

nitrogen, metal nitrides, phosphorus compounds of nitrogen, arsenic nitride, carbon compounds of nitrogen, silicon nitride, titanium compounds of nitrogen, zirconium nitride, boron compounds of nitrogen, nitrogen in closed rings, alkaloids, protein substances, analytical methods, addenda.

The treatment of the element and its important inorganic compounds, *e.g.* nitric acid and ammonia, seems very satisfactory, although, for instance, the action of hypobromite on ammonium chloride might well have been included in the list of methods of preparing nitrogen, instead of merely being referred to incidentally in another connection.

Apparently no attempt has been made to sift critically the large accumulation of material at the author's disposal, and the book therefore assumes the character of a dictionary. Nevertheless, several cases are to be found where a more connected treatment is given to the subject, as, *e.g.* in the description of the steps by which the formation of nitric acid in the soil was traced to a specific ferment, or in the account of the application of Werner's theories to the constitution of the metal ammonia compounds. Such accounts, although written in briefest outline, serve to direct attention to points of importance in theoretical chemistry. The account of the diazo-compounds one could wish fuller, and some reference might have been expected to Goldschmidt's important work on the dynamics of the diazo- and azo-compounds. In mentioning the transformation of ammonium thiocyanate (the melting point of which is 149°, not 159°) into thio-urea, also, the work of Waddell might have been referred to. Further, in the analytical portion of the book, although various methods are given for the estimation of nitrogen in organic compounds, no mention is made of the Frankland-Armstrong modification of Dumas's method, although it is probably the most convenient and accurate method of estimation.

In compiling the book, the chemical literature up to 1900 has been taken into account; and in an appendix additions and corrections are given bringing the work up to 1902. In spite of some omissions, the book will be readily welcomed as an important addition to the works of reference in chemistry, and the author deserves the thanks of his fellow-workers for the trouble he has taken in the compilation. A. F.

PROSPECTING.

La Prospection des Mines et leur Mise en valeur. By Maurice Lecomte-Denis. Pp. xv+551, with 320 figures. (Paris: Schleicher, 1903.)

WHEN an author is fortunate enough to have such a godfather for his book as M. Haton de la Goupillière, it may be taken for granted that the work contains much useful matter. The book is intended not so much for the old-time prospector, armed with pick, shovel, and pan, who wanders about in search of gold, as for the scientific mining engineer called upon to report upon a mineral deposit already discovered, and possibly already worked on a small scale. M. Lecomte-Denis tells the novice how to set

about his work, and how to draw up his report to his employers, and he points out useful precautions to be observed in purchasing mines and minerals. The motto for the chapter upon "salting," "*Défiance est mère de sûreté*," is well chosen; many of the common tricks of fraudulent mine-vendors are exposed by the author, who most wisely advises the inspecting engineer to err on the side of scepticism when making his examinations.

Next come two purely geological chapters upon the distinctive characters of the igneous and of the sedimentary rocks. It is doubtful whether it is wise to burden a book upon prospecting with more than three hundred figures of fossils. M. Lecomte-Denis points out, however, that the traveller cannot carry a geological library with him, and that it will probably be a convenience to him to possess a little palæontological information for immediate reference on the spot.

Six chapters are devoted to the study of the modes of occurrence of the most important useful minerals, *viz.*, coal, petroleum, bitumen, and the ores of iron, copper, zinc, and lead. Many useful commercial data are appended. Similar information concerning phosphates, bauxite, and the ores of tin, mercury, &c., is promised in a later edition.

When a mineral deposit has been found, it is usually necessary to investigate its commercial value by certain preliminary workings. The manner of carrying these out and of making deductions from the results obtained is treated in a long and useful chapter. The author speaks wisely with regard to writing reports when he bids the engineer weigh his words very carefully, for extracts may be made, and words may be twisted, so as to convey a meaning very different from that which was intended. The greatest prudence is necessary on the part of inspecting engineers with the object of not raising his employer's hopes too high, nor, on the other hand, by an unnecessarily pessimistic tone, of preventing him from embarking upon an undertaking which may have many chances of success. What is required is complete frankness; let the capitalist know the grounds upon which the engineer bases his opinions. If the former is in doubt, he can then go to a consulting mining engineer and say, "Supposing these data to be true, what is your advice?"

The inspecting engineer should certainly make himself acquainted with the mining laws of the country in which the property upon which he is reporting is situated; and the brief remarks of M. Lecomte-Denis upon foreign mining jurisprudence may serve as a first step in the study. On the other hand, more space is devoted to an exposition of the mining laws of France than seems to be necessary.

The tables at the end of the book are similar to those found in the usual miners' pocket-books. Some palpable errors show that sufficient care was not taken in preparing them for the press, and consequently the reader may feel a little sceptical about their trustworthiness. On the whole the book is likely to prove useful to the mining engineer, for it deals with matters which are usually considered somewhat outside the scope of the ordinary text-books.