

a Hauptsatz or Satz number to be looked for under the paragraph, and sometimes a Zusatz under the Satz. Inasmuch as the number of cross references is extremely large, the method employed becomes a matter of some importance to the reader. If page references are deemed impracticable because of trouble with the proof and because of the necessity of change with every new edition, it may be suggested that a system preferable to the author's would be a division of the subject matter into short paragraphs not more than a page or two in length and numbered consecutively to the end, as is done in so many French works. The terms and definitions are well chosen and, with rare exceptions, well explained. So far as I can find, the terms Randpunkt for a region and singular point for a function are left undefined, being regarded as self-explanatory or sufficiently clear from the examples given. It is to be regretted that a term so distinctive as "meromorphic" and so universally used is nowhere introduced.

In conclusion, admiration must be expressed for the combination of a grasp "im Grossen" with one "im Kleinen," to apply descriptive terms which are employed by the author and which, if we mistake not, are of his own mint. The appearance of the second volume will be awaited with great interest. Analytic functions of two or more variables will doubtless be considered? What else? From the abundance of material on every hand we may confidently expect to have again a selection of great individuality and interest.

EDWARD B. VAN VLECK.

PARIS,  
March 27, 1914.

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#### NOTES.

IN response to the invitation of Brown University to participate in the celebration of its one hundred and fiftieth anniversary, the twenty-first summer meeting of the American Mathematical Society will be held at that university on Tuesday and Wednesday, September 8-9. Titles and abstracts of papers intended for presentation at the summer meeting should be in the hands of the Secretary by August 22.

THE closing (June) number of volume 15 of the *Annals of Mathematics* contains the following papers: "Some solutions

of the Pellian equations  $x^2 - Ay^2 = \pm 4$ ," by E. E. WHITFORD; "On the rank of a matrix," by W. H. METZLER; "On the expression of certain minors of the  $l$ th compound of a determinant as a function of the elements of a single line of  $m$ th compound," by W. H. METZLER; "Implicit functions at a boundary point," by L. S. DEDERICK; "A formula in the theory of surfaces," by R. D. BEETLE; "The deviations of falling bodies," by F. R. MOULTON; "Properties of certain homogeneous linear substitutions," by H. HILTON.

At the meeting of the London mathematical society held on April 23 the following papers were read: By P. A. MACMAHON, "A modified form of pure reciprocants possessing the property that the algebraic sum of the coefficients is zero"; by P. A. MACMAHON, "Lattice and prime lattice permutations."

THE Deutsche Mathematiker-Vereinigung will hold its summer meeting at Hanover, September 20-26, in affiliation with the eighty-sixth annual convention of the association of German naturalists and physicians.

THE French association for the advancement of science will hold its next meeting at Havre, July 27-August 2, under the presidency of Professor A. GAUTIER. The British association will participate in the same meeting.

THE Swiss mathematical society will hold its annual meeting at Bern September 2, during the session of the Helvetian society of naturalists.

THE following courses in mathematics are announced for the academic year 1914-1915:

JOHNS HOPKINS UNIVERSITY.—By Professor F. MORLEY: Higher geometry, three hours.—By Professor A. B. COBLE: Modular functions, two hours; Theory of probability, two hours, second half year.—By Dr. A. COHEN: Calculus of variations, two hours.—By Dr. H. BATEMAN: Differential equations of physics, two hours.

UNIVERSITY OF ILLINOIS.—By Professor E. J. TOWNSEND: Functions of a complex variable, three hours; Ordinary and

partial differential equations and advanced calculus, three hours.—By Professor G. A. MILLER: Elementary groups, three hours; Theory of equations and determinants, three hours, second semester.—By Professor H. L. RIETZ: Actuarial theory, three hours, first semester; Averages and the mathematics of investment, three hours, second semester.—By Professor M. FRÉCHET: General analysis, (a) abstract sets, two hours; (b) functional operations, two hours.—By Professor C. H. SISAM: Algebraic surfaces, three hours; Solid analytic geometry, three hours, second semester.—By Professor J. B. SHAW: General algebra, three hours.—By Professor A. EMCH: Projective geometry, three hours.—By Dr. A. R. CRATHORNE: Calculus of variations, three hours.—By Dr. R. L. BÖRGER: Modern algebra, three hours.—By Dr. E. B. LYTLE: History of mathematics, two hours, second semester; Teacher's course, two hours, first semester.

THE following advanced courses in mathematics are being given at the Belgian universities during the present semester. The list does not include the courses of the first two years nor those offered in the technical schools connected with the universities.

UNIVERSITY OF BRUSSELS.—By Professor E. BRAND: Elliptic functions, two hours; History of mathematics, two hours.—By Professor L. ANSPACH: Dynamics, two hours.—By Professor A. MINEUR: Higher geometry, two hours.

UNIVERSITY OF GHENT.—By Professor A. DEMOULIN: Differential geometry, one hour; Analytic and elliptic functions, two hours.—By Professor M. STUYVAERT: Theory of numbers, one hour; Theory of elimination, one hour.—By Dr. C. SERVAIS: Algebraic curves and surfaces, two hours.

UNIVERSITY OF LIÈGE.—By Professor J. DERUYTS: Elliptic functions, three hours; Partial differential equations and the theory of surfaces, two hours.—By Professor C. LE PAIGÉ: Spherical astronomy, two hours; Probabilities, one hour; History of mathematics, one hour; Celestial mechanics, two hours.—By Dr. J. FAIRON: Analytic geometry, two hours.

UNIVERSITY OF LOUVAIN.—By Professor C. DE LA VALLÉE-POUSSIN: Partial differential equations of mechanics, two

hours.—By Professor E. PASQUIER: Dynamics, two hours.—By Professor S. DEMANET: Thermodynamics, two hours.—By Dr. G. VERRIEST: Binary forms, one hour.—By Dr. E. GOEDSEELS: Astronomy, two hours; Probabilities, one hour.

MR. G. P. THOMSON, of Trinity College, Cambridge, has been appointed lecturer in mathematics at Corpus Christi College.

PROFESSOR W. F. OSGOOD, of Harvard University, has been appointed Perkins professor of mathematics; Professor W. C. SABINE has been appointed Hollis professor of mathematics and natural philosophy.

PROFESSOR C. J. KEYSER, of Columbia University, received the honorary degree of doctor of laws from the University of Missouri on the occasion of the seventy-fifth anniversary of the foundation of the university.

AT Purdue University Professor WILLIAM MARSHALL has been granted a leave of absence to study a year in France. Mr. R. B. STONE has been promoted to an assistant professorship of mathematics. Dr. T. E. MASON and Mr. O. W. ALBERT have been appointed to instructorships in mathematics.

AT Dartmouth College Drs. J. E. ROWE and E. S. ALLEN have resigned, the latter to accept an instructorship in Brown University. Dr. R. D. BEETLE, of Princeton University, and Dr. L. C. MATHEWSON, of the University of Illinois, have been appointed instructors in mathematics. Professor J. W. YOUNG has accepted the position of chief examiner in geometry of the College entrance board.

PROFESSOR T. M. PUTNAM, of the University of California, will be abroad on leave of absence during the first half of the coming academic year.

DR. W. F. SHENTON has been appointed instructor in mathematics in Johns Hopkins University.

DR. HELEN TAPPAN has been appointed instructor in mathematics at the Iowa State College.

DR. E. A. T. KIRCHER has been appointed instructor in mathematics at the Massachusetts Institute of Technology.

PROFESSOR JULES MOLK, of the University of Nancy, director of the French edition of the Encyclopedia of Mathematical Sciences, died May 7 at the age of 56 years.

## NEW PUBLICATIONS.

### I. HIGHER MATHEMATICS.

- BAER (W. S.). Beiträge zum Waringschen Problem. (Diss.) Göttingen, 1913.
- BERANCK (A.). Zur sphärischen Abbildung der Flächen zweiter Ordnung und ihrer stereographischen Projektion. (Progr.) Baden bei Wien, 1913. 8vo. 12 pp.
- BERECHNUNG der Zahl  $\pi$  auf Grundlage zyklischer und parabolischer Gesetze. Aussig, 1913.
- BOREL (É.). Le Hasard. Paris, Alcan, 1914. 12mo. 4+312 pp.  
Fr. 3.50
- CORRAL (J. I. DEL). Nuevos métodos para resolver ecuaciones numéricas. Madrid, Romo, 1912. 8vo. 22+304 pp.  
P. 7.00
- DOLBŃIA (J.). Oeuvres mathématiques. Publiées sous les auspices de l'École supérieure des Mines de l'Impératrice Cathérine II, à Saint-Pétersbourg. Avec une préface de G. Darboux et une notice sur la vie et les travaux scientifiques de DolbŃia, par N. Kryloff. Paris, Hermann, 1913. 8vo. 14+348 pp.
- EICHHORN (E.). Konstruktive Ueberführung projektiver Grundgebilde. (Progr.) München, 1913. 8vo. 44 pp.
- EXNER (F. M.). Ueber die Korrelationsmethode. (Diss.) Jena, 1913. 8vo. 36 pp.  
M. 1.00
- FALK. Ueber eine symmetrische Darstellung einiger in der Theorie der elliptischen Funktionen vorkommenden Wurzelgrößen. 8vo.  
M. 3.50
- GAUSS (C. F.). Die vier Beweise für die Zerlegung ganzer algebraischer Funktionen in reelle Faktoren 1ten und 2ten Grades. (1799-1849.) Herausgegeben von E. Netto. (Ostwald's Klassiker der exacten Wissenschaften, Nr. 14.) 3te Auflage. Leipzig, Engelmann, 1913. 8vo. 82 pp. Cloth.  
M. 1.20
- GENELIN (S.). Die vier Grundoperationen mit abgekürzten Dezimalzahlen. (Progr.) Krems, 1913. 8vo. 43 pp.
- GREBE (F.). Verwendung des Imaginären in der Geometrie. (Progr.) Naumburg a. S., 1913. 8vo. 26 pp.
- HABENICHT (B.). Funktionen mit ganzzahligen Hauptpunkten. Linden-Hannover, Ellermann, 1913. 8vo. 9 pp.
- HEINE (H.). Arithmetische und geometrische Reihen. Leipzig, Ehlermann, 1913.  
M. 1.20
- JANS (C. DE). Over middelvlakken en middelkrummen. Gand, Hoste, 1913.