to those involved in the teaching or practice of radiation protection.

Arthur B. Chilton has been involved in shielding and related radiation protection for many years, the last six of which have been spent teaching and doing research in the Nuclear Engineering Program of the University of Illinois. Chairman of the Shielding and Dosimetry Division of the ANS, a consultant to both governmental and industrial research organizations on shielding, and a contributor to technical and professional literature for much of his professional life, he would like to point out how much easier it is to be a critic than a creator.

SOME NOTEWORTHY PAPERS

Title Radiation Chemistry, Vol. 1

Editor Robert F. Gould

Publisher American Chemical Society, 1968

Pages xviii + 616

Price $16.00

Reviewer A. O. Allen

The organizers of this international conference sponsored by Argonne National Laboratory, August 12-15, 1968, under the chairmanship of E. J. Hart, spared no expense in bringing scientists from all over the world to their meeting. This volume contains 41 papers, plus 17 abstracts of papers not received in time for complete publication. Contributions from 13 different countries are included. The volume is an impressive testimonial to the widespread interest in basic research in the field of radiation chemistry.

It would be pleasant to be able to say that this compilation presents a comprehensive picture of the present state of radiation chemical science. Unfortunately, this is not the case. Few contributors chose to present a general review of a topic of any breadth. Instead, we have mainly detailed accounts of new experiments, which might have appeared in, e.g., the *Journal of Physical Chemistry*. It is impossible to review each paper in this space. We will mention a few which seem to be of broadest interest.

About half the papers are classed under *"Aqueous Media"*. Several deal with the hydrated electron; R. M. Noyes discusses its thermodynamic properties; D. C. Walker reviews what is known of its role in non-radiation produced reactions, e.g., Na + H_2O; K. Schmidt and E. J. Hart show how useful yields of e_{aq} can be generated photochemically. Most of the other papers present new detail regarding specific reactions brought about by radiation in aqueous solutions of various sorts.

Papers classed here under "Biology" are not really concerned with biology, but rather with radiation effects in chemical compounds of biological interest, such as proteins, amino acids, or nucleic acid components, or with large molecules such as dyes which are apparently thought to behave under radiation like biologicals. The impression one gets is that the chemical changes are complicated and despite much work are little understood in detail. In the case of protein radiolysis, a beginning has been made through the persistent efforts of W. M. Garrison and his co-workers over a period of many years. One paper in this section is noteworthy for its concern with building molecules up by radiation, rather than tearing them down: N. Getoff and G. O. Schenck synthesized the amino acid cystine by gamma-irradiation of a solution containing ethylamine, sodium bicarbonate, and hydrogen sulfide, with the surprisingly high yield G =1.65. This section also includes an interesting review of G. E. Adams, et al. on rates of electron transfer reactions in solution, including data on a large variety of active electron donors, organic and inorganic.

The third section, "Dosimetry", has only six papers. Five are on methods of measuring radiation doses in specific situations; the sixth is of more general interest, being a review of the status of theoretical calculation of radiation-chemical yields and the track structure, by Santar and Bednář of Czechoslovakia. A theoretical paper on structure of heavy particle tracks by Mozumder, Chatterjee, and Magee of Notre Dame, Indiana was included in the *"Aqueous Media"* section. These papers deserve careful reading by everyone interested in the basic principles of radiation chemistry; and the extensive theoretical work of the Czech school deserves much wider appreciation than it has had in this country.

The high price of these volumes will deter their purchase by many libraries. The same amount of material, edited and printed to the same high standard by a regular journal, would cost subscribers only about a third as much. This material, however, should be made available to all active researchers in the field of radiation chemistry.

A. O. Allen (PhD, Chemistry, Harvard University, 1938) was associated with the wartime development of nuclear reactors at the University of Chicago. Since then he has devoted himself to research in the field of chemical effects of high energy radiation, first at Chicago, then at Oak Ridge, and since 1948 at Brookhaven National Laboratory where he is senior scientist. His interests include radiation-induced reactions in aqueous solutions, radiation effects in heterogeneous systems, and measurement of ionization yields in irradiated insulated liquids He is a past president of the Radiation Research Society

A MUST FOR LIBRARY BOOKSHELVES

Title Radiation Chemistry, Vol. II

Editor Robert F. Gould

Publisher American Chemical Society, 1968

Pages xvi 558

Price $16.00

Reviewer D. Metz

This volume, a companion to the one reviewed above, contains those papers presented at the ANL-sponsored International Conference on Radiation Chemistry in the sessions entitled "Gases, Solids, and Oranic Liquids," as well as several plenary session papers addressed to the same general areas. Inasmuch as the book was available at the time

of the conference, commendations are due the authors for their cooperation, conference Chairman E. J. Hart for his diligence and planning, and the Editor for his coordination, all combining efforts to meet this deadline. However, it is regrettable that approximately one-third of the papers appear only as abstracts.

A book such as this cannot be reviewed in the same way as one might approach a textbook, or a review article by one (or several) author(s), or a multi-authored book in a reasonably narrowly defined field. Nor can it be treated as a compilation of review articles, each covering in depth the recent advances along a broad front in a number of individual, but related areas of research. Instead, it is the printed proceedings of a conference, in which the majority of the papers are research papers covering very narrowly defined systems.

The plenary session papers are good reviews of broad aspects of radiation chemistry. M. C. Symons' paper on "ESR of Radiation Damage in Inorganic Solids" is an excellent review of that field, including information on the more recently discovered inorganic radicals. The paper on "Electron-Scavenging Processes in the Radiolysis of Hydrocarbon Solutions" by Warman, Asmus, and Schuler, discusses critically the present knowledge of electron-scavenging processes in liquid hydrocarbons. The paper "Pulse Radiolysis Studies of Some Reactive States of Aromatic Molecules in Solution," by Dorfman, Shank and Arai contains an excellent compilation of absolute rate constants for energy transfer and electron and proton transfer reactions.

In addition to these papers, there are several other contributions that are essentially of a review nature or which consider problems of more general applicability. Among these are "Dipole Effects on Hydrogen Atom Transfer in Ion-Molecule Reactions" by Meisels and Leger, "Collisional Excitation Transfer in the Gas Phase" by Watanobe, "Properties and Reactions of Electrons in γ-Irradiated and Photoionized Organic Glasses" by Bonin, Lin, Tsuji, and Williams, "Ion Neutralization Times in the Gamma or Electron Radiolysis of Several Dielectric Liquids with Different Dielectric Constants" by Freeman, "Rate Constants and Equilibrium Constants for Electron Transfer Reactions of Aromatic Molecules in Solution" by Arai and Dorfman, and "Pulse Radiolysis of Monomers and Polymers" by Swallow.

The book is printed on high quality paper, the printing is good, and the binding durable. It contains a reasonably complete subject index but no author index. It should appeal to the generalist through its plenary session papers and the other review-type papers, and to the specialist through its many fine research papers. It is probably a must for the bookshelves of any central library serving people doing radiation chemical research.

Donald J. Metz received his MS and PhD (Physical Chemistry) degrees from Polytechnic Institute of Brooklyn. He is a chemist in the Radiation Division of the Nuclear Engineering Department, Brookhaven National Laboratory. His primary area of research is the effects of radiation in organic systems. For the past several years he has been making contributions to the understanding of radiation induced ionic polymerization in liquid vinyl monomers.

COLLECTION OF OPINIONS

Title Radiation Chemistry and Its Applications

Publisher United Nations Educational, Scientific and Cultural Organization (1968)

Pages 182

Price $4.00

Reviewer David E. Harmer

This book can be described as a series of "snapshots" of the status of applied radiation chemistry. Each picture is presented by an expert in the field and reflects his individual interests. As a collection of snapshots it is inevitable that many areas of overlapping exist. However, the picture is presented from a little different view by each person.

At first glance, the title of this book could lead to the assumption that it was a textbook of the applied aspects of radiation chemistry. This is not the case, since the publication is a collection of papers from a panel sponsored by the International Atomic Energy Agency in April 1967, together with summaries of verbal discussions and recommendations.

The field has been fairly well explored by panel members who are for the most part active in the application of radiation chemistry. The participants are affiliated with research institutes and universities, none from industrial establishments. Although several chapters contain reviews of fundamental radiation chemistry, the book should not be considered a text or even a comprehensive review of the fundamental aspects. Where these fundamentals occur, it is within the context of background information for the more applied discussions.

As a result of the diversified authorship, much information is packed into the book. However, this information is in many respects lacking the organization found in a unified textbook or review. Moreover, some chapters are very much more readable than others.

The personal approach to each chapter has given insight into the individual opinions and views of the authors. As examples, one author has claimed that the use of a linac could mean an economic breakthrough because "it is simply easier to obtain a good utilization of the radiation." In another case, one author insists that there is a separate branch of radiation chemistry to be found in low temperature reactions, and has made this decision on the basis of temperature rather than on the basis of solid state as has been conventional in the field. On the other hand, the individual treatment of chapters brings out some gems of personal information. By way of example, there is the contention that preirradiation of copper-modified ferrous dosimeter solution will stabilize it for several days.

The organization of the book places summaries of formal papers, general discussions, and recommendations at the beginning. The reader may find more meaning in these