"Enzyme Systems Associated with the Oxidation and Reduction of Glutathione in Plant Tissues," L. W. Mapson describes glutathione reductase, an enzyme which reduces oxidized glutathione to reduced glutathione by coupling reactions involving triphosphopyridine nucleotide dehydrogenases; dehydroascorbic acid reductase, which catalyzes the oxidation of glutathione by dehydroascorbic acid; and other enzyme systems in which oxidation of glutathione can occur. Mapson also considers the not too convincing evidence that the glutathione–ascorbic acid system may function in an *in vivo* respiratory pathway; he states less equivocally, however, the probable greater physiological importance of glutathione in activation of sulfhydryl dependent enzymes. In "Glutathione Metabolism in Animals," P. C. Jocelyn describes first the different enzymes capable of synthesizing or breaking down glutathione; then the functions of glutathione as a cofactor for different enzymes, as a carrier of acyl groups, and as a protective agent. Jocelyn also discusses the apparent influence of thyroxine, vitamin B_{12}, growth hormone and adrenal hormones in gearing the glutathione level to body requirements. In "Glutathione and Neural Tissues," H. McIlwain brings out the facts that the total glutathione concentration in the brain is 10 times that in the plasma, that up to one-third of the reduced form is rapidly converted non-enzymically to oxidized form *post mortem*, and that cerebral tissue contains potent quantities of glutathione reductase, glyoxalase, and different enzymes which catalyze the formation and hydrolysis of S-acetyglutathione. Finally, McIlwain considers evidence for connection between mental phenomena and blood glutathione and implies that it is inconclusive. S. G. Waley, in "Glutathione and its Analogues in the Lens," describes the natural occurrence in the lens of γ-glutamyl-α-amino-n-butyrylglycine, called ophthalmic acid, and other analogs and derivatives. He also discusses the findings that glutathione in the lens appears to be bound to protein, and that lens glutathione decreases with experimental cataract. In the seventh and last chapter of the book, "Thiols and Radiation Damage," D. B. Hope discusses the *in vivo* protective effects of thiols and other compounds and the various mechanisms which have been postulated to explain the protection. In addition, Hope describes some of his own studies, using X-rays on mice, which showed correlation between radio-protection and hypothermia.

Each chapter is highly informative. Some are more readily absorbed, however, than others. Isherwood's is a model of clear, succinct presentation. Waley and Hope each accommodate the reader by following their statements of findings with statements of interpretations, a practice not always followed by some of the other authors. McIlwain's style is somewhat ponderous.

In spite of the numerous findings which have accumulated concerning glutathione, the existence of unresolved problems is quite apparent. For example, there are uncertainties regarding the involvement of the glutathione-ascorbic acid system in respiration, the *raison d'etre* of glyoxalase, the effects of glutathione on protein thiol groups *in vivo*, and the mechanisms of radio-protection by thiols and non-thiol compounds. The book should be informative for the non-specialist in glutathione research, stimulating for the specialist.

PIONEERING RESEARCH DIVISION
QUARTERMASTER RESEARCH AND ENGINEERING CENTER
NATICK, MASSACHUSETTS GAIL LORENZ MILLER

Structure and Properties of Thin Films. Proceedings of an International Conference held at Bolton Landing, New York, on September 9–11, 1959. Edited by C. A. NEUGEBERGER, J. B. NEWKIRK and D. A. VERMILYEA. John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1959. xiv + 561 pp. 22 × 28.5 cm. Price, $15.00.

This book consists of the papers and discussions presented at an International Conference sponsored jointly by the U. S. Air Force Office of Scientific Research, Air Research and Development Command, and the Research Laboratory of the General Electric Company. For workers interested in thin films or the bulk properties of matter which may be investigated more conveniently with thin films, the book will be of inestimable value. There are forty-two papers with the subsequent discussions plus a panel discussion on the theory of surfaces.

Papers with emphasis on studies of thin film properties to reveal information on bulk properties include research on phase transformations, chemical reactivity, superconductivity, electrical resistance, Hall effect, magnetic properties and magneto resistance. Some papers deal with special properties such as chemical, mechanical, electrical and magnetic behavior not associated with the bulk form; the nature of the responsible states come under considerable discussion.

Another group of papers are concerned primarily with surface chemistry. These shed light on interactions at surfaces, and are important also to understanding the growth properties of thin films. Often good reproductions of electron photomicrographs illuminate the discussion. A final group of papers take up the theoretical aspects of electronic structure, of epitaxial relationships and of the interactions of atoms with thin films.

If the student or researcher wishes to explore the growing interplay of experimental approaches and concepts of the physicist and chemist, he can scarcely find a better book in which to delve. It makes a valuable contribution as well to basic research and, ultimately to development, in the quite divergent fields of devices and coatings.

DEPARTMENT OF CHEMISTRY
LEHIGH UNIVERSITY A. C. ZETTLEMOYER
BETHLEHEM, PA.

Tables pour le Calcul Direct des Constantes D'équilibre des Systèmes Chimiques aux Hautes Températures. Graphiques de Conversion en Composition a L'équilibre. Exemples de Calculs. By HENRI MAURAS, Ingénieur-Docteur, Chef de Travaux à la Faculté des Sciences de Toulouse. Masson et Cie, 120, Boulevard Saint-Germain, Paris-6, France. 1959. vi + 149 pp. 17 × 25.5 cm. Price, Broché, 1.650 fr.; Cartonné toile, 2.450 fr.

This book is an effort, directed primarily toward chemical and metallurgical engineers, to provide free energy data in a form permitting rapid calculations for reactions.

There are two main parts. The first consists of tables, in which the data are given as "component factors of equilibrium." The "component factor" is defined by the author as

$$\mathfrak{F} = -\frac{\Delta H_{298}(\text{form.}) + \int_{298}^{T} C_p \mathrm{d}T}{4.575T} + \frac{S_{298} + \int_{298}^{T} C_p \mathrm{d}T}{4.575}$$

for an element or a compound; so that when "factors" for the reactants and products are combined, the result is the logarithm of the equilibrium constant of the reaction. "Factors" are given at 20-degree intervals from 400°K. to a limit of 240°K. (Also given are temperatures of phase changes.) There seems to be no particular advantage in representing the data in this chosen manner. The National Bureau of Standards accomplishes the same purpose by reporting $\log K = -\Delta F(\text{form.})/4.575T$.

About one-quarter of the tables are for organic compounds, principally hydrocarbons. For the most part the author uses other compilations as a source of data. The main criticism of the tables is that the author has not used up-to-date values. Two of his sources of compiled information have been superseded by later revisions. Also, omissions and the selection of outmoded values could have been remedied by a brief literature search. For example, at 1,000°K., the value selected for alumina is in error by more than 20 kcal., titanium dioxide by 8 kcal.

The second part gives information designed to permit rapid calculations of equilibrium gas compositions. The author considers eighteen different types of reactions. Equations, tables and charts, expressing the equilibrium constant as a combined function of the equilibrium composition and total pressure, are supplied. Examples to illustrate the use of the tables and charts are given.

This book cannot be recommended as a source of thermodynamic information for those wishing to make the most accurate calculations possible. However, it is a handy compilation for order-of-magnitude calculations, and it could be used satisfactory as a teaching medium.

U. S. BUREAU OF MINES
226 HEARST MINING BLDG. E. G. KING
BERKELEY 4, CALIF.