

writings of Hermann Kopp, and the more recent contributions of Berthelot, leave little to be desired in completeness, and provide a repository of information invaluable for purpose of reference. This, however, is literature for the fully fledged chemist or chemical author.

The chemical student requires something different. The importance to him of attending to the historical aspect of chemistry is recognised by most teachers. It is indeed maintained by some that there is no other satisfactory way of approaching even the elements of chemistry, than by performing experiments in historical order. A Board School might be cited where the older boys are given the Alembic Club reprints, and asked to do the experiments as there described. Whatever may be thought of this, it cannot be denied that a study of chemical history is most important, not only for a clear grasp of the origin and growth of our present theories, but because of that more subtle influence on the mind and imagination which perhaps may be included in the much-abused word culture.

The full advantage of historical study is not to be obtained by the reading of such a work as the one under notice, but rather by the careful study of those original memoirs or books which will ever remain landmarks in the track of scientific progress. At the same time, a connected history is a useful and perhaps a necessary adjunct to these partial studies, and this want is met extremely well by the book under notice.

Prof. Ladenburg has cast his story in the form of lectures, and for the purpose in view this is a satisfactory arrangement. In tracing the history of chemistry from the time of Lavoisier to the present day a vast amount of material has, of course, to be dealt with; and of the prodigious amount of reading and critical examination entailed upon the author there is abundant evidence both in the text and in the numerous references which are appended. As to the general balance of the book it may be said that the earlier part is fuller and more explanatory than the later. The account, for example, of the controversy between Berthollet and Proust is very clear and interesting, whilst the accounts of the controversies that raged later in the century in regard to fundamental questions of organic chemistry are much more compressed and difficult to follow. The last chapter of the book is little more than an enumeration of the chief chemical topics that have engaged attention during the past fifteen years.

However, looking at the book as a whole, it must be said that Prof. Ladenburg has produced a most useful history, extremely readable considering the inevitable compression, remarkably free from the bias of personal opinions, and giving a connected view of the progress of chemical science which will be of great benefit to students.

Dr. Dobbin has succeeded admirably in the arduous work of translating narrative German into narrative English. Here and there sentences are to be found which declare their origin; but on the whole the English (or should one say British?) flows smoothly, and there is a remarkable absence of typographical errors or mistakes of a more serious kind. Dr. Dobbin and the Alembic Club may certainly be congratulated on their latest contribution to chemical literature.

A. S.

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OUR BOOK SHELF.

Untersuchungen über Mikrostrukturen des erstarrten Schwefels nebst Bemerkungen über Sublimation, Überschmelzung und Übersättigung des Schwefels und einiger anderer Körper. By O. Bütschli. Pp. iv + 96; 4 plates. (Leipzig: W. Engelmann, 1900.)

Untersuchungen über die Mikrostruktur künstlicher und natürlicher Kieselsäuregallen (Tabaschir, Hydrophan, Opal). By O. Bütschli. Pp. 287-348; 3 plates. (Reprinted from *Verhandl. d. Naturhist.-Med. Vereins zu Heidelberg*, N.F. Band vi. 1900.)

A PREVIOUS work by the professor of zoology at Heidelberg ("Untersuchungen über Strukturen," 1898), reviewed in *NATURE* (vol. lx. p. 124), dealt more especially with the microstructure of organic substances, comparing them with the supposed alveolar structure of protoplasm. In the first of the present pamphlets the author describes in minute detail his observations in the same direction made on inorganic substances, more particularly sulphur. Amongst the various globular and crystalline forms produced by the sublimation and subsequent transformations of sulphur, he describes some which have a radial or concentric arrangement of vacuities or air-spaces suggesting an alveolar structure. The subject is, however, treated throughout from a crystallographic rather than from a biological point of view, and much the same ground has been covered in a more concise and earlier paper by Dr. R. Brauns, the professor of mineralogy at Giessen ("Beobachtungen über die Krystallisation des Schwefels aus seinem Schmelzfluss," *Neues Jahrb. f. Mineralogie, &c.*, 1899, Beil.-Bd. xiii. pp. 39-89; 7 plates).

The second pamphlet describes with equal minuteness the appearances shown under the microscope by chips and thin sections of dried gelatinous silica, as well as of the natural forms of colloidal silica, tabasheer and opal (including hydrophane and precious opal), which are all very similar in their minute structure.

Both pamphlets are admirably illustrated with numerous well-prepared microphotographs.

The School Journey. A Means of Teaching Geography, Physiography and Elementary Science. By Joseph H. Cowham. With additional "Journeys" by G. G. Lewis and Thomas Crawshaw. Pp. 79. (London: Westminster School Book Depot, 1900.)

FOR many years the study of geography at the Westminster Training College has been supplemented by an excursion from Croydon to Godstone, under the guidance of Mr. Cowham, the lecturer on education at the college, and the author of several excellent educational works. In this volume a description is given of the chief characteristics observable during the ramble; and horizontal and vertical sections, as well as photographic illustrations, elucidate the physical geography of the district traversed. In addition, the book contains accounts of excursions to Greenwich and Woolwich, and along a river bank in Lancashire, contributed by two of Mr. Cowham's former pupils.

The book appears at the right psychological moment; for the feeling that geography should, whenever possible, be made an outdoor study, is spreading, and every statement of experience is of value to teachers who want to improve methods of instruction in geography but are unable to see clearly how to carry out schemes which have been put on paper by persons who may not have given full consideration to ways and means. Here, however, we have notes upon actual excursions and how they were planned and performed, and with these before them, teachers should have no difficulty in arranging others if they have some knowledge of physical geography. The Geologists' Association and Prof. Seeley's Geological