courses in mathematics are announced for the summer session, June 26 to August 4: By Professor E. B. SKINNER: Differential geometry. Linear substitutions.—By Professor H. W. MARCH: Theoretical mechanics. Infinite series and products.—By Professor H. C. WOLFF: Probabilities and statistics.—By Professor W. W. HART: The teaching of mathematics. Courses in analytic geometry and the calculus are also offered.

COLLÈGE DE FRANCE.—By Professor G. HUMBERT: Theory of quadratic forms in its relation to the theory of groups.—By Professor J. HADAMARD: Analytic theory of prime numbers.

Professor C. J. DE LA VALLÉE POUSSIN has been invited to give a series of conferences at the Collège.

UNIVERSITY OF STRASSBURG (summer semester).—By Professor F. SCHUR: Differential and integral calculus, II, three hours; Theory of quadric surfaces, two hours; Seminar, two hours.—By Professor J. WELLSTEIN: Linear differential equations, three hours; Axonometry and perspective, two hours.—By Professor M. SIMON: Non-euclidean geometry.—By Professor P. EPSTEIN: Foundations of analysis, two hours.—By Dr. O. SPEISER: Mechanics, two hours.

THE Gamble prize of Girton College, Cambridge, has been awarded to Mrs. W. H. YOUNG for her contributions to mathematics.

AT Smith College, Professor HARRIET R. COBB has been promoted to a full professorship of mathematics and Miss PAULINE SPERRY has been appointed assistant professor of mathematics.

DR. OLIVE C. HAZLETT, of Radcliffe College, has been appointed associate in mathematics at Bryn Mawr College.

DR. E. J. MILES, of the Sheffield Scientific School of Yale University, has been promoted to an assistant professorship of mathematics.

DR. R. W. BURGESS, of Cornell University, has been appointed instructor in mathematics in Brown University.

DR. G. A. PFEIFFER, of Harvard University, has been appointed instructor in mathematics in Princeton University.

DR. EDWARD KIRCHER and Mr. W. L. HART have been appointed to the Benjamin Peirce instructorships at Harvard University for the year 1916-1917.

MR. H. B. NIXON, instructor in mathematics in Gettysburg College, died March 30.

NEW PUBLICATIONS.

I. HIGHER MATHEMATICS.

- AHRENS (W.). *Mathematiker-Anekdoten*. Leipzig, Teubner, 1916. 8vo. 4+56 pp. Karton. M. 0.80
- BAIER (W.). *Zur Polartheorie des Flächenbündels 2. Ordnung mit besonderer Berücksichtigung des Flächenbündels der Raumkurve 3. Ordnung*. Rostock, 1914. 8vo. 71 pp.
- BEUTNER (W.). *Ueber die primitiven Gruppen in sechs Veränderlichen*. Giessen, 1914. 8vo. 30 pp. M. 0.60
- BIERI (A.). *Geometrische Darstellung der elliptischen Integrale 1. und 2. Art*. Bern, 1914. 8vo. 73 pp.
- BOHR (H.) og MOLLERUP (J.). *Laerbog i matematisk Analyse. Foreløbig udarbejdelse til Brug ved Forelaesninger paa Polyteknisk Laeranstalt. Afsnit 1*. Kjöbenhavn, 1915. 8vo. 498 pp. (Autographed.) M. 13.20
- BRANDT (H.). *Zur Komposition der quaternären quadratischen Formen*. Strassburg, 1913. 4to. 26 pp. M. 2.00
- BÜRGER (W.). *Die Rekonstruktion der Urform aus einer vorgeschriebenen Kovariante*. Strassburg, 1913. 8vo. 69 pp. M. 2.50
- BURKHARDT (H.). See ENCYKLOPÄDIE.
- CASTELNUOVO (G.). See ENCYKLOPÄDIE.
- CRANTZ (P.). *Analytische Geometrie der Ebene zum Selbstunterricht*. Leipzig, Teubner, 1915. 8vo. 5+93 pp. M. 1.00
- EBNER (P.). *Ueber eine reziproke Zuordnung von Kurven im Raume*. Würzburg, 1914. 8vo. 42 pp.
- ECKERT (H.). *Ueber zwei den Eulerschen Funktionen $\Gamma(p)$ und $B(p, q)$ ähnliche Doppelintegrale*. Leipzig, 1914. 8vo. 80 pp. M. 2.00
- ENCYKLOPÄDIE der mathematischen Wissenschaften. Band II 1, Heft 7-8: H. Burkhardt, *Trigonometrische Reihen und Integrale bis etwa 1850*. Leipzig, Teubner, 1914-1915. Gr. 8vo. Pp. 819-1154+1155-1354. M. 10.50+6.20