Nuclear Chemistry, Vol. II. Edited by L. Yaffe, Academic Press, New York, 1968. $22.00.

Volume II of *Nuclear Chemistry* completes the two-volume set that has as its ambitious aim the exposition of most, if not all, of the research that is of interest to nuclear chemists. Because Vol. I was also reviewed by us [*Nucl. Sci. Eng.*, **34**, 349 (1968)], we shall make a few general remarks before discussing Vol. II.

The review articles are scholarly, broad in scope, and well written. Their main shortcoming lies in the fact that many of them were completed in 1965, with few additions having been made in proof. The absence of very recent developments is apparent in many of the articles and is most glaring in those that deal primarily with techniques and instrumentation. A time interval of less than three years between writing and publication would have been desirable.

Volume II begins with Chapter 7, "Nuclear Fission," by J. E. Gindler and J. R. Huizenga. It presents an excellent, exhaustive review of the subject; i.e., eleven pages alone are devoted to references. Each step of the complex fission process is discussed in a well-organized, detailed manner (an amusing error on p. 28 presents data for the exotic reaction, $^{238}He + {}^{4}U$). Unfortunately, two topics of current great interest receive little or no attention: fissioning isomers and the second minimum in the fission barrier.

Chapter 8, by A. G. Maddock and R. Wolfgang, deals with "The Chemical Effects of Nuclear Transformations." A good but brief discussion of the dynamics of various nuclear processes is presented as an introduction to the subject of hot-atom chemistry. Various hot-atom reaction mechanisms, as well as a kinetic theory of hot reactions, are discussed. Much attention is paid to the problem of annealing.

The ninth chapter, "Modern Rapid Radiochemical Separations" by S. Amiel, is a brief introduction to the techniques and methods used to effect rapid chemical separations of various elements. The chapter is ordered according to method, such as volatility techniques, liquid separation techniques, and physical separation methods. Interested readers will necessarily have to consult other treatises on this vast subject.

"Electromagnetic Separator and Associated Techniques," Chapter 10, by F. Brown is an extremely brief review of an experimental technique of especial importance to nuclear spectroscopists. The discussion covers the basic principles of separator technique, descriptions of various types of separators, and the preparation of monoisotopic targets and sources. No mention is made of current "on-line" separator projects in which many nuclear chemists are involved.

Chapter 11, "Computers Applied to Nuclear Chemistry" by D. L. Morrison, is mainly devoted to a detailed discussion of the computer analysis of decay curves and of γ, β, and α particle spectra. But, unfortunately, recent important developments such as the relatively simple analysis of γ ray spectra taken with Ge(Li) detectors, automated emulsion scanning, and on-line and multiparameter experiments are barely mentioned.

The last chapter, "Nuclear Chemistry of the Earth and Meteorites" by O. A. Schaeffer covers only a few of the topics implied by the title. Of interest are discussions of the heat from radioactivity in the earth's crust, of age determinations with terrestrial and meteoritic samples, and of the use of meteorites as probes of cosmic ray intensities in the solar system.

In conclusion, although some of the chapters would clearly benefit by including discussions of recent developments, we believe that *Nuclear Chemistry* does contain a wealth of information and recommend it as a very useful reference book.

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Radiation Chemistry. Vol. I, Advances in Chemistry Series 81, 616 pp, $16.00; Vol. II, Advances in Chemistry Series 82, 558 pp, $16.00, American Chemical Society, Washington, D.C. (1968).

The development of high-current pulsed electron accelerators provided a powerful tool for studying radiation-induced chemical reactions. The first decade of progress in pulse radiolysis was marked by an international conference on radiation chemistry sponsored by the Argonne National Laboratory in August 1968. The conference brought together about 200 prominent radiation chemists from 21 countries, representing 81 universities and research establishments. One hundred and eleven papers were presented, 77 of which are published in these two volumes along with abstracts of the other 34 papers. Unfortunately, the discussion, which often provides the best insight on current developments, interests, and thoughts of the participants, is not included.

The papers were submitted well in advance of the meeting (around the first of the year) and the books were available at the meeting. The papers were supposedly refereed according to ACS editorial standards and most are of high quality, although some seem to be more of the nature of a preliminary report. Most of the abstracts of oral presentations are informative, but some present little more than the title. While the conference was held to celebrate Argonne National Laboratory's participation in a decade of pulse radiolysis, it covered all phases of radiation chemistry ranging from theoretical to the experimental study of macromolecules and polymers. The multitude of papers is divided in such a way that Vol. I includes those on aqueous media and molecules of biological significance, plus a few papers on dosimetry. Volume II contains papers on gases, organic liquids, and solids.

About a third of the papers deal with pulse radiolysis studies. Many laboratories are now equipped to study transients that survive more than a microsecond. The intermediate is usually detected by its absorption spectrum, although conductivity, esr, and luminescence measurements have also been used. A microsecond is a long time after the initial act of energy absorption, which requires only 10^{-15} sec or less. However, many of the important intermediates such as triplet states of aromatic molecules, ions in polar systems, and free radicals can be observed on this time scale. The hydrated electron, for example, has a lifetime in pure water at pH 7 of > 200 μsec