WAR-TIME TECHNOLOGY IN THE UNITED STATES

Q.E.D.: M.I.T. in World War II

By John Burchard. Pp. xvi + 354 + 16 plates. (New York: John Wiley and Sons, Inc.: London: Chapman and Hall, Ltd., 1948.) 21*s.* net.

Battlefronts of Industry

Westinghouse in World War II. By David O. Woodbury. Pp. ix + 342 + 32 plates. (New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1948.) 21*s.* net.

THESE two books, one the story of the Massachusetts Institute of Technology in the Second World War and the other that of the contribution of the Westinghouse Electric Corporation to the victory over the Axis powers, reveal the enormous achievements made by civilian forces during the War. The Massachusetts record "Q.E.D." is that of the assistance given to the war effort by a single privately endowed American institution, and is typical of the war-time contribution of the academic institutions. The author rightly points out that his book is not the history of the achievements of individuals, because research and development in these days are almost always the work of teams. Indeed, throughout, one quality of the war-time activity of the Institute stands out clearly—the quality of unity and simplicity. However difficult and numerous were the problems, there was always just one criterion for their solution: "Is this the most useful thing which M.I.T. can do to help win the War?"; and when this question had been answered, all its powers and activities were organised to this end.

In a foreword to the volume, the president, Karl T. Compton, says that one of the outstanding lessons of the War was the great value of civilian experts at high levels in the military and other government councils. Civilian pressure broke down peace-time routine. It was civilian pressure which opened the way for the training of thousands of radar experts; which convinced those in high authority that the traditional methods of anti-submarine warfare were inadequate; which developed the amphibious 'DUKW', in spite of lack of interest by the military authorities, and similarly the rocket missiles. The war-time contribution of the Massachusetts Institute of Technology falls into three categories: (1) research and development contracts; (2) special training courses; and (3) personal service by its staff. The range of technical problems undertaken by the personnel resources, past and present, of this great institution was enormous, and the author of "Q.E.D.", John Burchard, director of libraries at the Institute, has with superlative skill made a most fascinating story.

"Battlefronts of Industry", the record of the Westinghouse Electric Corporation of its activities in the War, is written in a popular style and well illustrated, and shows in a striking way the American genius for quick production on a large scale. It shows how the policy determined by the expert management was developed by the research and engineering staffs and then carried into effect with the full weight of a great manufacturing organisation behind it. An early decision of the management to embark only on those war projects which would lend themselves to future peace-time production was soon abandoned when the full needs of the Armed Forces became increasingly recognized. The range of activity undertaken by the Corporation was enormous, in both size and complexity, and emphasizes this important lesson to be learned from the War, namely, that unless a country possesses a weight of manufacturing resources backed by free initiative and enterprise, it will suffer a great handicap when its normal productivity has to be geared to war effort. Among the most interesting of the twenty-four chapters of the book are those on "The Impossible takes a Little Longer", "Uranium" and "The Battle of the Isotopes".

The student of the history of the War will do well to study these two volumes, bringing out, as they do, the inception of new ideas and the effort required to translate these into war devices.

A. P. M. FLEMING

ULTRA-HIGH FREQUENCY RADIO FOR STUDENTS

Ultra-high Frequency Transmission and Radiation

By Nathan Marchand. Pp. ix+322. (New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1947.) 27*s.* net.

THE Second World War and the succeeding years have seen a great extension of the use of radio waves of very high frequency, largely as a result of the stimulus provided by the development of radar, and of television and frequency-modulation broadcasting systems. It is therefore perhaps not surprising that there have appeared recently several books on matters associated with the use of such short waves. However, it might be suggested that the time has now been reached when intending authors and publishers in this field should consider carefully what they have to offer before adding to the list. One might particularly emphasize that it seems scarcely necessary nowadays to include a treatment of vector analysis, and a detailed derivation of Maxwell's equations, together with the fundamental principles underlying electromagnetic radiation, in every new text dealing with very high frequency radio phenomena.

The headings of the eight chapters in the present book are as follows: transmission lines, elements of vector analysis, fundamental electromagnetic equations, plane electromagnetic waves, radiation, antenna arrays, wave guides, and complex transmission-line network analysis. It is the reviewer's opinion that, unless an author has some essentially new points of view on these subjects to present—and such are not evident in this book—there would appear to be little justification for producing a further treatment.

Mr. N. Marchand states in his preface that he has "prepared this book keeping in mind the requirements of both the college student who will study it as a textbook in a prepared course, and the practising engineer who will read it for self-instruction". Nevertheless, although there is little to quarrel with in the manner of presentation of the material, it is a little difficult to see what the student or engineer will find in this book that is not already covered adequately in several well-established texts on physics and electrical engineering. This criticism is supported by the numerous references to such books as those, for example, by Stratton and Schelkunoff. There are included a number of tables; but these also are such as one would expect to find in any of the widely available collections of mathematical tables.

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