HISTORY OF TECHNOLOGY

A History of Technology

Edited by Charles Singer, E. J. Holmyard, A. R. Hall and Trevor I. Williams. Assisted by Y. Peel, J. R. Petty and M. Reeve. Vol. 5: The Late Nineteenth Century, *c.* 1850 to *c.* 1900. Pp. xxxviii + 888 + 44 plates. (Oxford: Clarendon Press; London: Oxford University Press, 1958.) 168*s.* net.

THIS fifth volume of the "History of Technology", covering the approximate period 1850–1900, marks the conclusion of this great work, which traces the development of technology from the earliest times to the beginning of the present century. In some fields brief reference is made in the present volume to developments that have taken place so recently as the years following the Second World War.

The book is divided into eight parts. The first deals with primary production, including the management of food and the development of the metal and petroleum industries. The second part concerns itself with stationary and marine steam engines and the internal combustion engine. Part 3 treats of the rise of the electrical industry; Part 4 of the chemical industry. Part 5 deals with transport, including railways, ships, aircraft, road vehicles, and cartography and other aids to navigation. Part 6 is concerned with civil engineering, and covers building materials, bridges, tunnels, hydraulic engineering and water supplies. The seventh part discusses manufacturing in general, including textiles, metals, machine tools, ceramics, glass, printing, photography, and rubber. The last part evaluates technological education and the general role of technology and its social consequences in the modern world.

Each of the chapters is written by a competent authority, and the whole volume has been brought together and made into a unified work by its principal editor, the eminent Dr. Charles Singer, and by Dr. E. J. Holmyard and two other distinguished co-editors.

Although it could not be expected that every one of the thirty-four chapters would delve with equal thoroughness into the mass of technological history behind each subject treated, nevertheless, the whole presents a most enlightening and valuable summary of progress during the crucial last half of the nineteenth century. For example, two such different stories as the development of machines for the generation of electricity and the discovery of aniline dyes are almost breath-taking in their implications for later pure science as well as for technology.

It is certain that many full reviews of this extensive and admirable work will be written in Great Britain. The present American reviewer feels that he should devote special attention to the volume as it may appear to some American eyes. First of all, it is impossible not to be struck by the clarity of exposition of the present work. It is hard to believe that an equal number of American students in this field could be found who could write so well. It is indeed surprising to find authorities in the highly specialized fields of technology who are able to present their subjects so lucidly. The style of the volume will make it attractive even to the layman who is concerned with the full history of our age. Anyone who is interested in reading present-day political or social history will also enjoy the style and the content of this volume. Here the reader is not overwhelmed by mathematics or repelled by an unnecessarily technical vocabulary. It has been possible for the editors to cover the really vast human achievement that is considered in this book only by exercising great verbal restraint. Often a single sentence summarizes a large development that even in an encyclopædia article might have been given a long paragraph. For example, Josiah Willard Gibbs, considered by some to be the man who did most for pure science underlying technology in America during this period, is described in four words as the formulator of the phase rule.

I could not indeed read many pages of this book without thinking of the fascinating problem of national differences in the approach to scientific and technological history. In recent years the world has noted successive Russian claims that very many of the great inventions and developments of the past really originated in Russia. Similarly, one who walks through the Deutsches Museum in Munich must feel that the tens of thousands of earnest young Germans who go through its admirable halls each year must gain the impression that the full flowering of the industrial revolution took place almost alone in fertile German soil. It is similarly apparent that the present volume quite properly emphasizes British science, technological inventions and developments. This very fact makes the work especially valuable in America. Many new industrial developments in the United States grew out of British beginnings, and this volume clearly portrays this essential background.

Some day a general treatise on detailed technological developments in the United States will be prepared, and when it does appear, it will be a valuable supplement to the present volume. When such a treatise is written, it will, for example, give full emphasis to the material contained in the voluminous publications of such organizations as Benjamin Franklin's still very active, learned academy, "The American Philosophical Society, Held at Philadelphia for the Promotion of Useful Knowledge"; the National Academy of Sciences of the United States; and the Smithsonian Institution. It is indeed a little surprising to find no reference in the index to these American organizations, which were doing so much for world science and technology during this period, in spite of many references to the Royal Society, Royal Institution, and the Science Museum, South Kensington. It is quite understandable, however, that the mass of American material could not be dealt with in a complete way in the present book, which is very properly British in its central emphasis.

All five volumes of this great work, nevertheless, fill a need long and keenly recognized, especially, it may be, on the western side of the Atlantic. Americans will long be deeply conscious, therefore, of the debt that they owe to the distinguished authors and editors of all five volumes of the work. The book will be read with pleasure and satisfaction by everyone in the United States who is professionally concerned with the history of technology and as already suggested, by many others as well. In the years ahead these volumes will be among the reference books most frequently reached for on the working shelf of any student who is concerned with this area of scholarship. An expression of gratitude is also due to the great Imperial Chemical Industries, Ltd., which helped to make possible the preparation of these expensive, well-illustrated, and well-printed volumes.

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