
The Physical Universe

Man's Physical Universe, by Arthur Talbot Bawden, is a book which has been prepared as a text for survey courses in physical sciences. How well this problem has been coped with can perhaps best be determined by actual use of the book in such a course, but in this reviewer's opinion the problem still remains unsolved. Certain chapters of this book may be regarded as suitable for a course in high school general science, but for students of college calibre it would seem to constitute a waste of valuable time. A great many inaccuracies may be pointed out throughout the book; for example, on page 62, Yerkes Observatory is placed at Madison Bay rather than at Williams Bay where it is actually located; on page 150 Leyden, a Dutch city of 70,000 population, is depicted as an obscure German village. On page 424, in fig. 245, is shown how parallel beams of light are acted upon by convex and concave lenses. No discussion whatever follows concerning the points to which the light converges in the first case nor the point from which the light appears to diverge in the second case. The infra-red rays of the spectrum are discussed on page 443 and one is left with the impression that it is just another region of the spectrum where special photographic plates are required, whereas what is actually the case is that only a very narrow region is photographable (from $.8\mu$ to 1.1μ) while the remaining region (from 1.1μ to 300μ) must be investigated bolometrically. On page 605 occurs a discussion of quantum theory. The word formulas has been used instead of what probably should have been formalism. Werner Heisenber is portrayed as an abstract mathematician rather than a cracking good physicist and finally Schrödinger theory is represented as a manifestation of the theory of relativity—both statements are notoriously incorrect. One is indeed left with the impression that the author is poorly informed concerning his subject matter. The book can really not be recommended for the purpose for which it is intended.

—H. H. Nielsen.

Man's Physical Universe, by Arthur Talbot Bawden. xvii+812 pp. New York, The Macmillan Co., 1937. \$3.50.

The Mathematics of Einstein's Theory of Gravitation

When Einstein developed his relativity theory of gravitation, he found the necessary mathematics ready to hand in Riemann's geometry. This geometry was a direct extension of the differential geometry of curves and surfaces in three-dimensional space to an arbitrarily curved space with any number of dimensions. The extension of the notations and methods of vector analysis to Riemannian geometry gave the tensor notation and absolute differential calculus of Ricci and Levi-Civita. In fact the paths of particles in Einstein's theory are lines of stationary length in a four-dimensional space-time homogeneous with respect to the Ricci tensor. Weatherburn's book is an introduction both to the tensor calculus and to Riemannian geometry. It is written in the same clear style as his books on vector analysis and differential geometry, and will form an admirable introduction either to advanced differential geometry or to the theory of relativity.—L. H. Thomas.

An Introduction to Riemannian Geometry and the Tensor Calculus, by C. E. Weatherburn. xii+191 pp. Cambridge, at The University Press; New York, The Macmillan Company, 1938. \$3.75.