

valuable space with an account of soils and soil analysis which the reader could far better obtain elsewhere. Yet there is scarcely a more vital industry at the present time than the manufacture of artificial fertilisers, nor is its importance likely to diminish.

The best chapters are the two on pebble phosphate and on hard-rock phosphate. The Florida phosphates are usually classified into four groups: hard rock, soft rock, land pebble, and river pebble, all of which occur in the Eocene and more recent formations. Of these the hard rock is the purest, containing phosphate equivalent to 80-85 per cent. of dicalcic phosphate; the land pebble contains somewhat less, while for the soft rock and river pebble the corresponding figures are about 55 to 68 per cent. The method of working is fairly well described. The remaining chapters, however, are not so good. More information might have been given about the mechanical dens and other contrivances used in the manufacture of super-phosphate. Scarcely anything is said about the manufacture of mixed manures, although this is one of the largest branches of the business. The chapter on the fixation of atmospheric nitrogen is some years out of date; no mention is made of the Haber or the Ostwald process; the old view, now given up elsewhere, is still put forward, that cyanamide changes to "dicyanamide" (dicyanodiamide) and then to ammonia by bacterial action.

Should a second edition be called for, the author would be well advised to omit the chapters on soil and the science of manuring. It might also be wise to ask a chemist to read the proofs in view of his gibe about treatises on agricultural analysis with methods which the student "would have to unlearn if he entered a fertiliser factory, where he would have to analyse manures against chemists of some reputation." The reader would thus be spared some interesting specimens of chemistry which we hope are not typical of the new chemistry given in American fertiliser factories in place of the unlearned college work, such as:—

"The sodium chloride decomposed by the free phosphoric acid caused the bags to burst in transit, for there is no substance which rots bags like free chlorine and fluorine—two elements given off when nitrate and damp superphosphate are mixed."

E. J. RUSSELL.

Our Bookshelf.

Telephony without Wires. By Philip R. Coursey. Pp. xix+414. (London: The Wireless Press, Ltd., 1919.) Price 15s. net.

THIS book gives a fairly complete account of the practical development of radio-telephony. Accurate descriptions are given of very many types of

apparatus. The book, therefore, is more useful for reference than for learning the principles of the art. Little space is devoted to theoretical considerations, but the author mentions some of the difficulties encountered, and indicates possible lines of advance. The bibliography is very complete, some 700 references being given to original papers on the subject.

From the commercial point of view, radio-telephony is not very attractive at present, as its applications are mainly confined to those cases where the ordinary telephone service cannot be used. It is possible by using very costly apparatus to telephone on land over thousands of miles. For instance, New York and San Francisco were put in telephonic communication in November, 1917, although the distance is 3400 miles. The experiment was successful, but it did not prove the commercial feasibility of such a long-distance service, as the value of the apparatus in use when talking was 400,000l.

Radio-telephony was very useful in the later months of the war, as communication was established by its use not only between aeroplanes and the earth, but also directly between aeroplanes. It has also proved useful in establishing communication between moving trains and the ordinary fixed telephone systems. During the last few years the rapid development of radio-telephony has been mainly due to the researches of the physicist and the mathematician. The problems it furnishes are of absorbing interest, and it is rapidly widening our knowledge of the laws of Nature.

Scientific Method: Its Philosophy and its Practice.

By F. W. Westaway. New edition. Pp. xxi+426. (London: Blackie and Son, Ltd., 1919.) Price 10s. 6d. net.

SIR J. J. THOMSON'S committee on the position of natural science in the educational system of Great Britain expressed agreement with the view that "some knowledge of the history and philosophy of science should form part of the intellectual equipment of every science teacher in a secondary school." There is no more enlightening and helpful volume from which to acquire such knowledge than this by Mr. Westaway. The implications of scientific reasoning, method, and practice are clearly presented, and the examples are both apt and instructive. Any science teacher, whether in university or school, who reads the book cannot fail to derive profit and interest from it.

In this second edition the chapter on "Philosophers and Some of their Problems" has been re-written, and is now a more precise statement of the specific claims of philosophy than was the chapter in the original issue. A new appendix, entitled "Retrospect and Reflections," surveys the function and influence of science and scientific method in national life, superseding one on "An American School Course in Chemistry." The index is missing in our copy of the book, though there was one in the first edition, but its absence is possibly due to a fault of the binders.