rial on the isolation of histones, although this section is somewhat incomplete.

Chapter VIII, entitled the "Acidic Nuclear Proteins," contains a wealth of material which, however, is not very critically evaluated. An example of a rather uncritical statement is the following (p 201): "... the ribonucleoproteins that are transported across the nuclear membrane include elements of both the ribosomes and the larger polysomic mass which contains both ribosomes and linear RNA filaments with a coding function...." No evidence is presented to substantiate the transfer of polysomes across the nuclear membrane, and it is not made clear what is meant by the elements of the ribosomes and polysomes. Some of the material included in this chapter, such as that concerning the NH_2-terminal amino acids of the acidic nuclear proteins, may be open to question because of failure to take into account the possibility of proteolytic autolysis. Nothing has been included concerning the relationship of the acidic nuclear proteins to the formation of gels by isolated nuclei, a topic which in the opinion of the reviewer ought to merit some attention. Finally, a number of statements seem to be presented as factual which are really inferences, and the chapter seems to be somewhat more didactic than is warranted, considering the difficulty of arriving at firm conclusions in the field being considered.

The last chapter (IX) on nuclear enzymes, on the other hand, appears to the reviewer not to be written in a sufficiently positive manner. References to the fairly recent literature are given, but the discussion seems weak, and, in spite of difficulties in interpreting the results of work on nuclear enzymes, the reviewer feels that a somewhat less vague picture could have been presented.

To recapitulate, the reviewer feels that the best part of the book is the part devoted directly to the histones, although the other sections are also valuable if the above-mentioned reservations are kept in mind. It seems likely that the book should be considered as a necessary addition to the bookshelves of those working on cell nuclei and histones, and that it would be of considerable value to anyone interested in these subjects. The style is good, there seem to be very few if any typographical errors, and the book is easy to read.

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Introduction to Mass Spectrometry and Its Applications. By ROBERT W. KISER, Associate Professor, Department of Chemistry, Kansas State University. Prentice-Hall, Inc., Englewood Cliffs, N. J. 1965. xii + 356 pp. 16 × 23.5 cm. $14.00.

The timing of Professor Kiser's book is well-nigh perfect. Mass spectrometry is currently enjoying a period of great popularity, and chemists and physicists in growing numbers are looking into potential applications of this technique in their varied areas of interest. For newcomers to the field, whatever their special interests, this book does a nice job of introducing and surveying the principles and applications of mass spectrometry relatively clearly and painlessly.

In accord with his objective of teaching mass spectrometry to those who know little or nothing about it, the author has gone out of his way to minimize the use of mathematics, jargon, and specialized terminology, although the results are not uniformly successful. The calculations required in quantitative analysis are couched largely in the language of matrix algebra; for the reader not at home in this branch of mathematics, such treatment can serve only to obscure the basic simplicity of the concepts and operations. At the other extreme, algebraic calculations at the high school freshman level are presented in full detail. Only very few examples of jargon survive, such as "coda compounds" (p 272) for cycloolefins, dienes, and acetylenes. Necessary specialized terms are carefully defined, although one might be inclined to take issue with some of the definitions. The author offers some of his preferred terminology as constituting "more basic definitions and distinctions" than the "somewhat confusing" more common usages; such a claim is at least challengeable and is certainly not convincingly demonstrated. A full chapter is devoted to classifying ions into numerous types, the descriptions of which serve a useful purpose. However, the seeming obsession with such classification leads to unnecessary complications and tends to obscure the common aspects of mass spectra with other chemical systems.

The definition of the "base peak" (p 128) as the most intense peak in a spectrum coincides with current practice of some workers but is far less useful than the older and broader sense of a peak arbitrarily selected by the spectrometrist, in accord with his convenience in the context of the problem at hand, to define the scale of relative intensities. The difficulty with Kiser's limited definition is well illustrated by his presentation of the partial spectra of isotopic benzaldehydes (p 271). Here the scale of relative intensities is, to say the least, of little help in bringing out significant relationships. To facilitate meaningful comparison of spectra of different isotopic species of a compound, the base peak should have as nearly as possible the same functional significance in the various spectra. The parent peak is often convenient for this purpose and, in this instance, was so used in the original paper. The strongest peak in the spectrum, assigned a relative intensity of 100 by Kiser, corresponds to the total $C_6H_5^+$ yield in the spectrum of unlabeled benzaldehyde, but to only part of the $C_6H_5^+$ yield in those of the labeled species.

A full chapter is devoted to an unquestionably useful survey of commercial instruments. Inevitably, such a survey is, in part, already out of date by the time the book is published; this limitation is explicitly recognized by the author. A second limitation, not so recognized, follows from the extent to which the author relied for his information on manufacturers' brochures and advertisements. He describes in impressive detail double-focusing mass spectrometers that have never been built except for prototype instruments in the manufacturers' plants. In view of the rapidity with which this field has been progressing, possible commercial production of such instruments will have to be preceded by extensive revision of specifications.

The book is an outgrowth of a series of lectures, the vestigial remains of which are evident in the chapter organization and in treatment of specific topics. In particular, the breakdown of the material on instruments incurs a great deal of repetition, sometimes to an extent slightly reminiscent of the Dick and Jane stories. A tighter organization would surely have been in order.

Perhaps the derivation of the book from lecture notes, with the attendant oversimplifications, can also account in part for some imprecise and misleading statements. One might cite, for example, the description of rearrangement ions (p 128) as "formed by rearrangements . . . at the moment of the unimolecular decomposition of the parent ion." The events comprising rearrangement and decomposition of polyatomic molecules are, in general, rate processes, and I know of no *a priori* reason why rearrangement must be concerted with a decomposition step. The statement, "It is not uncommon that the production of rearrangement ions requires considerably more energy than for most of the fragmentation processes" (p 128), tends to perpetuate a common misconception. A similar statement, but with "more" replaced by "less," could be made with at least equal justification. The conventional explanation offered here—going back to vertical *vs.* adiabatic processes—for the discrepancies often found between values of ionization potentials measured by electron impact and by other means (p 166) is by no means firmly established and ought to be taken with a large grain of salt. To the statement that "The relative total ionization should be independent of the particular mass spectrometer employed" (p 132), one is tempted to ask how such a relationship can be expected in view of the assorted spectrum-distorting effects generally lumped as mass discrimination. The discussion of total ionization and its relationship to elemental composition and molecular structure would be much improved by replacing a few "indicates" with "suggests," and by clear recognition that the postulated relationship, although useful in some situations, is by no means rigorous and should be looked on as giving only a rough approximation. The loosely worded statement appearing here (p 199) of "Stevenson's rule" can only help to perpetuate erroneous thermochemical arguments that have been justified by reference to misstated versions of the rule.

The easy, semiconversational style lapses at times into simply poor grammar. The use of the word "impact" as a verb with the sense of "impinge," although not serious, is not correct and should have been caught by the author or a copyreader. The auxiliary verb "shall" seems to have a special attraction for the author, but nearly every time he uses it, he gets into trouble, swinging back and forth between "shall" and "will" for the first person, and following with "shall" for the third person. Such idiosyncrasies will not cause any confusion in the reader's mind, but they are annoying and they are surely uncalled for.

Now, having played the role of the devil's advocate, I want to return to my original thesis. The book covers a great deal of ter-

ritory in easy, readable fashion. The division of attention between the instruments themselves (five chapters) and applications to chemical and physical problems (six chapters) represents a nice balance. The author's enthusiasm for his subject matter is tempered by good judgment in both the selection of topics to be covered and the treatment accorded them. For example, the discussion of low-voltage spectra (p 231 ff) is brief and very good, defining clearly both the special strengths and the limitations of the technique. This book will serve well the needs of the student or professional worker with no previous experience in mass spectrometry. It will furnish him both an introduction to and survey of the entire field and guidance in exploring the literature for material relevant to his special interests and needs.

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Crystal Chemistry of Tetrahedral Structures. By ERWIN PARTHÉ, Department of Metallurgy and Laboratory of Research on the Structure of Matter, University of Pennsylvania. Gordon and Breach, 150 Fifth Ave., New York, N. Y. 1965. xii + 176 pp. 15.5 × 23.5 cm. $9.50.

This scholarly and well-produced monograph is concerned with the crystal chemistry of some 200 elemental, binary, ternary, and quaternary compounds, the structures of which are related to the two basic tetrahedral lattices: the cubic lattice of diamond (or of sphalerite) and the hexagonal lattice of the oxygen atoms of ice I (or of wurtzite). The principal theme is the classification into *normal structures*, in which every atom has four tetrahedrally coordinated nearest neighbors, *defect structures*, in which not all four corners of the surrounding tetrahedra are occupied, and *filled structures*, which contain additional atoms within the voids of the tetrahedral lattices. By means of an easily recognized shorthand notation specifying stoichiometry and valence, and an electron-counting formula called valence electron concentration, VEC, the author is able to encompass within a consistent scheme many of the structural types found in those combinations of elements which tend to be symmetrically disposed with respect to the lower center of the periodic table. These compounds are intermediate in their electronic structures between the metals and the insulators, and, for this reason, it is of considerable technical importance to have their known or probable compositions and structures related in this orderly way. Parthé's approach is essentially that of descriptive stoichiometry and geometry, but he uses these concepts critically. For example, he says of the mineral germanite, "Cu_3GeS_4 supposedly crystallizes with a normal adamantine structure. With a VEC = 3.86, this is impossible. Either the true composition is Cu_2GeS_3, perhaps Cu_2FeGeS_4, or the structure is different." This approach is most useful for evaluating old compounds and preparing new ones.

The monograph is a classical example of the application of crystal chemistry to the structural data of a related group of compounds. As such, it is a necessary prerequisite to the much more difficult questions concerning which structures are thermodynamically the more stable at different temperature and pressures. Why, for example, of the 245_2 compounds, is $BeSiN_2$ related to wurtzite, while $MgGeP_2$ is related to zinc-blende; or for that matter, why is cubic ice stable only at around −130°C and hexagonal diamond is not found? As Parthé says in his last sentence "here lies the challenge for the solid state physicist (or the quantum chemist) to develop accurate bonding mechanisms which ultimately must result in valence electron rules identical to those demonstrated in this crystal chemical study."

The author and publishers are to be commended upon producing a book which is exceptional in the accuracy and detail with which it covers the limited field of its subject matter. It should be useful both as a reliable reference and as a source of authoritative material for teaching crystal chemistry.

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