

sphere in his harmony, and invited his co-operation. In the same letter Tycho declared that the reason for his removal from Denmark was to prevent the destruction of his astronomical treasury collected through so many years with such great labour and expense. With our great store of observations it is difficult to realise the uniqueness of Tycho's work, so far exceeding anything that had survived from the ancient or that seemed likely to be attempted again in the modern world.

The editor, in addition to his usual brief but pertinent comments, has in this volume given us an alphabetical biographical index of the principal people named in the astronomical letters.

The twelfth and thirteenth volumes complete the collection of Tycho's observations. A flysheet issued with the last of these and dated 1926, Sept. 25, records how Dr. Dreyer before his death on Sept. 14 had requested the presidents of the Society of Danish Language and Letters to present this last volume of Tycho Brahe's treasury of observations to the Carlsberg Institute on Sept. 25, the fiftieth anniversary of its foundation, in gratitude for the munificence with which it had provided for the publication of the greater part of the works of the famous Danish astronomer.

The two volumes of observations contain not only Tycho's observations, but also several by Fabricius, and a few collected by Kepler. There are also two catalogues of stars, but Tycho's complete catalogue appears elsewhere. Probably the most important part for present-day astronomy is to be found in the 107 pages devoted to observations of seven comets. These observations at least can never be superseded by observations of other comets made with better instruments.

J. K. F.

Our Bookshelf.

Artificial Fertilisers: Their Chemistry, Manufacture and Application. By P. Parrish and A. Ogilvie. Vol. I. Pp. 356. (London: Ernest Benn, Ltd., 1927.) 45s. net.

As the authors state in their preface, this is the first English treatise on artificial fertilisers which deals in any detail with the technique of the manufacture of fertilisers. This, the first of two volumes, is almost entirely devoted to the manufacture of phosphatic manures, and the mixing and compounding of these with other fertiliser ingredients. After surveying in some detail the world's resources of phosphatic material, the mining operations are described in some detail.

The bulk of the book is taken up with the manufacture of superphosphate, by-products of other industries such as basic slag taking quite logically a minor share. Superphosphate manufacture in its

main outline has not changed since its invention, and improvements are due rather to engineering than to chemical progress, and modern plant and machinery are described and well illustrated by diagrams and photographs. The chemistry of the manufacture of soluble phosphates is dealt with briefly but adequately for the needs of the technician, although the statement on p. 31 that "phosphate rock is essentially tricalcium phosphate" is misleading and is contradicted later in the book. The chemistry of open-hearth basic slag is still obscure, but enough is said to indicate the problems before the investigator. A correct interpretation is given of the results in the citric solubility test for water-insoluble phosphate and, up to the present, no better measure of the availability of phosphate to the plant has been discovered.

This work comes at an opportune moment: the old-fashioned fertiliser industry in Great Britain has not only to face foreign competition in the export trade, but also attractive new compounds now being placed on the market by the great German fertiliser firms. In these, phosphoric acid functions as a carrier of ammonia and sometimes of potash also. The superphosphate manufacturers of Great Britain are fully alive to this new aspect and the formation of the International Superphosphate Association is the result. In a stimulating and thoughtful final chapter the trend of future developments is discussed. The authors conclude that superphosphate will be required for many years to come, but that only larger factories operating with highly efficient plant will be able to compete at all successfully.

Such a readable and well-illustrated book cannot fail to be of interest and service to all connected with the fertiliser trade, and the second volume will be awaited with interest.

The Practical Telephone Handbook and Guide to the Telephonic Exchange. By Joseph Poole, and others. Seventh edition, thoroughly revised and enlarged. Pp. xxv + 870. (London: Sir Isaac Pitman and Sons, Ltd., 1927.) 18s. net.

DURING the last few years the art of telephony has made gigantic strides and the future of the telephone industry seems very promising. Many engineers first acquired their working knowledge of the subject from the earlier editions of this well-known handbook. It has gradually increased in size, although much obsolete and obsolescent matter has been cut out in each edition. In this latest edition the book has been increased by 146 pages and more than 100 illustrations. Although the book is becoming more technical and more mathematical, it can still be recommended for the beginner. The rapid progress of automatic telephony in Great Britain has taken even experts by surprise. A few years ago it used to be urged that its secrecy, which is really one of its greatest advantages, laid it open to the practical joker who could play silly tricks with impunity. In the United States the trouble had proved to be a real one, and special laws were proposed to frighten the jokers. An unscrupulous business man also might