nection with the second and third of these examples are given in the second chapter (pages 9–22) which is entitled: "Variations. Notation and nomenclature. Illustrative problems." We find here also a second solution of the two-dimensional shortest line problem (polar coordinates), and a solution of the problem of the geodesic line joining two given points on the surface of a sphere. Section 10 is devoted to isoperimetrical problems. The seven examples that are given for solution involve slight developments of the text.

In Chapter III (pages 23–28), on "Problems involving several dependent variables," Hamilton's principle and its application are considered. Chapter IV (pages 29–33) on "Multiple integrals" contains (1) the derivation of the differential equation of minimal surfaces, and, by means of Hamilton's principle, (2) the derivation of the differential equation for small transverse oscillations of a stretched elastic string.

"Variation of limits" and the "Principle of least action" are the topics of the last chapter. In each of the last three chapters are examples to be solved.

No references to the literature of the subject are to be found in the tract.

R. C. ARCHIBALD.

Science and the Nation. Essays by Cambridge Graduates with an Introduction by the Right Hon. Lord Moulton. Edited by A. C. SEWARD. Cambridge, at the University Press, 1917. 22 + 328 pages. Price 5 shillings. (G. P. Putnam's Sons, New York. Price $1.50.)

"IT is widely believed that technical education stands for efficiency and prosperity, but pure science is regarded as something apart—a purely academic subject. It was with a view to demonstrate the fallacy of this distinction that the present volume was suggested," writes Mr. Seward.

The volume contains thirteen chapters each written by a specialist of note. The first four chapters, occupying about one third of the volume, are headed as follows: "The national importance of chemistry" by W. J. Pope; "Physical research and the way of its application" by W. H. Bragg; "The modern science of metals, pure and applied" by W. Rosenhain; "Mathematics in relation to pure and applied science" by E. W. Hobson.

Some of the topics in Professor Hobson's very interesting 27-page chapter are: mathematics and practical life; evolution of mathematical concepts; physics and mathematics; dynamical theory of tides; mathematics and physical science; optics and mathematics; abstract dynamics; geometry; reform of teaching; the teaching of mechanics; university teaching; research.

The volume as a whole is exceedingly readable and the reviewer considers that a perusal of its pages must convince any one that pure science is *not* to be regarded "as something apart."

R. C. ARCHIBALD.

Cours de Mécanique. Vol. II. By LÉON LECORNU. Paris, Gauthier-Villars, 1915. 538 pp.

THIS is the second of the three volumes of a treatise on mechanics for use in l'Ecole Polytechnique. The first volume was reviewed in the BULLETIN for April, 1915. The present volume is devoted to theoretical mechanics with a few immediate applications and it is the intention of the author to treat the mechanics of engineering in the third volume.

The first four parts of the complete course are contained in the first volume. The second volume begins with the fifth part, on general dynamics, which includes the fundamental theorems on the motion of a system of particles, the theory of energy, constrained motion, impact, the equations of Lagrange, and small oscillations.

The dynamics of a rigid body is the subject of the sixth part and includes the following topics: moments of inertia, rotation about a fixed axis, motion parallel to a fixed plane, motion about a fixed point, motion of a heavy homogeneous solid of revolution on a smooth horizontal plane, motion of a solid subject to no restraints, and a brief chapter on an extension to the motion of a deformable system.

The seventh part, on the dynamics of physical solids, is devoted principally to a discussion of friction. The theory of elasticity is given in the eighth part, and the volume is concluded by the ninth part on the mechanics of fluids.

W. R. LONGLEY.

Les Théories statistiques en Thermodynamique. Par H. A. LORENTZ. Leipzig, B. G. Teubner, 1916. 120 pp.

DELIVERED at the Collège de France by Lorentz in 1912,