very important effects of hydrogen bonding and, more generally, of interactions and variations in charge distribution in altering characteristic frequencies receive inadequate attention. In all other respects, the book is an extremely valuable contribution which forms an excellent introduction to the subject for chemists and those more interested in the practical applications of infrared spectra. For the chemical spectroscopist, it is a storehouse of interesting information, which should prove very stimulating in the fascinating problem of correlating the spectroscopic and chemical properties of molecules.

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Titanium: Its Occurrence, Chemistry, and Technology. Jelks Barksdale. New York: Ronald Press, 1949. 591 pp. $10.00.

Growing interest in titanium chemistry and applications of elemental titanium and its compounds in recent years has demonstrated an urgent need for a comprehensive and concise summary of information pertaining to the chemistry of the element. Such a summary is presented in the present monograph.

Although written largely in terms of the titanium pigments industry, and thus reflecting the author's major experiences and interests, the volume nevertheless strikes a comparatively good balance among the technical developments involving titanium materials. Its wealth of information about pigments is supplemented by adequate discussions of uses of the element or its compounds in alloys, in the electrical and ceramic industries, in dyeing processes, and in catalysis. Recent developments involving the production of the pure metal and its applications are discussed, as are miscellaneous applications of compounds running the gamut from gem stones to water purification and sewage treatment.

Emphasis througthout the book is primarily upon technology. Considerable space is devoted to the mineralogy and technical treatment of useful ores for the recovery of compounds of the element. The chemistry of the free element and of its compounds is, however, treated in considerable detail in three chapters, and methods for analyzing titanium materials are considered in one chapter. This last chapter is very brief and appears to be somewhat sketchy in character. On the whole, however, the treatment seems excellent.

Throughout, the book is well documented. References to both technical and patent literature are indicated clearly in connection with statements of fact in the discussion. These references are then collected by chapters into a section of 77 pages, placed just before the index at the end of the volume. The author's statement that these references are complete up to the time when the book went to press appears correct. Indexing is equally comprehensive.

The book is written in a clear prose which is easy to follow and free from ambiguity. In general, the author has been sufficiently critical of conflicting literature reports to render his presentation authentic, although there are some instances where he has not been. One might wish that he had explored more searchingly the basic chemistry of some of the processes he described and had thereby offered more adequate explanations for these processes. In these and most other instances, however, the viewpoint has been more technical than theoretical or experimental. The volume has been given careful handling by the publishers and is thus clearly printed, attractively bound, and free from significant errors. In the opinion of the reviewer, however, the price is excessive.

Barksdale's *Titanium* should prove useful to both technologist and teacher. It contains a fund of information and should fill a vital need in the rapidly expanding field of titanium chemistry. Its use is to be recommended.

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The Alkaloids: Chemistry and Physiology, Vol. I. R. H. F. Manske and H. L. Holmes, Eds. New York: Academic Press, 1950. 525 pp. $10.00.

This volume is not for the casual reader who seeks a little information on the subject of vegetable bases, but rather for specialists in the alkaloid field, or those who intend to become so. It consists of seven sections, selected apparently on the basis of interests and availability of the authors.

The introductory chapter by Manske, "Sources of Alkaloids and their Isolation," is well described by its title, and offers many valuable generalizations of technique which are more specifically illustrated in the later chapters, where the isolation and separation of individual members is usually given.

The section by W. O. James, "Alkaloids in the Plant," is a scholarly treatment of the subject which assumes more botanical knowledge than is possessed by most chemists. The old and fascinating question of why plants produce alkaloids (and why many do not) is treated in some detail, and leaves us just where we started; we do not know, and perhaps there is no reason to speculate.

There are two excellent chapters by Léo Marion, "The Pyrrolidine Alkaloids," "The Pyridine Alkaloids," which deal with the simple cyclic plant bases, and the commercially and medically more important members of the pepper, areca, lobelia, and tobacco groups, as well as some minor types.

The relatively obscure subject of the *Senecio* alkaloids is considered in elegant detail by N. J. Leonard. Although the plants are of little importance except as a menace to cattle, the alkaloid group is nevertheless of interest as the first known example of the pyrrolizidine ring structure, and for the methodical way in which the nature of the individual members was elucidated.

"The Tropane Alkaloids," by H. L. Holmes, includes such medicinally important drugs as hyoscyamine, atropine, cocaine, and scopolamine. In addition to discussion of reactions and structure, there is an exhaustive table of derivatives and properties which may serve as an up-to-date Beilstein.

"The Strychnos Alkaloids," also by Holmes, makes difficult reading, but any account of strychnine will have