

tious with a direct bearing on the physical universe. It is purely the broader mathematical development which fascinates him. To the reviewer, this disclaimer seems overdrawn. Any system of dynamics which contains the Newtonian world as a special case is likely sooner or later to lead to new points of view when the specialization is made. Witness, for instance, the interpretation reached of Weber's electrodynamic law of attraction. This is found deducible from the law of gravitation, provided a third *concealed* point is so attached to the system as to act upon it only through inertia. Indeed Königsberger is pursuing the subject with a trenchant enthusiasm rare in the veteran. A recent paper communicated to the Berlin Academy treats the Lagrangian equations from the point of view of two dimensional time.

The book is dedicated to the memory of Helmholtz, and is in a measure inspired by famous Heidelberg associations.

C. Barus

Catalase. By Oscar Loew. 15 × 23 cm; 47 pp. Washington: Government Printing Office, 1901. — This is Report No. 68 of the Department of Agriculture. The author decides that the power of decomposing hydrogen is not the property of any hitherto described enzyme, and he therefore calls the enzyme which has this power, catalase. It exists in an insoluble and a soluble form to be known as α -catalase and β -catalase. The author has studied these two forms of catalase with reference to their behavior towards various salts, mercuric chloride, acids and bases, alcohol, chloroform, phenol, formaldehyde, nitrous acid, prussic acid, hydrogen sulphide, hydroxylamine, phenylhydrazine, and alkaline silver solutions.

Wilder D. Bancroft

Geometric Exercises in Paper Folding. By T. Sundara Row. Edited and revised by W. W. Beman and D. E. Smith. 12 × 19 cm; pp. xiv + 148. Chicago: Open Court Publishing Company, 1901. Price: bound, \$1.00, net. — This little book is a systematic development of the geometry of plane figures bounded by straight lines, based upon the idea of superposition. Take any irregular piece of paper and fold it upon itself; a crease is formed — a straight line. Spread the paper out and again fold it, so that the former crease is folded on to itself; a new crease is formed, at right angles to the first. Using this idea, and that of comparison of equal distances (using length of a crease for unit of measure), most of the exercises in Euclid's first four books are proven; and a method is given for constructing any number of points on nearly all of the classic curves, and some problems connected with them. A chapter is devoted to the progressions and the summation of a few infinite series, including an approximation construction for π .

For teachers of elementary geometry the book is really of considerable value, as it shows in a forcible and tangible way how properties vaguely known to us by experience are logical and necessary consequences of a few definitions. A set of colored squares of paper is provided with the book.

Virgil Snyder

these years, — of the cholera outbreak in 1834, of public events of different kinds, and of the honors which were from time to time bestowed upon himself.

On the whole, the impression of Berzelius' character left by these letters, is that of a man of perfect sincerity in every act, of untiring energy in his work, of kindly sympathy with those he loved, of broad-minded public spirit, and of that mixture of modesty with the consciousness of worth which is so characteristically the gift of very great men.

Much space is taken up in the letters with the discussions regarding the publication in German, under Wöhler's care, of Berzelius' *Lehrbuch* and of the dealings with the publisher Arnold in this connection.

In all of this I have said very little of Wöhler. His letters are full of interest to him who reads for a picture of the growth of chemistry through those years; but the intense personal quality, the picturesqueness, the lofty independent spirit, are not there. Wöhler's was a quiet, affectionate temperament; his aim was to avoid the centers of conflict and keep the peace between his friends too if he could. His letters are not dull; far from it; only one reads those of Berzelius first.

The understanding and enjoyment of the letters, which cover the period between 1824 and 1848, is very much facilitated by a synoptical index at the beginning, and by many good foot-notes throughout, the work of J. von Braun.

On the whole two "stately" volumes, and most welcome ones.

A. P. Saunders

Die Principien der Mechanik. *Mathematische Untersuchungen.* By Leo Königsberger. 14 × 21 cm; pp. xii + 228. Leipzig: B. G. Teubner, 1901. —The Lagrangian function, or specifically the Lagrangian equations of motion, is a means, primarily, of expressing what may be called the Newtonian dynamics of matter with greater breadth by generalizing the coordinates. The equations were, however, soon found available by Maxwell, among others, for treating the motion of other agencies than ponderable matter. Helmholtz in his theory of cyclic systems gave to the equations even greater comprehensiveness, by systematically generalizing the forces, the momenta, the accelerations, velocities, etc. Thus forces and energies and works are allied to the usual conceptions only in mathematical form. The forces may be ordinary forces, or they may be torques, or electromotive intensities; the momenta may be electrokinetic; while electric currents occur like velocities, self-inductions like moments of inertia, etc.

Königsberger, following Helmholtz and Hertz in his development of the doctrine of concealed motions, proceeds to investigate in like manner, systematically, all the usual principles of dynamics. Beginning with D'Alembert, he treats in turn Lagrange's equations, Hamilton's principle, the doctrine of energy, Gauss's principle of least constraint, Maupertuis's principle of least action, the principle of areas, of the motion of the centre of mass, Helmholtz's principle of concealed motions, the general doctrine of potential, and the equations of Laplace and Poisson, not to mention other relevant matter.

To enter into a non-technical discussion of these subjects seems out of the question. Königsberger expressly disclaims all intention of deducing proposi-