

exposition is remarkably clear and easy to follow, and illustrated by numerous and well-chosen numerical examples and exercises. Several topics, for instance the arithmetical reduction of bilinear forms, are presented here in a more lucid and accessible form than in any other work known to the reviewer.

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Leçons sur la Théorie générale des Surfaces et les Applications géométriques du Calcul infinitésimal. Par GASTON DARBOUX. Première partie: *Généralités. Coordonnées curvilignes. Surfaces minima.* Deuxième édition, revue et augmentée. Paris, Gauthier-Villars, 1914. vii + 618 pp.

AFTER having been out of print for some time, the first volume of Darboux's classical treatise now appears in a second edition. Since the general features of this admirable work are undoubtedly familiar to the majority of the BULLETIN's readers, it will be sufficient to mention, in this review, the new matter added in the second edition and taken mostly from Darboux's own papers in the *Bulletin des Sciences mathématiques* and the *Comptes rendus*.

In Book I, Chapters 5 and 6 deal with the kinematics of motions dependent on any number of parameters, and the integration of the corresponding total differential equations for the direction cosines. Chapter 7, dealing with the special case of two parameters, brings some new developments regarding the Plücker conoid. Chapter 10 gives a new solution, which is both elementary and elegant, of a problem first proposed and solved by Sophus Lie: to determine all surfaces which can be generated in more than one way by the translation of a rigid curve. It seems, however, to have escaped the notice of the distinguished author that a similar solution has been previously given by Scheffers ("Das Abelsche Theorem und das Liesche Theorem über Translationsflächen," *Acta Mathematica*, volume 28 (1904), pages 65-91).

In Book II, there has been added to Chapter 1 a study of a special conjugate system formed by plane curves, which leads to a class of surfaces applicable on quadric surfaces and discovered by Peterson. Chapter 4 contains an exposition of Gauss's method for the conformal representation of the terrestrial ellipsoid on a sphere, as well as a solution of a problem

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.

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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