Ewan's article is, as stated, predominantly a status report on utilization of semiconductor detectors in nuclear physics applications with particular emphasis on the newest area of gamma radiation detection with relatively large volume lithium drifted germanium spectrometers. The basic semiconductor theory involved is treated in cursory fashion as is the associated instrumentation requirement. The article collects a number of useful tabulations and nomographs of interest to anyone using semiconductor spectrometers. It specifically does not concern itself with any of the witchcraft involved in the spectrometer fabrication area but does provide a very complete bibliography for readers with such interests.

The paper by Alväger and Uhler is very complete and, to a much greater extent than the other two in this volume, is concerned with the practical details involved in actually carrying out isotopic separations electromagnetically. Questions of ion sorcery, beam formation, magnetic design, sample collection, etc., are treated in detail. This article provides a very useful compendium of technical details in addition to a brief but complete historical introduction and a description of state-of-the-art devices such as the new on-line mass separators used in the study of fragments from accelerator targets. It will be useful not only to the mass spectroscopist but also to anyone concerned with problems of ion beam formation and handling.

One of the outstanding features of this volume is the excellent set of bibliographies appended to the articles. It is gratifying to find that in each article the relevant literature has been surveyed almost to the date of publication; this is unfortunately rare in most multi-author volumes, reflecting the usual difficulties in obtaining all manuscripts at roughly the same time.

Despite the excellence of its three articles, the volume exhibits one of the all-too-prevalent defects of Progress series. It would be a rare scientist indeed who would find all three of the articles of direct interest. Recognizing the difficulty of finding and coordinating appropriate authors, it would nevertheless appear very much worthwhile to work toward more related topics in any one volume with perhaps separators, bubble and spark chambers, storage rings, etc., in one volume and semiconductor detectors, ion sources, new nuclear accelerator designs, etc., in another. This problem of heterogeneity is very much accentuated in a Progress series devoted to instrumentation as opposed to one concerned with research progress in a broad field where the heterogeneity could be advantageous in broadening horizons and breaking down specialization.

In a mechanical sense, the volume is extremely well produced and a pleasure to read. One of the authors, G. T. Ewan, might well have cause to complain, however, since he appears as G. T. Evans on the dust jacket and as G. T. Owen in Farley's Preface!

D. A. Bromley is Professor of Physics and Director of the A. W. Wright Nuclear Structure Laboratory at Yale University. Chairman of the National Academy of Sciences Committee on Nuclear Science, a member of the Council of the American Physical Society and of the Executive Committee of the National Research Council Division of Physical Sciences, and a Director of the United Nuclear Corporation, he has worked extensively in research in nuclear structure and nuclear reaction mechanisms utilizing particularly ^{3}He and heavy ion projectiles; he has been actively involved in the development of new nuclear physics accelerators and, with J. M. McKenzie, fabricated and used the first germanium surface barrier detectors in nuclear reaction studies as well as the first room temperature semiconductor detector—a silicon surface barrier unit.

WILL BRUSSELS SPROUT?

Title Preservation of Fruit and Vegetables by Radiation

Publisher International Atomic Energy Agency, 1968

Pages 152

Price $3.00

Reviewer D. K. Salunkhe

This small book emphasizes the practical side of radiation preservation of fruits and vegetables. The subject matter is divided into twelve chapters with specific viewpoints of practical application—each one amply documented. In addition, there is a fine chapter on summary, conclusions, and recommendations.

In my opinion, the book represents a broad and fascinating new field. The subject matter is written by various authorities in their fields in a clear and interesting style without diluting the scientific information. This book will be useful to professors and students of horticulture and food technology and also to personnel in the food industry.

The International Atomic Energy Agency and Food and Agricultural Organizations of the United Nations must be congratulated for this excellent and timely book.

For the past 15 years, Dr. Salunkhe (PhD, Michigan State, 1951) and his co-workers have conducted extensive research on radiation effects on fruits and vegetables and authored many papers on radiation preservation of fruits and vegetables. One of his review articles, "Radiation Effects on Fruits and Vegetables," Economic Botany, 18, 28, 1960, was selected as an outstanding article in biological journals in that year. He is considered as one of the pioneers in the field of radiation pasteurization of fruits and vegetables.

WELL WORTH YOUR DINARS AND RIELS

Title Operation and Control of Ion-Exchange Processes for Treatment of Radioactive Wastes

Publisher International Atomic Energy Agency, 1967

Pages 147, 31 fig., 27 tables

Price $3.00

Reviewer Friedrich G. Helfferich

To assist in providing guidance, mainly for developing member states, for treatment of radioactive wastes, the IAEA has commissioned books on the three principal waste-treatment techniques: precipitation, evaporation, and ion exchange. The

book on ion exchange, the subject of this review, has been ably compiled by L. A. Emelity, of the University of California's Los Alamos Scientific Laboratory.

At a bargain price, this booklet provides a valuable source of basic information. No knowledge of ion exchange and only a rudimentary acquaintance with physical chemistry and chemical and nuclear engineering is expected of the reader. An introduction and a brief historical review outline the problem of disposal of wastes from various types of reactors (7 pages). In a lucid manner, the principles of ion exchange, the structure and synthesis of ion-exchange materials (including membranes), and the limitations of such materials are surveyed (19 pages). The main chapters deal with application to waste processing (26 pages) and operating procedures and experiences (13 pages). A short chapter on cost calculations follows (6 pages). The presentation is supported by 65 pages of appendices and tables, 101 literature references, and an additional bibliography of 93 entries.

The treatment of the basic facets of ion exchange follows standard texts. The author skillfully manages to convey, in a well-organized and logical manner, the most significant aspects without burdening the reader with too much detail. The approach to applications of waste treatment is less systematic but equally informative. The discussion of methods—batch, fixed-bed, moving-bed, electrodialysis, and centrifuge operations—is relatively brief but well done and is abundantly supplemented by detailed examples of technical installations. The copious tabular material includes: a table of properties of ~300 ion-exchange materials from clay minerals to resins of Czech and Hungarian manufacture, properties of the principal radionuclides in waste solutions, and lists of reactors using ion-exchange processes. The enchanted reader will also find conversions, e.g., of degree Baumé to other concentration units, of atmospheres to feet of H_2O at 60°F, of ounces (British fluid) to cubic inches, and of dollars to Jordanian dinars or Cambodian riels. Should he not have known before, the glossary defines for him "radioactivity" and "electrolyte."

The only shortcoming somewhat impairing the value of this commendable treatise is the lack of an index. A few minor weaknesses are: the treatment of kinetics (pp. 15-16) fails to provide a feeling of how long it will take to approach equilibrium in given cases; the structural formula for zirconium phosphate (p. 24) is incorrectly reproduced and outdated; most column experts will take issue with the peremptory pronouncement that, universally, the optimum flow rate is 0.27 bedvolumes/min (p. 52); the explanation of what happens in counterflow regeneration (p. 59) is incorrect; misprints, otherwise remarkably rare, have sneaked into some calculations and equations (e.g., pp. 56 and 60); the example of cost calculation (pp. 80-84) is too complex to be of value for the casual reader, yet too crude to meet process-engineering standards. The bibliography, apparently intended as a list of recommended reading, is slightly haphazard; thus, Kitchener's and Salmon and Hale's eminently readable short monographs are not listed whereas Orborn's obsolete one is, and a fair number of the papers and agency reports are too specialized for the expected readership of this book.

These critical comments on minor points should not detract from the value of the book. The aim of providing basic guidance for the relative newcomer has been admirably achieved by the author. At its bargain price, the book can also be recommended as supplementary reading for the more experienced nuclear engineer.

Friedrich G. Helfferich, a native of Germany, received degrees in chemistry from the Universities of Hamburg and Goettingen. His scientific career includes research positions at Max Planck Institute, MIT, and Caltech., and lecturing at U of C, Berkeley. With Shell Development Company since 1958, he supervises the Industrial Chemicals Division's long-range process-engineering group. His specialty is quantitative chemical kinetics and its application to process design. Inventor of the ligand-exchange separation method and the tracer-pulse technique for chromatographic determination of multicomponent phase equilibria, he had developed a general theory for chromatographic behavior of interfering solutes. He is best known, however, for his earlier work on ion exchange and as the author of a standard text on this subject.

ISODOSE ATLAS

Title Atlas of Radiation Dose Distributions, Vol. III, Moving Field Isodose Charts

Authors K. E. Tsien, Jr., J. R. Cunningham, D. J. Wright, D. E. A. Jones, and P. M. Pfalzner

Publisher International Atomic Energy Agency, 1967

Pages iii + 57, 168 charts

Price $15.00

Reviewer Harold L. Atkins

This volume is the third of four planned publications by the International Atomic Energy Agency in the field of radiation therapy isodose charts. The two previously-issued volumes dealt with single-field and multiple-field isodose charts. The projected fourth volume is to deal with brachytherapy. A number of institutions and individuals have cooperated in assembling the data. The effects of field size, penumbra, locus of axis of rotation, angle of rotation, body size, and radiation energy are all considered.

With the increasing utilization of high-energy radiation sources throughout the world, particularly ^{60}Co teletherapy sources, the data presented in this volume should be especially useful. Physical data related to moving-field therapy are needed, particularly in those institutions where adequate consultation with radiologic physicists is not possible. While the material included in this volume cannot be applied directly, it should serve very well as a reference for checking dose distribution calculations in a particular problem. The loose-leaf format is especially useful in this regard.

An authoritative discussion of the principles involved in moving-beam therapy, as well as a moderately extensive list of references, should