# Book Reviews

**Titanium.** A. D. McQuillan and M. K. McQuillan. Academic Press, New York; Butterworths, London, 1956. 466 pp. Illus. $10.

The industrial development of titanium metal and alloys made therefrom has suffered in the past from a lack of fundamental information on many aspects of titanium metallurgy. The urgency to produce a satisfactory metal as a basic product, to melt or alloy it into useful combinations, and to fabricate it into useful shapes for a wide variety of applications has led us into measures and procedures that have often handicapped, rather than aided, industrial development in this most recent chapter of industrial technology.

The present volume on *Titanium* by the McQuillans sets out to correct this situation. In the preface to the volume, the authors state that "although the present industrial techniques may be expected to be rapidly superseded, the greater part of the material included in the book will retain its validity." They present, for the first time, a summary of the fundamental facts on which all titanium metallurgy must eventually be based.

The chapters on the production of titanium metal are naturally of special interest, since the future applications of titanium to industries other than those that are government-supported depends on a more economical method of production than the magnesium reduction processes now in common use. The reduction of the halides and subhalides of titanium by sodium, attributed by the authors to Quinn, has interesting possibilities for future production. The reduction of titanium oxide by calcium would be of great importance but this development "awaits the appearance of plentiful supplies of cheap high purity calcium." Electrolytic methods and thermal decomposition of titanium iodide have not yet arrived at the point of large-scale operation.

The engineering features used in the production of end-products in titanium metallurgy are covered in the sections on melting and casting of titanium and its subsequent fabrication into finished parts.

The melting of titanium into ingot form is still one of the bottlenecks of the industry. Consumable and nonconsumable electrodes, double and triple melting—skull melting or melting in graphite—vacuum or argon atmospheres, are problems that are calling for more adequate solutions.

The summaries on the physical properties of titanium and the constitutional diagrams of the known binary titanium alloys provide a brief compendium of information in these fields. The sections on heat treatment and mechanical properties review the extensive literature on these subjects which has been presented in the last 10 years.

As a contribution to the scientific and engineering features of titanium metallurgy, this present volume, I think, is among the best.

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**Water.** The yearbook of agriculture, 1955. U.S. Department of Agriculture, Washington, D.C., 1955 (order from Supt. of Documents, GPO, Washington 25). xiii + 751 pp. Illus. $2.

This is a very important book. Two presidential commissions and now a proposed national program have dramatized the urgent need for us to face up to the implications of present water problems and a demand that is expected to double by 1975. This volume provides a means by which the technical specialist, the scientist, the farm and civic leader, and the thoughtful citizen can obtain the comprehensive background that is necessary to place their endeavors and their local problems into broad perspective.

In the words of the Yearbook Committee, "our main emphasis is on the facts and basic principles that will help people in reaching the best decisions." This book is centered about the problems of agriculture, but only in the broadest sense. Thus, it reaches far beyond the farm to the factors involved in the making and prediction of weather, runoff, erosion, sedimentation, infiltration, and surface- and ground-water flow. It considers watershed, forest and range management, recreational, wildlife, domestic and irrigation needs, conservation, flood control, legal and legislative implications, and fundamental scientific research. There are 96 topics and a considerably greater number of authors. All things considered, the volume is remarkably well aranged, well integrated, and well written. The reader will find this book valuable, whether he desires to read it as a whole or to select separate papers according to his interests.

The great majority of the authors come from within the Agricultural Research Service, the Forest Service, and the Soil Conservation Service. Where necessary to the continuity and coverage, the editors wisely went beyond this talented group within the U.S. Department of Agriculture and obtained participation from experts from other agencies, such as the U.S. Geological Survey, the Weather Bureau, the Bureau of Reclamation, the U.S. Public Health Service, the Fish and Wildlife Service, and the Saline Water Conversion Program, from university and state experiment stations, from professional associations like the American Waterworks Association, and from private organizations. The quality of the individual efforts is quite uniformly good.

In a book that attempts this coverage, every reader will discover some topic that he feels may have been overlooked or undervalued. I am no exception, and I would have welcomed an article on the possibilities for developing plants with greater drouth resistance and lower water requirements and one on the possibilities for reducing evaporation. In the preface, the editors explain that the agricultural scope of the book precluded much emphasis on hydroelectric power, navigation, pollution, and industrial use. To this I might add engineering structures, large dams, and river diversion projects. Jurisdiction for many of these fields lies within the U.S. Department of the Interior, and it can be hoped that it may someday see fit to publish a companion volume covering these subjects.

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**Advances in Geophysics.** vol. 2. H. E. Landsberg, Ed. Academic Press, New York, 1955. x + 286 pp. Illus. $7.50.

This volume of extensive review papers, assembled under the competent editorship of Helmut Landsberg, covers diverse and important aspects of geophysics in which there have been substantial developments in the last few years. In addition to being review articles, most of these papers include some new mate-