

THURSDAY, JANUARY 18, 1917.

## AN APPRECIATION OF WORK.

- (1) *Pictures of the Wonder of Work*. By Joseph Pennell. Pp. lii. (London: W. Heinemann, 1916.) Price 7s. 6d. net.
- (2) *Joseph Pennell's Pictures of War Work in England*. With an Introduction by H. G. Wells. Pp. xii+plates 51. (London: W. Heinemann, 1917.) Price 6s. net.

(1) THE author of this interesting volume of illustrations was recently requested by the Ministry of Munitions to record his impressions pictorially and in his own inimitable way of the wonder of the work now going on in the mills and factories of Britain and of France in order to enable us to understand better the efforts being made to win the war. These drawings are to be exhibited in all our great cities, and, judging from the quality of the illustrations in the book before us, such an exhibition will attract considerable public attention.

It is so seldom that a word of appreciation is heard of the conditions of life in our smoky centres of toil that to find an artist of high repute giving himself up enthusiastically to discover the wonder, the power, the romance, and the tragedy of it all is to arrest our attention whether we will or no.

In this handy volume is a collection of pictorial representations of the work of the world as done in mine, mill, and factory, and as seen under many different conditions and in many lands. To the author the vision of mill-wheel and crane, of tall chimney and of smoke unlimited, is as full of interest and of inspiration as the vacant landscape or the wooded hillside for the artist of another type of mind. The book is a pictorial record of the wonder of work, in the doing of it rather than of the product itself, and it brings home to the mind more vividly than by words the price that is paid by one-half of our people on behalf of the well-being of the whole. Though the conditions of manual work may improve as time goes on, it is certain that much of the indispensable work of the world will always be done under conditions of stress and strain almost beyond belief by those who dwell far from centres of toil. It is well that these conditions should be recorded, not only for our information, but to awaken in us sentiments of wonder at the skill, the strength, and the persistence of man in overcoming difficulties, and of gratitude to those by whom the work is done and by whose self-sacrificing service we all receive advantage. In this volume we have such a record conveying to us in a few strokes of the artist's pencil a vivid sense of life and reality.

The striking drawings are accompanied by some very shrewd and characteristic comments which add much to the interest of the book as a whole. "It is far easier," says the author, "to paint a heavenly host or a dream-city in one's studio than to make a decoration out of a group of

miners or to draw a rolling-mill in full blast, yet one of these subjects can be as noble as the other." He has, as he says, "something to say in his own way about his own time." "I am simply an artist searching for the wonder of work—not for morals, political economy, stories of sweating, the crime of ugliness. I am trying to record the wonder as I see it, that is all." We congratulate Mr. Pennell on the success of his effort.

(2) This is a further volume by the same author, dedicated to the same purpose as the work already noticed. The production of munitions of war is delineated by a succession of marvellously clear and effective pencil drawings showing the various stages involved in the production of munitions from the iron-mine and the coal-mine onwards through the processes of steel melting in furnaces, of treatment in hammers and presses, and of manufacture in machine-shops, in which women as well as men are taking so great a part.

As Mr. Wells says in his Introduction: "Through all these lithographs runs one present *motif*, the *motif* of the supreme effort of Western civilisation to save itself and the world from the dominance of the reactionary German Imperialism that has seized the weapons and resources of modern science."

Mr. Pennell has had exceptional facilities afforded him for obtaining these pictures. No such opportunity is available to the ordinary citizen, and next to the privilege of actually visiting the works themselves, no more effective means are available for obtaining a clear and vivid idea of all that is meant by the manufacture of munitions of war than that provided in this most interesting collection of drawings. W. RIPPER.

## ADJUSTMENT OF OBSERVATIONS.

*Theory of Errors and Least Squares*. By Prof. Le Roy D. Weld. Pp. xii+190. (New York: The Macmillan Co.; London: Macmillan and Co., Ltd., 1916.) Price 5s. 6d. net.

THIS work, which embodies the material used by the author as lecture notes at Coe College, Iowa, is intended not only as a text-book for undergraduates, but also as a book of reference which a research worker can read through in a few evenings and then put into immediate practice. An interesting feature of the work is the wide range involved in the illustrative examples, which include applications to numerous branches of science. The mathematical treatment in the text is very elementary, requiring little more than a knowledge of the meaning of differentiation. This is supplemented in the appendix by a few pages involving rather more advanced methods, but in the main the book is free from mathematical difficulties to a degree quite unusual in works on least squares.

The first chapter deals with the meaning of measurement, estimation, and errors of measurement, and is followed by some useful exercises, which junior science students will find very suggestive. In the next chapter the occurrence and