nac, de la Rive and Agassiz, with Henri Sainte Claire Deville and Dumas, in France, as well as with the great Swede Berzelius. Of these letters, numbering more than 1500, two groups have been published by Prof. Georg W. A. Kahlbaum and others, those exchanged with Faraday and those with J. J. Berzelius.

The first six letters of the series in the volume under review refer to the passivity of iron, independently observed, but not discovered by Schönbein, as the phenomena had been described by James Keir as early as 1790. The balance of the correspondence concerns chiefly ozone. In the long letter, dated April 14, 1844, Schönbein writes he has finally decided that the odoriferous principle produced by electrolysis of water, etc., is identical with chlorine, and he gives five reasons for believing this. The fact that ozone is a form of oxygen was suggested to Schönbein on April 20th, in the following year by Plantamour of Geneva.

The discovery of parchment paper is announced in a letter dated March 5, 1846. Three months later Schönbein refers to guncotton as a substance already known, and mentions experimenting with it in small firearms, large guns, and using it for blasting purposes in a tunnel.

This exchange of letters was terminated only by the death of Berzelius in 1848.

Chemists will find this volume an interesting contribution to the history of the science during the period embraced.

HENRY CARRINGTON BOLTON.

A TRAVERS LA MATIÈRE ET L'ENERGIE. PAR LE DR. F. E. BLAISE. Paris: Librairie Ch. Delgrave. 1902. 8vo. 344 pp. Prix, broché: 12 fr.

This volume is another example of that strong tendency which is at present manifesting itself on the part of scientific men to write on general philosophical themes. After an introduction covering six pages, the subject matter is treated in six parts, as follows: electrochemistry and mechanics, 122 pp.; matter, 20 pp.; the formation of bodies in space and their luminosity, 8 pp.; electricity, 39 pp.; electrical induction, 102 pp.; philosophical views and conclusions, 34 pp.

The author assumes the existence of a prime ether and then seeks to explain all phenomena as resulting from movements of

the particles of ether. He endeavors to show that the laws of conservation of energy and of matter, as well as all other known laws of chemistry and physics, can be deduced from the basis of his fundamental assumption. He considers atoms as made up of ether particles, and light and electricity as movements of ether. In speaking of organized beings, it is argued that since ether particles unite to form the atoms, the latter are organized and so all matter is organized. Remarks on the application of the laws of electricity and mechanics to the solution of social and moral problems, and on the absolute necessity of the existence of a form of energy capable of intelligence, imagination and volition, form an important portion of part six, which is concluded with a tirade against Darwinism and an attempt to parallel religious dogmas with scientific truths.

The book bears evidence that its author has studied a great variety of subjects; but the relations that he attempts to express are frequently vague and indefinite, and the scientific terms employed are not always correctly used. This appears, for example, in the attempt to explain the relation between Avogadro's hypothesis, Faraday's law, and the law of Dulong and Petit. The energy idea may be said to dominate the book, and yet on page 41 is the statement that according to Faraday's law chemically equivalent quantities of different substances are separated out by the same amount of energy. This clearly shows that the author does not make the very necessary distinction between energy and its factors.

The fundamental assumption that atoms are made up of ether particles is old. And while the author's endeavors to explain diverse well known laws of nature on the basis of this hypothesis are often interesting and suggestive, they are frequently based on further auxiliary assumptions, or are nothing more than mere similitudes. This is strikingly illustrated, for instance, by the comparison of tendencies for good and evil with the action of a mechanical couple and with positive and negative electrical induction. In speaking of Darwinism, surprise is expressed that the conceptions it involves should in this enlightened age have been produced, accepted and perpetuated. Species are considered as unchangeable as atoms themselves—apparently the primal assump-

tion that the latter are composite and consequently not necessarily unchangeable, is overlooked in this connection. Finally the parallelisms between religious dogmas and scientific truths, while in some respects amusing reading, are largely vague, fanciful comparisons, which can hardly be classed as stimulating intellectually or uplifting spiritually. LOUIS KAHLENBERG.

SEWAGE AND THE BACTERIAL TREATMENT OF SEWAGE. BY SAMUEL RIDEAL, D.Sc. (London). Second edition. London: The Sanitary Publishing Co., Ltd. New York: John Wiley & Sons. 1901.

This book is the most comprehensive treatise that has yet appeared on the treatment of sewage. It is so good in a great many respects, that it seems almost ungracious to point out defects, yet in logical arrangement and clearness of statement it leaves much to be desired, and it seems to the reviewer, that though it contains a large amount of most valuable information, and experimental data, it does not give a very clear insight into the practical working of the various processes of sewage treatment. This may be explained by the fact that the book is evidently written from a student's point of view, and the author consequently does not take up the details of construction of plants, nor describe at all fully the practical methods of working the various processes, but rather devotes himself to explaining the changes that the sewage undergoes, and the cause or reason of these changes.

The first five chapters, about one-third of the book, are devoted to the following subjects: Chemical Analyses of Sewage and Effluents, Bacteria Occurring in Sewage, The Changes Produced by Bacteria and Enzymes. Of these chapters, that on chemical analysis is the least interesting, and certain of the methods given, especially that of determining the amount of free ammonia by adding Nessler's solution directly to the sewage, after dilution with water free from ammonia, is open to criticism. The chapters on bacteria, and the changes brought about by bacteria, and enzymes, are well written, but that the reactions as given for the decomposition of carbohydrates and fats, take place in the septic tank, is somewhat doubtful, and in fact it is questionable if any large amount of fat or grease is decomposed in a septic tank.

The remaining chapters of the book are a study of the various processes of sewage treatment: Irrigation and Sewage Farming,