aware of the sources from which information could have been obtained, and so has nothing to tell,—does not even know the dates of his birth and death, or why he was called 'of Durham.' Wright was born at Byer's Green, near Durham, in 1711, and died there in 1786. Brought up as a 'philosophical instrument-maker,' his attention was called early to mathematico-physical problems and, by his thirty-first year, he had gained such reputation as a teacher of mathematics (like other eminent English scientists, a *private* teacher) that he was called to the chair of navigation by the Imperial Academy of St. Petersburg, an offer which he did not accept. There would seem to be no reasonable doubt that he was the first to light upon the modern physico-philosophical theory of the material universe. As De Morgan says, ' He gave the theory of the milky way which is now considered as established,' and he predicted ' the ultimate resolution of the rings of Saturn into congeries of small satellites' (203). The conclusion of Wright's seventh letter furnishes a striking instance of his remarkable prevision. "Thus, Sir, you have had my full opinion, without the least reserve, concerning the visible creation, considered as part of the finite universe; how far I have succeeded in my designed solution of the *Via Lactea*, upon which the theory of the whole is formed, is a thing will hardly be known in the present century, as in all probability it may require some ages of observation to discover the truth of it" (202). The 'ages of observation' and the Lick Observatory have not failed him. An edition of the 'Original Theory' was published in this country, at Philadelphia, by Rafinesque (1837). If Dr. Hastie had done no more than rescue this man's name from blank oblivion, he had deserved well of students of science. And he has accomplished much besides.

Apart altogether from its contribution to our knowledge of the manner in which Kant's early scientific studies influenced his later philosophical speculation—a contribution by no means inconsiderable as our somewhat scanty literature in English goes, the book ought to have distinct effect in bringing us to a clear consciousness of the close and friendly relations between science and philosophy main-

tained from the days of Bacon, Galileo and Descartes till broken off, during the estrangement between the German idealists and modern scientific men, since 1840. This is a long story, upon which I can not enter now. Further, it happens to have been misunderstood or forgotten till within the last few years. An earnest of better things appears to some at least to be one of the most interesting features of contemporary tendencies. To build this promise into actual fact, we need just such books as this. And, accordingly, Dr. Hastie has fairly won our warmest thanks. It is one of his greatest merits that he stands clear from all scientific and philosophical controversies, and so can state what he knows in its definite bearings, not in those which he might desire it to assume.

There must be some good hope for the future of Scottish theology when, at the university which has recently lost from its staff the most eminent living British physicist and the greatest living British Kantian scholar, the chief chair of the divinity faculty is ornamented by the occupancy of a thinker so successful in appreciative unification of the sundered learning of his famous colleagues.

R. M. WENLEY.

UNIVERSITY OF MICHIGAN.

A School Chemistry. Intended for use in High Schools and in Elementary Classes in Colleges. By JOHN WADDELL, B.A. (Dal. Coll.), B.Sc. (Lond.), Ph.D. (Heidelberg), D.Sc. (Edin.). Member of the American Chemical Society ; formerly Assistant to the Professor of Chemistry in Edinburgh University ; Lecturer in Chemistry in the School of Mining, Kingston.

So far as the general method of arrangement and treatment is concerned, this book is similar to others intended for the same purpose; but there are several points to which attention might be called. The author has avoided the error so often made of subordinating facts to theories, and says in the preface: "The endeavor is made in this book to help the pupil in the discovery of new facts, to enable him to see their connections, and to show how facts lead to theory and theory aids in investigation

and in the discovery of further facts. The subject is presented in what seems to me the correct perspective, theory being subordinated to fact." The method of treatment is the interrogatory one and an effort is made to teach the student to observe for himself. While this method is an excellent one in theory it is doubtful whether it can be used with success with a class of beginners who have had no experience in scientific methods. In the early stages of the work they must be taught how to observe, and their powers of observation must be trained by showing them what they should see in each case. In some cases the important features of the experiment might be entirely overlooked and unimportant details magnified if the attention is not directed to the desired points. Of course, this might be overcome by constant personal contact with the student ; but such is hardly possible in many institutions.

<div align="right">J. E. G.</div>

BOOKS RECEIVED.

Les diastases et leurs applications. E. POZZI-ESCOT. Paris, Masson et Cie. 1900. Pp. 217.

Alcyonium. SYDNEY J. HICKSON. London, Williams & Norgate. 1901. Pp. viii + 22. 3 Plates.

Lehrbuch der vergleichenden Anatomie der wirbellosen Thiere. ARNOLD LANG. Jena, Gustav Fischer. 1901. Pp. vi + 311.

Proceedings of the Iowa Academy of Sciences for 1899. SAMUEL W. BEYER. Des Moines, F. R. Conway. 1900. Volume VII. Pp. 212.

Bibliotics or the Study of Documents. PERSIFOR FRAZER. Philadelphia, J. B. Lippincott Company. 1901. Pp. xxiv + 226.

Thirty-second Annual Report of Births, Deaths, Marriages and Divorces in Michigan. JUSTUS S. STERNS. Lansing, Robert Smith Printing Co. 1900. Pp. xvi + cixxii. Tables, 189.

Laboratory Companion. W. A. SHENSTONE. London, Edward Arnold. 1901. Pp. viii + 117.

Theoretical Mechanics. L. M. HOSKINS. Stanford University, Cal., published by the Author. 1900. Pp. x + 436. $3.25.

Reservoirs for Irrigation, Water-Power and Domestic Water-supply. JAMES DIX SCHUYLER. New York, John Wiley & Sons ; London, Chapman & Hall, Limited. 1901. Pp. xviii + 414.

SCIENTIFIC JOURNALS AND ARTICLES.

IN the January number of the *Physical Review* Theodore Lyman presents the results of a study of the 'false spectra' often produced by a Rowland concave grating. These spectra are most clearly seen in the extreme ultra-violet, and are shown to be diffraction spectra of much less dispersion than the ordinary spectra. They appear to be due to errors of ruling, extending over the whole surface of the grating. A. A. Noyes describes in the same number a modification of the usual method of determining transference numbers, and applies the method to a large number of salt solutions of varying concentration. The application of interference methods to the determination of Poisson's ratio forms the subject of an article by J. R. Benton ; while two articles by Chas. T. Knipp deal respectively with the employment of the bicyle wheel in illustrating the principles of the gyroscope, and with a new form of automatic temperature regulator. The former article describes a number of simple experiments with an ordinary bicycle wheel which are readily performed, and at the same time illustrate very strikingly the properties of the gyroscope and gyroscopic pendulum. Experiments are described by E. C. Roberts to determine whether the dielectric constant is altered by a magnetic field. The results are wholly negative.

THE January number of the *American Journal of Mathematics* (Vol. XXIII., No. 1), contains the following articles : ' Die Typen der linearen Complexe rationalen Curven im R_r,' by S. Kantor ; 'Transformation of Systems of Linear Differential Equations,' by E. J. Wilczynski ; 'Distribution of the Ternary Linear Homogeneous Substitutions in a Galois Field into Complete Sets of Conjugate Substitutions,' by L. E. Dickson ; ' Distribution of the Quaternary Linear Homogenous Substitutions in a Galois Field into Complete Sets of Conjugate Substitutions,' by T. M. Putnam ; ' On the Determination and Solution of the Metacyclic Quintic Equation with Rational Coefficients,' by J. C. Glashan ; ' Construction of the Geometry of Euclidean *n*-Dimensional Space by the Theory of Continuous Groups,' by E. O. Lovett ; ' A Table of Class Numbers for Cubic Number