proposed by Lagrange: to determine all geographical maps such that the meridians and parallels are represented by circles.

In Book III, Chapter 3 gives the determination of all minimal surfaces capable of being generated by translation in more than one way, and in Chapter 8 a special minimal surface is considered which was discovered by Riemann and is generated by the motion of a circle of variable radius. Finally, Chapter 9 gives an investigation of Ribaucour's isotropic congruences, with applications to Bertrand's curves.

<div style="text-align:right">T. H. GRONWALL.</div>

NOTES.

THE opening (January) number of volume sixteen of the *Transactions of the American Mathematical Society* contains the following papers: "On the theory of curved surfaces, and canonical systems in projective differential geometry," by G. M. GREEN; "The multitude of triad systems on 31 letters," by H. S. WHITE; "The φ-subgroup of a group," by G. A. MILLER; "On a set of postulates which suffice to define a number-plane," by R. L. MOORE; "The equivalence of complex points, planes, lines with respect to real motions and certain other groups of real transformations," by W. C. GRAUSTEIN; "Invariants of the rational plane quintic curve and of any rational curve of odd order," by J. E. ROWE; "A set of postulates for general projective geometry," by M. G. GABA; "Certain quartic surfaces belonging to infinite discontinuous cremonian groups," by V. SNYDER and F. R. SHARPE; "The functions of a complex variable defined by an ordinary differential equation of the first order and the first degree," by J. SLEPIAN; "On the differential geometry of ruled surfaces in 4-space and cyclic surfaces in 3-space," by A. RANUM.

THE opening (January) number of volume 37 of the *American Journal of Mathematics* contains the following papers: "Generalizations of geodesic curvature and a theorem of Gauss concerning geodesic triangles," by G. A. BLISS; "On the medians of a closed convex polygon," by A. EMCH; "The

rational sextic curve, and the Cayley symmetroid," by J. R. CONNER; "Limited and illimited linear difference equations of the second order with periodic coefficients," by T. FORT; "Finite groups of plane birational transformations with eight fundamental points," by F. R. SHARPE; "Conics through inflections of self-projective quartics," by F. R. SHARPE; "Concerning an analogy between formal modular invariants and the class of algebraical invariants called Booleans," by O. E. GLENN; "Periodic orbits on a smooth surface," by D. BUCHANAN; "On Foucault's pendulum," by W. D. MACMILLAN.

The frontispiece of the volume is a portrait of JOHN NAPIER.

THE first number (January 15, 1915) of the *Proceedings of the National Academy of Sciences* contains the following mathematical papers: "Recent progress in the theories of modular and formal invariants and in modular geometry," by L. E. DICKSON; "The synthesis of triad systems Δ_t in t elements, in particular for $t = 31$," by H. S. WHITE; "The φ-subgroup of a group of finite order," by G. A. MILLER.

The second number (February 15) contains: "Transformations of surfaces Ω," by L. P. EISENHART; "Conjugate systems of space curves with equal Laplace-Darboux invariants," by E. J. WILCZYNSKI.

THE following papers on mathematics or mathematical physics have recently appeared in the *Proceedings of the American Academy of Arts and Sciences:* "The generalized Riemann problem for linear differential equations, and the allied problems for linear difference, and q-difference equations," by G. D. BIRKHOFF, volume 49, pages 519–568; "On the theory of the rectilinear oscillator," by E. B. WILSON, volume 50, pages 105–128; "Planck's radiation formula and the classical electrodynamics," by D. L. WEBSTER, volume 50, pages 128–145.

AT the meeting of the London mathematical society held December 10 the following papers were read: "Simultaneous equations, linear or functional," by E. H. NEVILLE; "Cyclotomic quinquisection," by W. BURNSIDE; "Oscillations near the isosceles triangle solution of the three body problem," by D. BUCHANAN; "Lamé's differential equation and ellipsoidal harmonics," by E. T. WHITTAKER.

THE Mathematical association held its annual meeting January 9 at the London day college. The following papers were read: "Mathematics in artillery science," by G. GREEN-HILL; "Teaching of modern analysis," by W. P. MILNE; "The circle of curvature," by A. LODGE; "Practical work in connection with mathematics," by R. C. FAWDRY.

A NOTICE has recently been sent out by Professor Fehr, secretary of the International commission on the teaching of mathematics, announcing that, on account of the war, it has been decided not only to abandon the idea of a meeting in August 1915, but also to postpone the preparation of such projected reports as relate to the European countries.

THE University of Chicago Press announces the following volumes in preparation for early publication in its Science Series: Finite collineation groups, by H. F. BLICHFELDT; Linear integral equations in general analysis, by E. H. MOORE.

AT Harvard University two Benjamin Peirce instructorships in mathematics have been established, the holders of which will devote a part of their time to teaching, including some advanced instruction, but will be given facilities and encouragement to prosecute scholarly research. Appointments are made, under open competition, for a term of one year, and may be renewed for not more than three years. Further information may be obtained from the chairman of the division of mathematics, PROFESSOR BÔCHER.

AT Cornell University provision has been made for giving two cycles of advanced courses in analysis and in geometry in the summer session, each cycle to run through four years. For 1915 these courses will begin with Advanced calculus and infinite series, by Professor W. A. HURWITZ, five hours, and Algebraic plane curves, by Professor VIRGIL SNYDER, five hours.

PROFESSOR DE LA VALLÉE POUSSIN, of the University of Louvain, will give a course of lectures in French at Harvard University on Lebesgue integrals, beginning February 16 and extending through the remainder of the academic year.

DR. M. BOTTASSO has been appointed docent in analytic geometry at the University of Pavia.

DR. T. H. HAVELOCK has been appointed professor of applied mathematics and mathematical physics at Armstrong College, Newcastle-on-Tyne.

PROFESSOR A. W. PHILLIPS, formerly dean of the Yale University graduate school, died January 20, at the age of 70 years. He became a tutor at Yale in 1877 and retired from his professorship in 1911. He was a member of the American Mathematical Society since 1896.

PROFESSOR A. VENTURI, of the University of Palermo, died December 29 at the age of 62 years.

Book catalogues: Deighton, Bell and Company, 13 Trinity Street, Cambridge, England, catalogue 27, some 300 mathematical pamphlets, theses, etc.—Gustav Fock, Schlossgasse 7, Leipzig, Handapparate of Amthor, Lüroth, Schubert, and others.—Julius Springer, Linkstrasse 23, Berlin, technical works, applied mathematics.

NEW PUBLICATIONS.

I. HIGHER MATHEMATICS.

BAYLISS (R. W.). A first school calculus. New York, Longmans, 1914. Cr. 8vo. 12+288 pp. $1.20

BLUEL (E.). Leçons de mathématiques spéciales. Volume 1: Algèbre, ligne droite et plan, trigonométrie, analyse, applications géométriques. Paris, 1914. 8vo. Fr. 15.00

——. Leçons de mathématiques spéciales. Volume 2: Géométrie analytique, courbes et surfaces. Paris, 1914. 8vo. Fr. 15.00

BÔCHER (M.). Charles Sturm et les mathématiques modernes. Paris, Alcan, 1914. 8vo. 19 pp.

——. Mathématiques et mathématiciens francais. Paris, Champion, 1914. 8vo. 16 pp.

BOREL (E.). Lecons sur la théorie des fonctions. Eléments et principes de la théorie des ensembles; applications à la théorie des fonctions. 2e édition. Paris, Gauthier-Villars, 1914. 8vo. 12+260 pp. Fr. 7.50

CREMONA (L.). Elements of projective geometry. Translated by Charles Leudesdorf. 3d edition. Oxford, Clarendon Press, 1914. 8vo. 322 pp. 12s. 6d.

CZUBER (E.). Wahrscheinlichkeitsrechnung und ihre Anwendung auf Fehlerausgleichung, Statistik und Lebensversicherung. 3te erweiterte Auflage. (2 Bände.) Band I: Wahrscheinlichkeitstheorie, Fehlerausgleichung, Kollektivmasslehre. Leipzig, Teubner, 1914. Gr. 8vo. 12+462 pp. Cloth. M. 14.00