180) or a legend that says succinate while the figure shows α-ketoglutarate (p. 141) are not likely to mislead even the less-experienced student. More unfortunate perhaps are insufficiently qualified statements about the discharge of accumulated calcium by uncoupling agents on page 164. Also, the formulas used on page 73 to indicate how Coenzyme Q can undergo reduction and cyclization show a hydroxyl group in the side chain not present in Coenzyme Q. There is also some confusion about the identity and type of protein in C-factors I and II on pages 194, 198, and 199.

The schemes presented on page 230 offer relatively little conceptually except possibly for (a), which contains potentialities for a mechanism. The newcomer to swelling and contraction may be confused by the fact that mitochondria are indicated as swollen when the ATP/ADP ratio is low, when evidence earlier in the book indicates contraction of mitochondria with the uncoupler DNP both *in vitro* and *in vivo*. The scheme is undoubtedly based on the known ATP contraction, but it does ignore known energy requirements for certain kinds of mitochondrial swelling. But these matters involve some very contradictory situations with uncouplers that are for current and future research, not points that can be settled in this book, which is highly recommended.

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Chemical Infrared Spectroscopy. Volume I. Techniques. By W. J. POTTS, JR., Chemical Physics Research Laboratory, The Dow Chemical Company. John Wiley and Sons, Inc., 605 Third Ave., New York 16, N. Y. 1963. xvi + 322 pp. 15.5 × 23.5 cm. Price, $8.50.

Dr. Potts is himself eminent in the world of chemical spectrometry and he dedicates this book to his mentor, Dr. Norman Wright. In so doing, he establishes a chain of communication with the Harrison Randall school of infrared spectrometry which played a dominant part in developing the basic techniques of the subject at the University of Michigan in the earlier decades of this century. Dr. Wright brought the academic techniques of infrared spectrometry from the University of Michigan to the Dow Chemical Company. He was joined there later by Dr. Potts, and these two with their colleagues, listed in the preface of this book, have done as much as any other single research group to establish infrared spectrometry as a tool in industrial analysis and process control.

This book, the first of two volumes, deals with the techniques of infrared measurement. It is to be followed later by a companion volume in which interpretation will be the main theme. Two introductory chapters on the nature of infrared radiation and on the absorption of infrared radiation by molecules ease the neophyte into the intricacies of this complex subject without scaring him prematurely by erudite displays of matrix algebra and partial differential equations. Those are saved for the eighth and last chapter, by which time the student should be hardened enough to face the mathematical facts of life. This final chapter effectively bridges the gap between the empiricism of "group frequencies" which induces shudders down the spines of true spectroscopists, and doctrinaire preoccupation with normal modes of vibration which deny analytical spectroscopists any hope of extending exact spectroscopic theory to the 99% of organic molecules that lack simple symmetry and contain more than half a dozen atoms. One might question whether this last chapter is not out of place in a volume dealing with technique, but this can be better judged when we have the whole work and see what is to follow.

Between these first two chapters and the eighth, the reader will find the best account of the instrumental aspects of infrared spectrophotometry that has yet been written. Successive chapters deal with spectrometer optics, the performance and operation of infrared spectrometers, sample preparation techniques, quantitative analysis, and a catch-all chapter headed "auxiliary devices and special techniques." The principles are all described with the assistance of clear and simple diagrams which concentrate on general principles rather than the incidental details of individual manufacturers' hardware. The information is all basic and there is no padding out with glossy pictures lifted from commercial catalogs. Particularly useful is the discussion of recorder noise, the practical illustrations of properly and improperly measured spectra, and the section on practical spectrometer operation and testing.

It is unfortunately only too evident from the published literature that many infrared spectroscopists do not know how to set the knobs on their instruments correctly. In this book Dr. Potts tells them. . . and many other useful things as well. We will be looking forward with interest to the appearance of Volume II.

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Survey of Progress in Chemistry. Volume I. Edited by ARTHUR F. SCOTT, Department of Chemistry Reed College, Portland, Ore. Academic Press, Inc., 111 Fifth Ave., New York 3, N. Y. 1963. 340 pp. 15.5 × 23.5 cm. Price, $7.95.

The rapid growth of research effort and its reporting has led to much concern with information retrieval schemes. It is frequently tempting, as the literature grows and it becomes more difficult to "keep up," to contemplate large data processing installations providing rapid and complete access to our accumulate knowledge. It is, however, worth remembering that this effort will be done by human beings and that its success will depend entirely upon the ability and competence of individuals. The review article is certainly our most common means of information retrieval, and illustrates well the variation in success that may be expected of any scheme.

This modest book is a collection of seven review articles. No attempt has been made to interrelate the material presented in the different articles. The announced intended average reader is the college teacher 10 years out of school. It is apparent that the dispersion of this sample will be quite large, but to this reader (whose qualifications are very close to the average) it appears that the range of subject matter covered is large enough that almost all will find something old, something new. In addition to the range of subject matter there is, of course, a large range in the efforts expended by the individual authors. It makes little sense, therefore, to review this book as a whole. The articles, with this reviewer's opinion of them, are listed below in the order they appear in the collection.

"New Research Tools of Chemists," by Riley Schaeffer.—This is a perfunctory survey of a few physical techniques which have found widespread application in chemical research. The level of presentation is shallow and the only purpose that it can serve, namely, to direct the reader to other works on the methods discussed, has been obviated by an inadequate bibliography. In summary, this chapter is better dead than read.

"High-Temperature Reactions" by Alan W. Searcy.—This chapter presents an informative discussion of the principles governing chemical equilibria at high temperatures. These principles are nicely illustrated by a large number of examples systematically presented which form in themselves an interesting section of descriptive inorganic chemistry. Since chemistry at high temperatures is qualitatively quite different from that of aqueous solutions at room temperature, this chapter will be of considerable value both practically and intellectually to a large group.

"The Implications of Some Recent Structures for Chemical Valence Theory" by R. E. Rundle.—It has always been and perhaps will always be the hope that the vast body of observation constituting chemistry can be explained by a few well-chosen principles which are relatively simple (mathematically) to apply. At the outset of this chapter, Professor Rundle points out clearly that these principles of valence theory must be in accord with quantum mechanics. The bulk of the chapter is a descriptive molecular orbital treatment of electron-deficient compounds, transition metal compounds, and, for want of a better title, outer d-orbital compounds (PCl_5, I_3^-, etc.). The central theme in the article is that the Lewis concept of molecules having rare gas structures can usually be maintained if a flexibility in the choice of molecular orbitals is accepted. A goodly amount of attention is paid to the symmetry classification of orbitals and some discussion of the qualitative energy order of orbitals is presented. In the course of presenting this description of chemical bonding, the author discusses the molecular structure of many novel species. This reviewer has reservations toward believing that qualitative molecular orbital theory does more than give an explanation of observation and is generally nonpredictive with