of vectors. He uses essentially the derivative dyad $d\sigma = d\rho \cdot \sigma$, that is, the dyad σ. It is now easy to define divergence as the average value of the scalar $\alpha \cdot \sigma \cdot \alpha$ over the surface of a unit sphere, α being any unit vector of variable direction. This gives of course what is commonly written $\cdot \sigma$. In the same manner the average value of $\alpha \times \varphi\alpha$ (where $\varphi\alpha = \alpha \cdot \sigma$) over the surface of the unit sphere, gives the curl. This would be the same as $\times \sigma$. There is nothing new in these definitions, as they have been given in one form or another before. A development of formulas that are useful follows.

Part II of 33 pages discusses the steady motion of a solid under no forces in liquid extending to infinity. Some of the well known results are reached. Towards the latter part of the section he considers certain cases of stable motion. The general problem is rather intractable, and the author is content with stating some conclusions of the simplest case. He finds that for this simple case, the two steady motions for which the screws are parallel to the greatest and least axes of a certain ellipsoid, are stable; that steady motion for which the screw is parallel to the mean axis is unstable.

J. B. SHAW.

An Introduction to the Theory of Relativity. By L. Bolton. New York, E. P. Dutton and Company, 1921. ix + 177 pp.

This little book gives a remarkably readable and intelligible account of the theory of relativity. It is by the author of the prize-winning essay in the contest recently conducted by the SCIENTIFIC AMERICAN. The author admits at the outset the impossibility of giving any sort of adequate notion of the theory of relativity without the use of mathematical ideas and symbols. He has set himself the task, however, of presenting his material without presupposing more than elementary algebra and the elements of plane geometry. As a result he finds it necessary to introduce the reader to the notion of the differential of arc, and in so doing brings back to life the "little zeros." There is also (p. 126) a footnote implying that cones and cylinders are the only developable surfaces. Such incidental blemishes may, however, be excused in view of the book's purpose and the extraordinarily satisfactory way in which this purpose has been carried out.

J. W. YOUNG.

Geometria Analytica. Part 1. *Il Metodo delle Coordinate.* By L. Berzolari. Second edition. Milan, Ulrico Hoepli. xiii + 495 pages.

This work belongs to the excellent series of manuals of the firm of Ulrico Hoepli. It aims to define the principal systems of coordinates in space of one, two and three dimensions and to derive the principal theorems and formulas of analytic geometry connected with them. It discusses in detail Cartesian coordinates of points, of lines in a plane and of planes in space. It further deals with homogeneous coordinates, and the fundamentals of analytic projective geometry. Equations of curves and surfaces are properly treated briefly. A short but well-selected appendix on vector analysis is added to this edition. Such topics as line coordinates in space and coordinates of spheres do not fall within the scope of this work. A few omitted topics which ought to have been included are: polar coordinates in space (radius vector and direction cosines), cylindrical coordinates and the fundamentals of intrinsic geometry.

The text is well and carefully written and, within its field, is thorough. Pedagogical requirements are borne constantly in mind and the expository form is good. American teachers and authors will find it a useful work for reference.

CHARLES SISAM.

Essai philosophique sur les Probabilités. By Pierre-Simon Laplace. I, II. Paris, Gauthier-Villars, 1921. 12 + 104 + 108 pp.

Mémoire sur la Chaleur. By MM. Lavoisier et de Laplace. Paris, Gauthier-Villars, 1920. 78 pp.

Mémoires sur l'Électromagnétisme et l'Électrodynamique. By André-Marie Ampère. Paris, Gauthier-Villars, 1921. 14 + 112 pp.

The editor of this series of reprints, entitled *Les Maîtres de la Pensée Scientifique*, pertinently remarks that the rapid scientific advances of the present time tempt us to neglect past discoveries and their authors. This neglect is almost unavoidable whenever the original papers are not within reach of the mass of scientific students. Reprints in cheap form, like the above, should meet with a hearty welcome. It is a privilege to be able to carry around in one's coat pocket the masterpieces of Laplace, Lavoisier and Ampère. Surely there is no need of enlarging upon the commanding place which each of these memoirs occupies in the history of science.

FLORIAN CAJORI.

Gruppentheorie. By Dr. L. Baumgartner. Berlin, Walter de Gruyter & Co., 1921. 120 pp.

This little book is as interesting as it is handy. It is simply written and divided into sections in a helpful way. There are four chapters: Introduction to the Group Notion, The Group Notion in Geometry, The Finite Group, The Infinite Group. The third chapter is much the longest and perhaps the most unified.

There are many illustrative examples, from theory of functions, transformations, number theory, etc., the predominance being from geometry. The literature list (p. 5) is very brief; in English only Burnside's earlier book is mentioned. The name of Lagrange is applied to the theorem, The order of a subgroup of a finite group is a factor of the order of its group (p. 7), a misnomer we are now told.* Sylow's theorem is introduced (p. 98) but a proof is appropriately omitted. If one were using this book for a first study of groups, certainly many supplementary exercises would be desirable. The little volume closes with answers to its forty-nine exercises and a very useful index.

LOUIS C. MATHEWSON.

* Carmichael, R. D., this BULLETIN, (2), vol. 27 (1922), pp. 474, 475.