my competence to comment critically on each of the contributions; the total effect of the two volumes, however, is impressive, and Giese and his collaborators are to be congratulated for a piece of work that cannot help but give focus and impetus to an expanding and significant field of scientific endeavor.

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Propellants for Rockets

Theoretical Evaluation of Chemical Propellants. Roger Lawrence Wilkins. Prentice-Hall, Englewood Cliffs, N.J., 1963. xvi + 463 pp. Illus. $15.

Wilkins has endeavored to make the five chapters and four appendices in his book a complete treatise for those who wish to evaluate the performance of chemical propellants in rockets. The author's own experience has made him aware of the great difficulty involved in obtaining or finding exact values for the thermodynamic quantities needed, and he uses the first four chapters to outline in some detail the methods one can use to arrive at good estimates of these values, when they have not been experimentally determined. The fifth chapter is a sound discussion of several methods used to arrive at an evaluation of the potential performance of chemical propellant combinations. Wilkins has been particularly careful to give adequate references for all data used in his discussions.

In the first chapter, "Calculations of thermodynamic functions of ideal gases," the author discusses several methods of calculating thermodynamic properties in the ideal gas state from molecular structure data derived from spectroscopic studies. In chapter 2, "Calculation of thermodynamic functions of solids and liquids," he deals with the problem of calculating thermodynamic properties of liquids and solids from limited spectroscopic data, and in chapter 3, "Theoretical methods for estimating standard heats of formation," he summarizes data available on heats of formation of compounds and discusses several reliable methods for making estimations when experimental data are lacking. In chapter 4, "Calculation of chemical equilibrium in complex systems," Wilkins shows how the data derived in the first three chapters are used to calculate equilibrium constants for individual chemical species. These constants can be used to calculate chemical equilibria, and the methods can be applied to a system that contains gaseous and condensed phases. In chapter 5, "Performance of chemical propellants for rocket engines," he shows how the methods developed in the previous chapters can be used to estimate the performance of chemical propellants. Typical results on a large number of chemical systems are also given in chapter 5.

The appendices are entitled "Thermodynamic functions of a monochromatic oscillator, with additional functions required for anharmonic corrections"; "Thermodynamic functions of some atomic species in the ideal gas state"; "Thermodynamic functions of some diatomic species in the ideal gas state"; and "Thermodynamic functions of some polyatomic species in the ideal gas state."

Overall, Wilkins has achieved his goal of providing a sound discussion of the thermodynamic methods involved in calculating propellant performance. The use of data at chamber pressures of 500 psia (pounds per square inch absolute) and 1000 psia is perhaps good. This should indicate to the newcomer that, although standard performance is quoted for chamber pressures of 1000 psia, actual usage will generally give a lower value.

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Atmospheric Research

Radio Astronomical and Satellite Studies of the Atmosphere. Jules Aarons, Ed. North-Holland, Amsterdam; Interscience (Wiley), New York, 1963. viii + 561 pp. Illus. $17.50.

This book includes the 28 papers presented at the summer school of the Advanced Study Institute at Corfu, Greece, in June 1962. The institute is one of a series of such meetings for specialists, held under the sponsorship of the Scientific Affairs Division of the North Atlantic Treaty Organization. The book title appropriately describes the major techniques utilized in the studies presented. The studies deal with the following topics: structure and composition of the atmosphere (a review), radio star scintillations, radar astronomical studies, cosmic noise absorption, satellite studies of the atmosphere by radio techniques, planetary atmospheres and incoherent scatter, and solar-terrestrial relationships.

Roughly one-half of the papers comprise reviews of relevant fields, with extensive bibliographies. Several of these are particularly valuable in view of the current status of research in the fields—for example, the reviews of techniques that utilize satellite radio transmissions for studying the earth's upper atmosphere. Such studies appear to have reached the stage where first order results are well in hand, and the reviews should be helpful in preparing for second generation experiments. Similar statements can be made about several other areas covered in the book.

In view of the above, I recommend this book as reading for specialists in the areas that it covers. The editor is to be commended for including, in the introduction, a summarization of the study groups recommendations with respect to the directions in which such researches should be pursued in the future. In fact, expanding that portion would have made the book even more valuable.

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Ecology

Quantitative Plant Ecology. P. Greig-Smith, Butterworth, Washington, D.C., ed. 2, 1964. xii + 256 pp. Illus. $8.95.

The first edition of this book (published in 1957) brought together leading concepts and thinking in quantitative approaches to plant ecology, by its clearly written and critical evaluation. The book has become the primary reference guide in this field of research and the most useful introduction to these problems for students in all aspects of community ecology. The second edition, which retain virtually all the material of the first, includes pertinent literature through 1962. By far the largest proportion of literature used is by British authors, entirely in keeping with the productivity of that group in quantitative studies, but an increased number of references to papers by workers in other countries indicates