These remarks on what seem desirable additions to the volume of Professor Weber's are not to be regarded in the least as criticisms of the work ; for there is no other book in any language which provides the student of physics with so much necessary imformation, so well selected and prepared. The only book which even attempts in part to do this is Professor Webster's treatise on " Electricity and magnetism," the first part of which is devoted to the general theorems of mathematics and mechanics. But while Webster's treatment on the whole is fuller and more satisfactory in some respects than the corresponding chapters in the volumes before us, it is by no means so extended. In the former, the physical facts and ideas are brought to the front ; while in the latter emphasis is laid upon the limitations imposed by mathematical analysis.

In conclusion, the utmost satisfaction must be expressed with the paper, type, and cuts of the book. It is an unusual pleasure to have in one's hands a volume which has been rendered so attractive and intelligible by the efforts of the printer and publisher.

J. S. AMES.

NOTES.

THE closing (October) number of Volume II. of the *Transactions* of the AMERICAN MATHEMATICAL SOCIETY contains the following papers : " Geometry of a simultaneous system of two linear homogeneous differential equations of the second order," by E. J. WILCZYNSKI ; " Theory of linear groups in an arbitrary field," by L. E. DICKSON ; " On certain aggregates of determinant minors," by W. H. METZLER ; " Ueber die Anwendung der Cauchy'schen Multiplicationsregel auf bedingt convergente oder divergente Reihen," by A. PRINGSHEIM ; " Ueber den Goursat'schen Beweis des Cauchy'schen Integralsatzes," by A. PRINGSHEIM ; " New proof of a theorem of Osgood's in the calculus of variations," by O. BOLZA ; " On certain pairs of transcendental functions whose roots separate each other," by M. BÔCHER ; " On the system of a binary cubic and a quadratic and the reduction of hyperelliptic integrals of genus two to elliptic integrals by a transformation of the fourth order," by J. H. McDONALD ; " On the theory of improper definite integrals," by E. H. MOORE ; " On the convergence and character of a certain form of continued fraction," by E. B. VAN VLECK ; Notes and errata, volumes 1 and 2.

THE October number (volume 23, number 4) of the *American Journal of Mathematics* contains the following articles : " Memoir on the algebra of symbolic logic," by A. N. WHITEHEAD ; " Secular perturbations of the planets," by G. W. HILL ; " Representation of linear groups as transitive substitution groups," by LEONARD EUGENE DICKSON ; " A class of number-systems in six units," by G. P. STARK-WEATHER.

THE October number (second series, volume 3, number 1) of the *Annals of Mathematics* contains the following papers : " On the convergence of the continued fraction of Gauss and other continued fractions," by E. B. VAN VLECK ; " On the differentiation of an infinite series term by term," by M. B. PORTER ; " A note on geodesic circles," by J. K. WHITTEMORE ; " Note on the functions defined by infinite series whose terms are analytic functions of a complex variable ; with corresponding theorems for definite integrals," by W. F. OSGOOD ; " Nim, a game with a complete mathematical theory," by C. L. BOUTON ; " On the groups generated by two operators of order three whose product is also of order three," by G. A. MILLER ; " On the invariants of a quadrangle under the largest subgroup, having a fixed point, of the general projective group in the plane," by W. A. GRANVILLE.

THE use of the centesimal division of the quadrant of a circumference has been authorized at the examinations for admission to the Ecole polytechnique at Paris. Beginning with 1902 tables in either sexagesimal or centesimal division may be used in trigonometrical computations, but beginning with 1905 the use of the latter will be obligatory with permission to check results by sexagesimal tables.

THE *Bibliotheca Mathematica* for September, 1901, contains a bio-bibliography, prepared by Professor G. ENESTRÖM, of mathematicians whose death occurred in the period 1881–1900, with references to published obituary notices.

PROFESSOR E. WÖLFFING, of Stuttgart is preparing a catalogue of non-periodical literature in mathematics and mechanics, soon to be ready for publication. It will contain about sixteen thousand titles arrange d under four hundred headings.

CAMBRIDGE UNIVERSITY.—Advanced mathematical courses for the current academic year are announced as follows :—
Michaelmas term, 1091.—By Professor Sir G. G. STOKES : Hydrodynamics, including viscosity, three hours.—By Pro-

fessor A. R. FORSYTH : Linear differential equations, three hours ; Calculus of variations, two hours.—By Professor G. H. DARWIN : Figure of earth and precession, three hours. —By Dr. E. W. HOBSON : Spherical and cylindrical harmonics, three hours.—By Mr. J. LARMOR : Electrodynamics, three hours.—By Mr. H. F. BAKER : Theory of functions (conformal representation, hypergeometric functions, discontinuous groups), three hours.—By Mr. H. M. MACDONALD : Waves (especially waves of light), three hours. —By Mr. H. W. RICHMOND : Plane analytic geometry, three hours.—By Mr. G. T. WALKER : The electromagnetic field, three hours.—By Mr. B. A. W. RUSSELL : The principles of mathematics, two hours.—By Mr. J. H. GRACE : Invariants and geometrical applications, three hours.

Lent term, 1902.—By Professor Sir G. G. STOKES : Physical optics, three hours.—By Professor A. R. FORSYTH : Linear differential equations (continued) and automorphic functions, three hours.—By Professor G. H. DARWIN : Potential and attractions, three hours.—By Professor Sir R. S. BALL : Planetary theory, three hours.—By Dr. E. W. HOBSON : Fourier's series and functions of a real variable, three hours.—By Mr. J. LARMOR : Electrodynamics, with optical and thermodynamic applications, three hours.—By Mr. H. F. BAKER : Theory of equations (Galois theory).—By Mr. H. M. MACDONALD : Hydrodynamics, three hours.—By Mr. A. BERRY : Elliptic functions.—By Mr. G. T. WALKER : The electromagnetic theory of light, three hours.—By Mr. G. T. BENNETT : Linear and quadratic complexes, three hours.—By Mr. B. A. W. RUSSELL : The principles of mathematics (continued).—By Mr. I' A. BROMWICH : Matrices, quadratic and bilinear forms.—By Mr. E. T. WHITTAKER : The problem of three bodies, three hours.

Easter term, 1902.—By Professor Sir R. S. BALL : Cometary orbits, three hours.—By Mr. H. F. BAKER : Continuous groups.—By Mr. W. L. MOLLISON : Theory of potential and electrostatics, three hours.—By Mr. A. N. WHITEHEAD: Non-euclidean geometry.

Long vacation, 1902.—By Professor Sir R. S. BALL : Applications of modern geometry to dynamics, three hours (short course).

THE HON. B. A. W. RUSSELL will deliver in Cambridge University (England) a course of lectures on the Principles of Mathematics and Symbolic Logic, during the Michaelmas and Lent Terms. The lectures will deal with Peano's logic, the logic of relations, cardinal arithmetic, ordinal

arithmetic (including irrationals and continuity), and geometry (projective, descriptive, and metrical).

MR. W. BURNSIDE and Mr. J. GREAVES are the moderators, and Mr. J. G. LEATHAM and Mr. J. H. GRACE are the examiners for Part I. of the Cambridge mathematical tripos held in the spring of 1902.

DURING the recent summer quarter of the University of Chicago there were offered fourteen mathematical courses with a total registration of three hundred and seventeen.

AT the recent bicentennial celebration of the founding of Yale University, the degree of doctor of laws was conferred on Professor J. HADAMARD, who was present as the official representative of the University of Paris.

PROFESSOR W. H. METZLER, of Syracuse University, has been elected a corresponding member of the Royal society of Canada.

DR. E. NEUMANN, docent in applied mathematics and physics in the University of Halle, has been appointed to an associate professorship in the University of Breslau.

PROFESSOR MAX WOLF, of Heidelberg, has received a call to the University of Göttingen as professor of astronomy and director of the observatory.

DR. G. ROST has qualified as docent in mathematics at the University of Würzburg.

MR. FRANK B. LITTELL, of the U. S. Naval Observatory, has been appointed a professor of mathematics in the navy.

AT Harvard University the leave of absence of Professor B. O. PEIRCE has been extended, and Professor M. BÔCHER has returned after a year's leave of absence. Dr. E. V. HUNTINGTON has been appointed instructor in mathematics in the Lawrence Scientific School.

PROFESSOR WILHELM SCHELL has retired from the active duties of the professorship of theoretical mechanics at the Technische Hochschule of Karlsruhe after fifty-one years of service in the institution.

THE deaths are announced of P. M. POKROVSKY, professor of mathematics at the University of Kiew, of A. F. BERGER, docent in mathematics at the University of Upsala, and of F. CASPARY, a mathematician of the firm of Siemens and Halske, Berlin.