

with this subject. But there is a great deal of valuable matter gathered here bearing on its properties, and it may very usefully be consulted.

(4) The somewhat inclusive title of the fourth volume under review covers a course of lectures on elementary physics and chemistry. Few alterations have been made from the earlier editions. A lecture has been added on liquid air. The book has found many friends, as we might have expected, and we have no doubt it will find many more.

(5) In this second edition of Dr. Mie's book a short section on radio-active bodies has been added. When it is stated that this occupies part only of a single page, it will be clear that it is not a detailed account. It is concerned only with the question of the composite nature of an atom and the transmutation of the elements. A few emendations have been made in the text to increase the lucidity.

(6) A short lecture on the relation of physics to other sciences, in the light of modern work on physical chemistry and recent discoveries of the non-valent gases and of radio-activity. While admitting the necessity of specialisation, it is urged that a broad outlook should be encouraged.

#### OUR BOOK SHELF.

*Refrigeration: an Elementary Text-book.* By J. Wemyss Anderson. Pp. ix+242. (London: Longmans, Green and Co., 1908.) Price 7s. 6d. net.

THE increasing use of refrigerating processes in the distribution and preservation of food, and also in many important industries, has already called for a special type of engineer who must possess a knowledge, not only of machines and mechanism, but also of the theoretical properties of heat. Nowadays, when the market for electrical engineers is becoming uncomfortably crowded, young men would do well to consider the prospects open to them as refrigerating engineers. To those who wish to enter this profession Mr. Anderson's book will be most welcome as an introduction to the fundamental principles on which modern refrigerating processes depend.

The treatment of the subject is accurate and lucid, and in all cases the necessary mathematical investigations are reduced to their simplest elements, many numerical examples being added. The first three chapters are devoted to a brief *résumé* of the elementary properties of heat, including radiation, conduction, and convection. In chapters iv. and v. the elastic and thermal properties of fluids are dealt with. A simple explanation of the first and second laws of thermodynamics is given in chapter vi. The remaining six chapters are of a more practical character, special attention being paid to the solution of problems which arise in connection with refrigerating processes. Cold-air machines, vapour machines, compression machines and absorption plants are described in chapter vii. The liquefaction of air is considered in chapter viii., and ice-making in chapter ix.

A very important branch of the subject is dealt with in chapter x., where the methods of insulating and cooling large chambers are described and illustrated. Miscellaneous uses of refrigeration are considered in chapters xi. and xii.; in order to appreciate the extent to which refrigerating processes are used industrially, it is only necessary to glance through the contents of these chapters. Ice-making is in demand for general purposes, and for skating rinks and curling ponds.

General cooling is used for keeping meat and other food-stuffs, and for increasing the yield of butter from milk. Special cooling arrangements are required for keeping ammunition (such as cordite) in a proper condition. The growth of plants and shrubs is checked, and unripe fruit is kept so that it can ripen according to the market, by the aid of suitable methods of cooling.

In general engineering, refrigerating processes are used for drying the air supplied to blast furnaces, and for hardening sandy or boggy soils in order that tunnels may be made or shafts sunk. Cooling processes are also largely used in the brewing industry. Mr. Anderson does not profess to treat of these applications of refrigeration in detail, and the design of refrigerating machines is not dealt with; but the student commencing the study of the subject cannot do better than master the contents of Mr. Anderson's book, after which he will be in a position to understand the nature of the problems which confront a refrigerating engineer, and upon the solution of which his success will depend.

E. EDSER.

*Ceylon. A Handbook for the Resident and the Traveller.* By Dr. J. C. Willis. Colombo Apothecaries' Company. Pp. x+247+iv. (London: Dulau and Co., 1907.) Price 5s. net.

THE Director of the Royal Botanic Gardens of Ceylon explains that he is the author of this handbook by default. He was of opinion that a handbook was needed, and having failed to persuade one better qualified than himself to become the author, Dr. Willis undertook to write the book himself. He gravely informs us in the preface that the idea was to write a comprehensive work of about 1000 pages, and that having devoted eight months of his leisure to writing the agricultural section he found that this alone would take 125 pages of the present book in print, whilst on the same scale the entire volume would take him ten years to complete. The chapter on agriculture was therefore reserved as the basis of a separate volume on tropical agriculture, and the present book of 244 pages was written with the assistance of many friends and authorities in the island.

The book includes a brief account of the natural features of Ceylon, of its history and peoples, with descriptions of roads, railways, towns and villages, and of the principal industries, with chapters on sports and games. It contains two small sketch-maps of Ceylon, and is illustrated with numerous photographs, many of which are excellent. As a whole the book is disappointing. It can, of course, lay no claim to comparison with Emerson Tennent's famous work, and the author's style is crude and has none of the charm of Sir Samuel Baker's. A great deal of information, solid and trivial, is conveyed in a terse but loose grammatical style of which the following sentences are examples:—"The Museum is closed for cleaning on Fridays and admission is always free." "Water is usually pretty bad in the low country and should always be filtered before use, though if used for tea-making unfiltered the boiling will have about killed all germs."

"The native who has lost his taste for his own art is in regard to whatever style of art he adopts among the most inartistic people on the face of the earth, as one glance into any native house furnished in European style will show. Many are in the worst style of early Victorian, whereas a native house furnished in the old native manner is a pleasing sight."

As the work of a man of science the book is distinctly disappointing, and is little, if any, improvement on the Ceylon handbook to the St. Louis Exhibition, on which the author has largely drawn. The