

attention of beginners to such matters generally results in preventing them from learning those parts of the subject which it is desirable that they should master at this stage.

There are two other criticisms on points of detail. The word "proportionally" is used on page 29 before the definition of proportion has been given. In this case a footnote, identical with that on each of the two following pages, was unfortunately omitted.

The second criticism relates to the accidental omission of the single but important word "concurrent" in the definition of four harmonic lines. This omission I greatly regret.

I have now dealt with the whole of the criticisms, and leave it to those who may be interested to determine whether they justify the charge that "In some of the details the book is almost incredibly careless."

There is one matter left which is of interest to teachers :

The reviewer says : "Parts of Euclid are undoubtedly too difficult for beginners, and the book before us attempts to remove the greatest of these difficulties, the theory of proportion. In American books we seek to reach this end by an appeal to the analogy of algebra, but herein we depart entirely from Euclid's pattern." I have not been able to determine the exact significance of the words "an appeal to the analogy of algebra," but I believe that those who will take up the fifth book of Euclid and examine how readily the ideas of the irrational number as developed by Dedekind can be used in connection with its results, will find that in rigor it far surpasses the modern attempts to turn the difficulties which Euclid faced and overcame.

M. J. M. HILL.

UNIVERSITY COLLEGE, LONDON,  
May 31, 1902.

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#### NOTES.

WITH the issue of the present number of the BULLETIN, Professor E. O. LOVETT and Dr. C. L. BOUTON retire from the editorial board. The Committee of Publication takes this opportunity to express its sense of obligation to the retiring editors for their faithful and valuable services.

THE third (July) number of volume 3 of the *Transactions* of the AMERICAN MATHEMATICAL SOCIETY contain the following papers : "On the group defined for any given field

by the multiplication table of any given finite group," by L. E. DICKSON; "Nachtrag zum Artikel: 'Zur Erklärung der Bogenlänge, u. s. w.'", by O. STOLZ; "Proof of the sufficiency of Jacobi's condition for a permanent sign of the second variation in the so-called isoperimetric problems," by O. BOLZA; "On hypercomplex number systems," by H. E. HAWKES; "On metabelian groups," by W. B. FITE; "Conjugate rectilinear congruences," by L. P. EISENHART; "Constructive theory of the unicursal cubic by synthetic methods," by D. N. LEHMER; "The groups of Steiner in problems of contact (second paper)," by L. E. DICKSON.

The editorial staff of the *Transactions* has been increased by the appointment as assistant editors of Professor JAMES HARKNESS, Professor E. B. VAN VLECK, Professor H. S. WHITE, Dr. C. L. BOUTON, Professor L. E. DICKSON, Dr. J. I. HUTCHINSON, and Professor M. B. PORTER.

THE third (July) number of volume 24 of the *American Journal of Mathematics* contains the following articles: "Die Typen der linearen Complexe elliptischer Curven im  $R^n$ ," by S. KANTOR; "Generalization of the differentiation process," by R. E. MORITZ; "Simple pairs of parallel  $W$ -surfaces," by H. D. THOMPSON.

THE July number (second series, volume 3, number 4) of the *Annals of Mathematics* contains: "Note on a twisted curve connected with an involution of pairs of points in a plane," by H. S. WHITE; "On some curves connected with a system of similar conics," by R. E. ALLARDICE; "Note on multiply perfect numbers," by J. WESTLUND; "A mechanical construction of confocal conics," by W. R. RANSOM; "On Sophus Lie's representation of imaginaries in plane geometry," by P. F. SMITH; "Note on the group of isomorphisms of a group of order  $p^m$ ," by G. A. MILLER; "Evaluation of slowly convergent series," by L. D. AMES.

THE UNIVERSITY OF CHICAGO.—The following advanced mathematical courses, four hours weekly, are offered during the three quarters ( $a$ ,  $w$ ,  $sp$ ) of the academic year 1902-1903:—By Professor E. H. MOORE: Projective geometry ( $a$ ); General arithmetic, with seminar ( $w$ ,  $sp$ ).—By Professor O. BOLZA: Theory of functions ( $a$ ,  $w$ ); Theory of equations ( $a$ ,  $w$ ).—By Professor MASCHKE: Modern analytic geometry ( $a$ ); Higher plane curves ( $w$ ); Linear differential equations ( $sp$ ); Advanced integral calculus ( $a$ ,  $w$ ,  $sp$ ).—By Professor J. W. A. YOUNG: Solid analytics ( $sp$ ).—By Professor L. E. DICKSON: Finite groups ( $a$ ); Continuous groups ( $w$ ).—

By Dr. F. R. MOULTON : Analytic mechanics (*a, w*).—By Mr. A. C. LUNN : Theoretical mechanics (*sp*).

The mathematical club meets fortnightly.—The advanced courses offered during the current summer quarter are announced on page 356 of the May number of the BULLETIN.

COLUMBIA UNIVERSITY.—The following advanced courses in mathematics will be offered during the academic year 1902–1903 : By Professor F. N. COLE : Riemann's theory of functions, including elliptic functions, three hours ; Theory of invariants, three hours. By Professor T. S. FISKE : Theory of abelian functions, three hours ; Functions defined by linear differential equations, three hours. By Professor D. E. SMITH : History of mathematics, two hours ; Practicum in the history and teaching of mathematics, two hours.—By Professor J. MACLAY : Analytical theory of curves of double curvature, three hours, first semester ; Analytical theory of curved surfaces, three hours, second semester.—By Dr. C. J. KEYSER : The general theory of assemblages, three hours.—By Dr. G. H. LING : Differential equations, three hours.—By Mr. H. B. MITCHELL : Advanced calculus, theory of functions of a real variable, three hours.

CORNELL UNIVERSITY.—The following advanced mathematical courses are offered next year :—By Professor G. W. JONES : Higher algebra and trigonometry, three hours ; Theory of probabilities and least squares, two hours.—By Professor L. A. WAIT : Advanced analytic geometry, three hours ; Advanced differential calculus and differential equations, three hours.—By Professor J. H. TANNER : Algebraic invariants, two hours.—By Professor J. McMAHON : Quaternions and vector analysis, two hours ; Theoretical mechanics, two hours ; Potential function, Fourier series, and spherical harmonics, two hours ; Mathematical theory of sound, two hours.—By Professor J. E. TREVOR : Mathematical theory of thermodynamics, two hours.—By Dr. V. SNYDER : Projective geometry, three hours ; General theory of algebraic curves and surfaces, three hours.—By Dr. J. I. HUTCHINSON : Advanced integral calculus, two hours.—By Dr. H. F. STECKER : Non-linear ordinary differential equations, two hours ; Calculus of variations, one hour ; Theory of functions, three hours.—By Dr. W. B. FITE : Continuous groups, three hours, first semester ; Linear groups, three hours, second semester ; Theory of numbers, two hours.

Two new series of mathematical and physical models are announced by Martin Schilling, of Halle. The one series, suggested by Professor F. KLEIN and constructed by Professor FR. SCHILLING and Dr. W. LUDWIG represents the cubic ellipse, parabola, and hyperbola on the corresponding cylinders, the tangent surface of the cubic ellipse, and horopter, and comprises six models. The second series, constructed by Professor FR. SCHILLING and Dr. H. GRASSMANN, consists of three models illustrating the epicycloidal, pericycloidal, and the intermediate form of rotation of a top under no forces.

A Gauss archive, in which, with other interesting material, the manuscripts of Gauss have been deposited, has been arranged in the rooms formerly occupied by him in the observatory at Göttingen.

PROFESSOR DAVID HILBERT, of Göttingen, has declined a call to the University of Berlin.

PROFESSOR H. MINKOWSKI, of the Zürich Polytechnic School, has been appointed to an associate professorship at the University of Göttingen.

At the University of California Dr. E. J. WILCZYNSKI has been promoted to an assistant professorship of mathematics.

At Purdue University Professor M. C. STEVENS has been made professor emeritus and Dr. JACOB WESTLUND has been promoted to an associate professorship of mathematics.

MR. G. H. SCOTT has been appointed professor of mathematics and astronomy at Yankton College, Yankton, S. Dak.

DR. OTTO DUNKEL has been appointed instructor in mathematics at Wesleyan University, Middletown, Conn.

MR. J. L. COOLIDGE, of Harvard University, has been granted two years' leave of absence, which he will spend in study abroad.

PROFESSOR JOHN D. RUNKLE, until the present year head of the mathematical department of the Massachusetts Institute of Technology, died on July 8. He was born at Root, N. Y., Oct. 11, 1823. For more than thirty years he was on the staff of the American nautical almanac. For eight years he was president of the Institute of Technology, retiring in 1878 and resuming his professorship of mathematics in 1880. He was editor of the *Mathematical Monthly* (1858-1861), one of the earliest attempts at a high-grade scientific journal in America.