Book Reviews

A History of Mechanical Inventions. Abbott Payson Usher. Harvard Univ. Press, Cambridge, Mass., rev. ed., 1954. xi + 450 pp. Illus. $9.

One might expect that the author of a comprehensive treatise on the history of mechanical inventions would be a professor of mechanical engineering, so engrossed in his subject as to delve deep among its hidden foundations. But while the professorial rank attributed to the author of this excellent book proved to be correct, it turns out (although this is not disclosed on the title page) that Usher is professor emeritus of economics at Harvard, with a very pronounced liking for history. But I think many of his readers will agree with me that with a little encouragement he might have become an engineer.

The book is in fact a revised and enlarged edition of an earlier work by the same author published in 1929 under the same title. The first four chapters present entirely new material. Their titles, in order, are "The place of technology in economic history"; "Historical analysis of social change"; "The particular system of events"; and "The emergence of novelty in thought and action." They are designed to provide the reader with a systematic statement of the philosophic and psychological theory that guided the author in the preparation of the descriptive and narrative chapters. As such, they should also be of interest and assistance to historians engaged in other fields. But they are not easy reading, and many readers will early be inclined to take the author's word for it and jump to the juicier chapters that follow.

These later chapters present to the student of mechanical inventions an intriguing story, with a wealth of detail, supplemented by many drawings and richly documented. They include the mechanical equipment of pre-Christian antiquity; water wheels and windmills; water clocks; mechanical clocks and their development into instruments of precision; printing; textile machinery; machine tools and quantity production. With the exception of the last chapter on the production and distribution of power, the historical account ends at 1850 and usually earlier. To me the transcendent chapter of all is the one devoted to Leonardo da Vinci, engineer and inventor.

It is of interest to note that photographic typesetting has been employed in producing this book. The result is pleasing, and it is fitting that the book itself should exemplify a new invention.

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The Physics of Experimental Method. H. J. J. Braddick. Wiley, New York, 1954. xx + 404 pp. Illus. $7.

Now that it is no longer practicable, with the increased enrollments in physics, to have undergraduates make minor repairs on their equipment or to design and build apparatus for their experiments, many colleges have introduced courses in laboratory arts. Braddick gives such a course at the University of Manchester entitled "The physics of experimental method." This book, bearing the same title, was written for the course. It is not and was not intended to be a source book for the student looking for detailed procedures and techniques. The course for which it was written is a lecture course, and, as the title indicates, it is primarily concerned with basic physical principles as they apply to experimental work. However, references to original sources and to other books are given so that the details of procedures may be found.

The student will find the chapters on "Errors and the treatment of experimental results," "Mechanical design," "The natural limits of measurements," and "Electronics" particularly valuable. This last chapter is for those who have not had a course in circuitry. The chapter on "Mechanical design," which deals with degrees of freedom, hysteresis, optimum size, and vibration, is especially well done and covers a field neglected by most teachers.

Those who have had a course in light will find little that is new in the chapter on optics, and most students will be disappointed that the chapter on nuclear physics is so brief. My chief criticism of the book is that too many items are discussed too briefly. For example, three pages are devoted to electric motors and three to vacuum gages.

This book is recommended for courses concerned with the broad aspects of experimental investigation. For courses emphasizing a particular area—for example, nuclear physics—and for those designed to develop manipulative skills, it should be available, and perhaps required, for supplementary reading.

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The Microtomist's Formulary and Guide. Peter Gray. Blakiston, New York, 1954. xiii + 794 pp. Illus. $10.50.

This is a valuable source and reference book for anyone who is concerned with the preparation of biological materials for microscopic examination. Numerous books on histologic technique are available, but not one of them written in English is equal to this work in logical organization and comprehensiveness.

There are 28 chapters. The first 16 chapters deal with the preparation of microscope slides. Chapters are devoted to whole mounts, smear and squash preparations, ground sections, paraffin, nitrocellulose, frozen sections, and methods utilizing injection masses. The chapters are well illustrated. Many of the drawings and much of the text of these first 16 chapters are to be found in the author's *Handbook of Basic Microtechnique.*

The last 12 chapters, which comprise more than two-