

## A LIFE OF PASTEUR.

*Pasteur.* (The Century Science Series.) By Percy Frankland, F.R.S., and Mrs. Percy Frankland. Pp. vi + 224. (London: Cassell and Co., Ltd., 1898.)

IT is a pleasing task to review a book devoted to the life of a great man, and especially so when that book, like the one before us, does not pretend to be an exhaustive biography, but is intended to tell simple salient facts in a straightforward and scientific manner. This is well accomplished in sixteen chapters; and those who read them will have had amply demonstrated to them a most lovable and simple character, and a series of epoch-making discoveries which the reader can never fail to appreciate, for they were all directed to alleviate suffering and distress. In the first chapter one seems to obtain a clue to the bent of Pasteur's mind, for at the age of twenty-five he had worked out the optical properties of the tartaric acids, and had laid the foundation of our knowledge of the grouping of atoms. In the manner in which he studies the growth of the crystals one sees at this early stage the mind of the biologist, and step by step this becomes more noticeable. In the second chapter, two great events are briefly and sympathetically chronicled by the authors. The first is his marriage, the second emphasises his remarkable observation upon the action of fermentation upon the tartaric acids, showing the delicate selective action of organisms in readily picking out what appear to be chemically identical substances. "His work during this period stands out as one of the most remarkable and artistic monuments in the annals of chemical science."

Chapter iii. is a serviceable and useful one. Pasteur is created Dean of the Faculty of Science at Lille, and at once directs his scientific knowledge to the requirements of the place. The town is a centre for the manufacture of alcohol from beetroot, and Pasteur studies fermentation, and Lille and the world at large has benefited by these studies. It is often stated that the seats of learning are not in touch with the communities in the midst of which they live; it is due, to a great extent, to a lack of the sense of citizenship and patriotism, both of which were developed in a remarkable degree in Pasteur. In the brief sketch of the dawn of fermentation, the very natural opposition of the chemists, and of the others of a less bold frame of mind, is admirably brought out, and Liebig and Helmholtz stand forth in the opposition as men of narrower conception.

In 1857 Pasteur was made Director of the École Normale, an honourable title to which was attached a modest salary but no laboratory, France in no way differing from us in this respect. By this time the biological turn of Pasteur's mind had become much more pronounced. He not only saw the living cell at work and producing the fermentation of beer and vinegar, but he recognised that putrefaction and decay were fermentative processes produced by aerobic and anaerobic organisms. And just as his studies in the fermentation of beer marked a new period in the history of brewing, so at the present time his observations upon putrefaction are being made the basis for the treatment of sewage. Criticism and opposition to his views had by this time largely increased, but the result was excellent and far-

reaching; for he laid the ghost of spontaneous generation, and demonstrated to the world that for their foods and infective diseases there could be effective sterilisation.

In Chapters vii.-ix. a still further development of fermentation is developed, and one which was destined to lead directly on to Pasteur's greatest service in the cause of humanity. In these chapters are unfolded his observations upon abnormal fermentation or the diseases of wine, beer, and of silkworms. The authors show how the industries concerned profited by these researches, and how the study of the diseases of the silkworms at once pointed out the necessity in the case of man and animals of intelligent central control in all infectious processes.

In Chapter x. and onwards the final work of Pasteur is described. Henceforth Pasteur is known as the pathologist who was able to bring a vast storehouse of chemical knowledge to his aid. He enters upon a new career, and soon begins to exercise as profound an influence in the medical world as the yeast cells did in the fermentative processes which he was the first to describe. Not only in France, but throughout Europe, medical men were encouraged by Pasteur's successes to come forward and prosecute their own studies into the cause of disease. In this manner it is clearly brought out, Davaine pursued his researches in anthrax, and Lord Lister his investigations in the treatment of wounds, methods which were destined to inaugurate a new epoch in surgery. Pasteur himself led the way in one direction of vast importance and utility, namely immunisation. This is developed in Chapters xii. and xiii., and the reader cannot fail to be filled with enthusiasm when he thinks of the beneficial results which have accrued and are likely to accrue from researches, prompted by a profound conviction in Pasteur's mind that there was a possibility of immunising against disease.

Chapter xiv. treats upon the researches in rabies, and every one will share the feelings of the authors in the stress they lay upon this most marvellously bold step in the cure of disease; it was probably his greatest achievement. The transformation worked in the medical profession had become complete, and laboratories similar to the Pasteur Institute were erected all over the civilised world; researches multiplied, and a new literature sprung into existence. We would wish that those who so hotly criticise Pasteur's work, could pause a little and read this chapter on rabies, and could see with us, something beyond the mere experiments therein recorded, the working of a civilising force which Pasteur has caused to take the form of a study in hydrophobia.

R. B.

## GARDEN-CRAFT.

*Garden-Making.* By L. H. Bailey. Pp. vii + 417. (London: Macmillan and Co., Ltd., 1898.)

*The Pruning-Book.* By L. H. Bailey. Pp. ix + 537. (London: Macmillan and Co., Ltd., 1898.)

THESE two volumes of the Garden-Craft series may, inasmuch as they deal mainly with technical subjects, be here taken together. Products of the pen of Prof. Bailey, originality of treatment may be confidently looked for and as certainly found. Neither principles nor practice in America differ in essentials from those