recommended to one who seeks pleasing applications of the most elementary mathematics to a chapter in scientific theory.

The chief merits of the exposition as an elementary treatment of its subject matter are intimately dependent upon the straightforward and simple manner of presentation on account of which the reader is able to follow the development with striking unity of effort and with little loss of energy consumed through divergent operations of thought. This renders the book particularly valuable for the learner who needs to concentrate attention upon the main issues in order to understand them thoroughly.

The effort to attain the advantages just mentioned has also led the author into the chief defects of his exposition. These are associated with the description of a special case as though it were the general case. Thus a lens is defined (page 56) as "a transparent body bounded by two spherical surfaces" and the student is left without any hint that lenses may also be of other forms. The most usual form of the kaleidoscope is described (page 13) as if there were no other form. A similar defect is in such a definition as that of optics (page 1) as "the science which treats of the properties of this mysterious agent" light, whereas the book itself deals with only a very narrow range of the properties of light and the student is given no hint of the more fundamental matters not treated in the book. The mathematical reader also feels a certain uneasiness in the free use of "infinity" (as on pages 84, 89, 113, and elsewhere) and in the uncritical use of processes of approximation. Nevertheless these minor defects do not obscure the real interest and value of this very elementary exposition.

R. D. CARMICHAEL.

NOTES.

THE fourth annual meeting of the Mathematical Association of America was held at the University of Chicago on Friday, December 27, 1918, in connection with the annual meeting of the American Mathematical Society. The morning programme included a conference on "Deductions from war time experiences with respect to the teaching of mathematics," a paper on "An experiment in supervised study," by D. R.

CURTISS, and the election of officers. At the afternoon joint session with the American Mathematical Society the following papers were presented: "Some mathematical features of ballistics," by A. A. BENNETT; "How the map problem was met in the war," by KURT LAVES; "Notes concerning recent books on navigation," by ALICE B. GOULD; "Statistics methods for preparation for war department service," by H. L. RIETZ; "Ordnance problems," by W. D. MACMILLAN; "Practical exterior ballistics," by P. L. ALGER; "The effect of the earth's rotation and curvature on the path of a projectile," by W. H. ROEVER; "On low velocity high angle fire," by H. F. BLICHFELDT. The evening was devoted to a joint dinner of the two organizations at the Quadrangle Club.

THE December number (volume 20, number 2) of the *Annals of Mathematics* contains the following papers: "The gamma function in the integral calculus (concluded)," by T. H. GRONWALL; "Invariants which are functions of parameters of the transformation," by O. E. GLENN; "A theorem on exhaustible sets connected with developments of positive real numbers," by HENRY BLUMBERG; "Solution of the differential equation $dx^2 + dy^2 + dz^2 = ds^2$ and its application to some geometrical problems," by ALEXANDER PELL; "A general method of summation of divergent series," by L. L. SMAIL.

THE fourth volume (1918) of the *Proceedings of the National Academy of Sciences* contains the following mathematical papers:—number 5 (May): "The structure of an electromagnetic field," by H. BATEMAN; "Invariants which are functions of parameters of the transformation," by O. E. GLENN; number 7 (July): "On the representation of a number as the sum of any number of squares, and in particular of five or seven," by G. H. HARDY; number 8 (August): "Arithmetical theory of certain Hurwitzian continued fractions," by D. N. LEHMER; "On closed curves described by a spherical pendulum," by ARNOLD EMCH; number 9 (September): "On the α-holomorphisms of a group," by G. A. MILLER; number 10 (October) "Invariants and canonical forms," by E. J. WILCZYNSKI; number 11 (November): "On certain projective generalizations of metric theorems, and the curves of Darboux and Segre," by G. M. GREEN; number 12 (December): "On Jacobi's extension of the continued fraction algorithm," by

D. N. LEHMER; "A characterization of Jordan regions by properties having no reference to their boundaries," by R. L. MOORE.

THE Council of the Mathematical Association of America has appointed as Committee on Publications Professors R. C. ARCHIBALD (editor in chief) W. A. HURWITZ and H. E. SLAUGHT. This Committee has charge of the official journal of the Association, the *American Mathematical Monthly*.

AT the annual meeting of the Paris academy of sciences, held December 2, 1918, the following prizes in pure and applied mathematics were awarded, in addition to those noted in the December number of the BULLETIN: The Grand prize, for a memoir on the theory of iteration, to G. JULIA, with honorable mention for the late S. LATTÈS, who was also awarded a prize of 2000 francs from the Gegner foundation for his work in mathematical analysis; a prize of 2000 francs from the Jérome Ponti foundation to P. BARBARIN for his work in non-euclidean geometry; a prize of 2000 francs from the Henri Becquerel foundation to P. FATOU for his work on the theory of series and the iteration of rational functions. The Fourneyron, Damoiseau and Guzman prizes were not awarded.

All the prizes are to be awarded in 1919 and following years under the usual conditions. For the Bordin prize (3000 francs), to be awarded in 1921, the following question is proposed: "To improve the theories relating to analysis situs developed in Poincaré's celebrated memoirs. It is required to connect, at least in important special cases, questions of the geometry of situation concerning a given multiplicity with the study of suitably chosen analytic expressions."

DR. F. W. REED has been appointed instructor in mathematics at the University of Illniois.

MR. A. D. CAMPBELL and DR. C. M. SMITH have been appointed instructors in mathematics at Cornell University.

THE resignation of Lieutenant W. E. MILNE, of the Army Ordnance, has been accepted and he has been appointed assistant professor of mathematics at the University of Oregon.

MR. J. S. MIKESH has been appointed instructor in mathematics at Sheffield Scientific School, Yale University.

DR. R. JENTZCH, of the University of Berlin, fell in battle, March 21, 1918.

PROFESSOR W. B. STONE, of Rutgers College, died January 6, 1918. Professor Stone had been a member of the American Mathematical Society since 1913.

NEW PUBLICATIONS.

I. HIGHER MATHEMATICS.

BATEMAN (H.). Differential equations. London, Longmans, 1918. 8vo. 11+306 pp. 16s.

BOYER (P.). La vie universitaire à Paris. Paris, Colin, 1918. Fr. 12.00

FORSYTH (A. R.). Solutions of the examples in a treatise on differential equations. London, Macmillan, 1918. 8vo. 249 pp. 10 s.

GALLATLY (W.). The modern geometry of the triangle. 2d edition. London, F. Hodgson, 1918. 8vo. 7+126 pp. 2s. 6d.

HEDRICK (H. B.). Interpolation tables or multiplication tables of decimal fractions giving the products to the nearest unit of all numbers from 1 to 100 by each hundredth from 0.01 to 0.99 and of all numbers from 1 to 1000 by each thousandth from 0.001 to 0.999. Washington, Carnegie Institution, 1918. Folio. 9+139 pp. $5.00

LAUGEL (L.). See SCHWARZ (H. A.).

PLANT (L. C.). See WEBBER (W. P.).

SANSONE (G.). Le divisioni regolari dello spazio iperbolico in piramidi e doppie piramidi. Pisa, tip. succ. fratelli Nistri, 1917. 8vo. 135 pp. con quattro tavole.

SCHWARZ (H. A.). Mélanges relatifs au domaine des surfaces minima. Traduit sur la dernière édition par L. Laugel. Pisa, E Spoerri, 1918. 8vo. 53 pp. L. 4.00

WEBBER (W. P.) and PLANT (L. C.). Introductory mathematical analysis. New York, Wiley, 1918. 250 pp. $2.00

II. ELEMENTARY MATHEMATICS.

ABBOTT (P.). Mathematical tables and formulæ. London, Longmans, 1918. 4+58 pp. 2s.

——. Numerical trigonometry. London, Longmans, 1918. 10+163+ mathematical tables, 3+33 pp. 5s.

CADORIUS (I.), FISKER (A.), HERLEV (V.) og OLSEN (L. P.). Regnebogen, Elevens Bog IV, V og VI. Laererens Bog III, IV og V. København, Gyldendalske Boghandel, 1918.

FERRARI (A.). Sopra un capitolo di geometria elementare. Torino, S. Lattes, 1918. 8vo. 32 pp.