motion of a rigid body is very pretty. It is, however, necessary to introduce the notion of the symmetric linear function, and unless the reader looks up the reference to Heaviside or similar source, he may find the chapter a trifle hard. The Poinsot motion yields with great ease to vector methods, and the author makes the most of his analysis.

The chapter on the mechanics of deformable bodies begins with a concise summary of properties of the general linear vector function, passes to strains and infinitesimal displacements, discusses surfaces of discontinuity (Hadamard), and terminates with stress. It would be difficult in so short a space (47 pages) to do the work better. There follows thirty pages on hydrodynamics which contain most of the classical theory as far as general properties are concerned, and a few other things. This, too, is thoroughly good.

To this point we have covered only 170 pages of the text. The brevity is partly a matter of conciseness in style, but largely due to systematically thinking and using vectors. Sixty-nine exercises, a table of cartesian-vector equivalents in parallel column, and an index complete the work. We could only wish for fifty pages more in which the classical electromagnetic theory, including a little crystal optics, should be presented as succinctly as the theory of rigid motion, fluid motion, and elastic media. As it is, however, Silberstein has given us an almost ideal introduction to mathematical vector physics.

<div style="text-align: right">EDWIN B. WILSON.</div>

NOTES.

THE July number (volume 15, number 3) of the *Transactions of the American Mathematical Society* contains the following papers: "A new principle in the geometry of numbers, with some applications," by H. F. BLICHFELDT; "An application of Severi's theory of a basis to the Kummer and Weddle surfaces," by F. R. SHARPE and C. F. CRAIG; "Transformations of surfaces of Voss," by L. P. EISENHART; "Birational transformations of certain quartic surfaces," by F. R. SHARPE and VIRGIL SNYDER; "One-parameter families of curves in the plane," by G. M. GREEN; "The minimum of a definite integral for unilateral variations in space," by G. A. BLISS and A. L. UNDERHILL; "On a method of comparison for triple-systems," by L. D. CUMMINGS; "An existence theorem

for a certain differential equation of the nth order," by W. R. LONGLEY.

THE July number (volume 36, number 3) of the *American Journal of Mathematics* contains the following papers: "On a certain completely integrable system of linear partial differential equations," by E. J. WILCZYNSKI; "On the connection of an abstract set, with applications to the theory of functions of a general variable," by A. D. PITCHER; "On series of iterated linear fractional functions," by R. D. CARMICHAEL; "The derivative of a function of a surface," by C. A. FISCHER; "Some invariants and covariants of ternary collineations," by H. B. PHILLIPS; "A geometrical application of the theory of the binary quintic," by FLORENCE P. LEWIS.

THE Prince Jablonowski society of Leipzig announces the following prize problem for the year 1916: "To extend the theory of linear functional differential equations in any direction. Particularly desirable is a complete consideration of new special cases." The value of the prize is 1,050 marks. Competing memoirs should be in the hands of the secretary before October 31, 1916.

THE academy of sciences of Paris has awarded its Poncelet prize for 1914 to Dr. H. LEBESGUE, of the University of Paris. The grand prize was not awarded. The Lalande prize in theoretical astronomy was awarded to Dr. M. GUILLAUME of the University of Lyon; the Valz prize was divided between Dr. P. CHEVALIER of Shanghai, and Dr. P. SALET, of the observatory of Paris.

THE following doctorates in mathematics and astronomy were conferred by the French universities during the academic year 1912–1913. A. BLONDEL; "On the theory of tides in a canal; application to the Red Sea" (Toulouse); M. LUIZET; "The Cepheides considered as double stars, with a chart of δ" (Lyon); K. POPOFF: "On the movement of 108 Hecube" (Paris); A. VÉRONNET: "Rotation of a heterogeneous ellipsoid and exact figure of the earth" (Paris); P. J. BROWNE: "The problem of inversion proposed by Abel and its generalizations" (Toulouse); G. COTTY: "Abelian functions and the theory of numbers" (Toulouse); G. FASBINDER: "Dynamics of variable

systems and the rotation of the earth" (Paris); M. GEVREY: "Partial differential equations of parabolic type" (Paris); C. PLATRIER: "The minors of Fredholm's determinant and systems of linear integral equations" (Paris); L. ROCHE: "The wave surface in rotative magnetic polarization and more general phenomena" (Paris); L. ROUYER: "The deformation of quadrics and conjugate surfaces with regard to a quadratic complex" (Paris); J. TROUSSET: "Semi-analytic study of the movement of the eighth satellite of Jupiter" (Paris).

IN memory of HENRI POINCARÉ an international committee has been formed for the purpose of raising a subscription, the proceeds of which, after striking a medal of Poincaré, will be administered by the Paris Academy in encouraging young scientists engaged in the fields to which Poincaré contributed especially, viz., analysis, celestial mechanics, mathematical physics, scientific philosophy. Contributors of 25 to 50 francs will receive a bronze medal, of 50 francs or more a silver medal. Subscriptions should be sent to M. E. Lebon, secretary-treasurer, rue des Ecoles, 4 bis, Paris.

THE following advanced courses in mathematics (elementary courses not included) are offered at the Italian universities during the academic year 1914–1915:

UNIVERSITY OF BOLOGNA.—By Professor P. BURGATTI: Theory of elasticity, especially elastic vibrations, three hours. —By Professor L. DONATI: Electrodynamics of moving bodies; thermodynamics; radiations; hypothesis of quanta with applications, three hours.—By Professor F. ENRIQUES: Theory of algebraic curves and surfaces, three hours.—By Professor S. PINCHERLE: Elliptic functions; integral equations and systems of linear equations with infinite unknowns, three hours.

UNIVERSITY OF CATANIA.—By Professor E. DANIELE: Equilibrium of elastic bodies, four hours.—By Professor M. DE FRANCHIS: Geometry on algebraic surfaces by transcendental aids, four hours.—By Professor G. PENNACCHIETTI: Hydrodynamics, four hours.—By Professor C. SEVERINI: Theory of analytic functions; theory of permutable functions, four hours.

UNIVERSITY OF GENOA.—By Professor E. E. LEVI: Calculus of variations, four hours.—By Professor G. LORIA: Geometric applications of elliptic functions, three hours.—By Professor O. TEDONE: Geometrical and physical optics, three hours.

UNIVERSITY OF NAPLES.—By Professor F. AMODEO: History of mathematics; the ancient ages, three hours.—By Professor A. DEL RE: n-dimensional analysis of Grassmann with applications to mechanics of the spaces of constant curvature, four and one half hours.—By Professor R. MARCOLONGO: Equations of dynamics; periodic solutions; asymptotic solutions; restricted problem of the three bodies, three hours.—By Professor D. MONTESANO: Theory of algebraic surfaces and of their linear systems; theory of birational transformations of three-dimensional space, three hours.—By Professor E. PASCAL: The functions of lines and the calculus of variations, three hours.—By Professor L. PINTO: Thermodynamics, three hours.—By Professor G. TORELLI: One—and more—dimensional sets; simple and multiple Lebesgue's integrals; functions of a set; derivation of indefinite integrals, four and one half hours.

UNIVERSITY OF PADUA.—By Professor F. D'ARCAIS: Functions of a complex variable; integral equations, four hours.— By Professor A. COMESSATTI: Algebraic geometry, three hours.—By Professor P. GARRANIGA: Theory of numbers, three hours.—By Professor T. LEVI-CIVITA: Analytic dynamics; problem of the three bodies, four and one half hours.— By Professor G. RICCI: Absolute differential calculus; potential; elasticity, four hours.—By Professor F. SEVERI: Linear systems of plane curves and rational surfaces, four hours.— By Professor A. TONOLO: Fourier's series; partial differential equations, three hours.—By Professor G. VERONESE: Geometrical applications of the theory of sets, four hours.

UNIVERSITY OF PALERMO.—By Professor G. BAGNERA: Functions of a complex variable; entire functions of one or of two variables, three hours.—By Professor M. GEBBIA: Electrodynamics (advanced part), four and one half hours.— By Professor G. B. GUCCIA: General theory of algebraic curves and surfaces, four and one half hours.—By Professor A. VENTURI: Foundations of the modern methods in celestial mechanics following Poincaré; method of Hill for the moon, four and one half hours.

UNIVERSITY OF PAVIA.—By Professor L. BERZOLARI: Geometry on an algebraic curve, and applications to linear systems of plane algebraic curves, three hours.—By Professor E. BOMPIANI: Differential geometry, three hours.—By Professor U. CISOTTI: Mechanics of continuous systems; theory of potential; electricity, three hours.—By Professor F. GERBALDI: Functions of a complex variable; elliptic functions, three hours.—By Professor G. VIVANTI: Integral equations, three hours.

UNIVERSITY OF PISA.—By Professor E. BERTINI: Cremona transformations in the plane and in space, three hours.—By Professor G. BIANCHI: Functions of a complex variable; linear differential equations, four and one half hours.—By Professor U. DINI: Integral equations; linear differential equations in the real field, four and one half hours.—By Professor G. A. MAGGI: Principles of analytic mechanics; theory of potential functions; phenomenological theory of electromagnetic field, four and one half hours.—By Professor P. PIZZETTI: Theory of interpolation; general notions of spherical astronomy; general theory of perturbations, four and one half hours.

UNIVERSITY OF ROME.—By Professor G. BISCONCINI: Geometrical applications of calculus, three hours.—By Professor G. CASTELNUOVO: Calculus of probability, three hours.—By Professor L. SILLA.. Kinematics and mechanisms, three hours. —By Professor V. VOLTERRA: Permutable functions; functional derivative equations with applications, three hours.— Elasticity, three hours.—By ————: Theory of functions; elliptic functions, three hours.

UNIVERSITY OF TURIN.—By Professor T. BOGGIO: Potential functions and hydrodynamics, three hours.—By Professor G. FUBINI: Calculus of variations; Fourier's series; the principle of minimum as application of Fourier's series to the calculus of variations, three hours.—By Professor C. SEGRE: Theory of invariants applied to geometry, three hours.—By Professor C. SOMIGLIANA: Magnetism and electromagnetism, three hours.

THE London mathematical society has awarded the de Morgan medal for 1914 to Professor Sir JOSEPH LARMOR, of Cambridge University.

DR. A. BOHR, of the University of Copenhagen, has been appointed reader in mathematical physics at the University of Manchester.

DR. U. CRUDELI has been appointed docent in mathematical physics at the University of Rome.

PROFESSOR L. TONELLI, of the University of Cagliari, will occupy the chair of analysis at the University of Parma during the present year.

DR. E. BOMPIANI has been appointed docent in analytic geometry at the University of Pavia.

DR. A. COMESSATTI has been appointed docent in geometry at the University of Padua.

DR. E. ROSATI has been appointed docent in projective geometry at the University of Pisa.

DR. M. PICONE has been appointed docent in mathematical analysis at the University of Turin.

DR. A. TONOLO has been appointed docent in mathematical analysis at the University of Padua.

PROFESSORS G. SCHEFFERS and C. JOLLES, of the technical school of Berlin have been named Geheime Regierungs-Räte by the German emperor.

PROFESSOR A. GUTZMER has been elected rector of the University of Halle for the coming academic year.

PROFESSOR A. KORN has been appointed honorary professor at the Charlottenburg technical school.

DR. E. HELLINGER, of the University of Marburg, has been appointed associate professor of mathematics at the University of Frankfort.

PROFESSOR P. STÄCKEL, of the University of Heidelberg, has been elected honorary member of the mathematical-physical society of Budapest.

PROFESSOR D. K. PICKEN, of Victoria College, New Zealand, has been appointed master of Ormand College, University of Melbourne.

THE University of Groningen conferred the honorary degree of doctor of mathematics and physics on Professor E. B. VAN VLECK at its recent tercentenary celebration.

PROFESSOR L. E. DICKSON, of the University of Chicago, will lecture at the University of California during the first term of the present academic year.

PROFESSOR ELIJAH SWIFT, of Princeton University, has been appointed Williams professor of mathematics at the University of Vermont.

DR. M. O. TRIPP has been appointed professor of mathematics at Olivet College.

DR. J. E. ROWE, of Dartmouth College, has been appointed assistant professor of mathematics in the Pennsylvania State College.

PROFESSOR W. C. KRATHWOHL, of Ripon College, has been appointed assistant professor of mathematics in the Armour Institute of Technology.

AT the College of the City of New York, Dr. E. E. WHITFORD has been promoted to an assistant professorship of mathematics. Messrs. G. M. HAYES, C. A. TOUSSAINT, J. A. BREWSTER, and S. A. SCHWARZ have been promoted to instructorships in mathematics.

AT Cornell University, Dr. W. A. HURWITZ has been promoted to an assistant professorship of mathematics.

DR. K. P. WILLIAMS, of Indiana University, has been promoted to an assistant professorship of mathematics.

MR. J. D. ESHLEMAN has been appointed instructor in mathematics at Western Reserve University.

DR. L. E. WILLIAMS has been appointed instructor in mathematics at the Georgia School of Technology.

Miss M. E. Wells, of Mount Holyoke College, has been appointed instructor in mathematics at Oberlin College; Professor Mary E. Sinclair, of Oberlin, is absent on leave during the present academic year.

Dr. Susan R. Benedict has been appointed associate professor of mathematics at Smith College.

At the University of Minnesota, Dr. W. H. Bussey has been promoted to an associate professorship of mathematics. Dr. W. F. Holman and Dr. H. L. Slobin have been promoted to assistant professorships of mathematics.

Professor E. P. R. Duval has returned to his former position as associate professor of mathematics in the University of Oklahoma.

At Columbia University, Professor D. E. Smith will be abroad on leave of absence during the coming academic year.

NEW PUBLICATIONS.

I. HIGHER MATHEMATICS.

Borgogelli (G.). Di un più semplice modo per disegnare le proiezioni dei cinque poliedri regolari. 2a edizione. Roma, Manuzio, 1914. 16mo. 27 pp.

Budde (E.). Tensoren und Dyaden im dreidimensionalen Raum. Braunschweig, Vieweg, 1914. M. 6.80

Dickson (L. E.). Elementary theory of equations. New York, Wiley, 1914. 8vo. 5+184 pp. Cloth. $1.75

——. Linear Algebras. (Cambridge Tracts in Mathematics and Mathematical Physics, No. 16.) Cambridge, University Press, 1914. 8vo. 8 + 73 pp. 3s.

Ducla (V.). Démonstration d'un théorème de Fermat. 2e édition, revue et corrigée. Pau, Garet & Haristoy, 1914. 8vo. 30 pp.

Dyck (W. v.). Ueber den Verlauf der Integralkurven einer homogenen Differentialgleichung 1ter Ordnung. (*Abhandlungen der k. bayerischen Akademie der Wissenschaften.*) München, Franz, 1914. 8vo. 49 pp. M. 2.00

Elliott (C.). Models to illustrate the foundations of mathematics. Edinburgh, Lindsay, 1914. 8vo. 8+116 pp. 2s. 6d.

Engel (F.). See Liebmann (H.).