Nuclear Electronics. Proceedings of the Belgrade Conference of May 1961, sponsored by the International Atomic Energy Agency. Distributed by the National Agency for International Publications, Inc., 801 Third Ave., New York 22, N.Y.

Volume I—Scintillation and Cerenkov detectors, image intensifiers, photomultipliers, luminescent chambers, gas and liquid filled detectors, semiconductor radiation detectors. 610 pp. $11.00.

Volume II—Multichannel analyzers, data handling systems, amplifiers, coincidence circuits, etc. 468 pp. $8.00.

Volume III—Nanosecond circuits and systems, accelerators, health physics instrumentation, misc. 531 pp. $11.00.

Nuclear research and nuclear engineering depend on instrumentation, much of which is special. The IAEA has performed an important service in sponsoring symposia on instrumentation every two years or so. This meeting was directed primarily to instrumentation for research, though many of the papers will be of interest to anyone concerned with nuclear instrumentation. These three volumes will surely be very useful for references, and even though two years out of date, I still discover new ideas in them.

One cannot hope to review 150 papers in a reasonable amount of space. What I have tried to do is to give some idea of the scope and to call attention to some of the papers that seem to me to be of special interest.

Basic to nuclear instrumentation are the radiation detectors. The scintillation symposia in this country provide an up-to-date survey every two years. The 60 papers of Volume I devoted to this subject supplement the scintillation symposia. There are five basic papers on scintillators, five important papers on scintillation neutron detectors (including one in Volume III), and a couple of good papers on Cerenkov counters.

There is a fine collection of papers on track imaging systems, a variety of interesting spark chamber designs, and an assortment of unusual detectors including the flexible GM tubes developed by Richter and Ballard.

There is an excellent set of papers on semiconductor radiation detectors, many of which are still of interest in spite of the rapid developments in this field, e.g., the article by Heerschap and de Coninck on SiC for use in a reactor.

Much of the material on multichannel analyzers and data systems is becoming dated. However the section called "Classical Electronics" presents a number of very interesting circuit ideas and is to me the most stimulating part of the record. The nanosecond circuit papers presented an excellent survey of the field which is still reasonably up to date.

A few accelerator papers and a set of interesting papers on radiation monitors completes the list.

This was a well organized and very constructive meeting. It is too bad that it takes so long to get the papers published.

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(About the Reviewer: W. A. Higinbotham is a fellow of the American Nuclear Society and head of the Instrumentation Division, Brookhaven National Laboratory. He is also a fellow of the Institute of Radio Engineers, American Association for the Advancement of Science, and the American Physical Society. He is a past chairman of the Federation of American Scientists and has been active on international committees on Security, Disarmament, and Peaceful Uses of Atomic Energy.)

Nuclear Instruments and Their Uses, Vol. 1. Ionization Detectors, Scintillators, Cerenkov Counters, Amplifiers: Assay, Dosimetry, Health Physics. ARTHUR H. SNELL, ed. Wiley, New York,

Composing this book was a major project of the Subcommittee on Instruments and Techniques of the Committee on Nuclear Science of the National Academy. As a member of that subcommittee I must explain that our contribution was zero or negative. The results are entirely due to the authors and the editor.

Chapter 1, "Ionization Chambers and Proportional Counters," is the best treatment of this subject that I have seen. It is highly recommended to those who are about to use or are learning to use these detectors for careful measurements. The basic principles and the many specific problems are carefully explained. There is enough specific data on selection and purification of gases, on construction, etc. for most applications. And there is an excellent list of references. The authors are W. Franzen of B. U. and L. W. Cochran of the University of Kentucky.

There are available several good books and many articles on scintillation detectors. R. B. Murray's chapter is an excellent review and brings the subject up to date. Again there is a wealth of practical information and a current bibliography.

The other chapters are: "A Survey of Cerenkov Counters," by Burton Moyer, "Electrometers and Amplifiers," by Ed Fairstein, "Counting Methods for Assay of Radioactive Samples," by Ellis Steinberg, "Radiation Dosimetry," by Hurst and Ritchie, and "Health Physics Topics," by K. Z. Morgan. I have had a preprint of Fairstein's chapter for several years and it has been most useful to our group. It treats electrometers and vacuum tube pulse amplifiers and includes a lot of very useful data on tubes which were taken at Oak Ridge. I hope Ed will write a book on transistor pulse amplifiers soon. I also find the chapter on dosimetry very useful.

The book was directed toward the small and middle sized radiation laboratories. I am sure they will find it most useful and many will appreciate the Morgan chapter on health physics.

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(See previous book review for information about Reviewer)

Reactor Safeguards. By C. R. RUSSELL. A Pergamon Press Book, The Macmillan Company, New York, 1962. 390 pages, Approx. $15.00.

The present volume, concerned with safety practices of reactor location and design, is addressed to all who are interested in the subject of reactor safeguards. It will be a disappointment to the designer looking for a working handbook or a compilation of solutions to design problems for a practical reactor. Many controversial problems such as limits of heat flux, ductile-brittle transitions, radiation aging, to mention a few, are not found in the discussion.

Although the subject of reactor safeguards is too broad to be treated in detail in a single volume of 390 pages, I believe the book will be useful to those looking for an introductory survey of the subject. In essence this book is a narrative account of the reactor safety review procedures as they have been developed by the U.S. Atomic Energy Commission. This aspect of the book is accurate and well prepared, drawing as it does on the author's experience as Secretary to the Advisory Committee on Reactor Safeguards. However, it does not describe in comparable detail the approaches to reactor safety analysis used by the U.K. Atomic Energy Authority, the French Commissariat A L'Energie Atomique, or other national agencies that are equally effective.

There are ten chapters dividing the subject into specific topics, but not all of these topics are treated with the same degree of detail (as stated in the preface). This disparity unavoidably creates an impression of relative importance which may not have been intended by the author. Chapter 2, after an introductory chapter describing the chronology of the development in safeguards for reactors, is an extended discussion of fission product yields, secular equations, chain lengths, decay heat, etc., without identifying the significant hazards or the problems introduced by individual considerations. The discussion on kinetics in Chapter 3 is adequate for an introductory text, but only an oblique reference is made in passing to the important subject of temperature effects of reactivity by Doppler broadening of resonances. Again there is only a limited amount of material relating the treatment of kinetics with reactor hazards. In Chapter 4, "Controls and Safety Systems," the author emphasizes the safety aspects of reactor design. The development of the subject is based on a mechanical or systems approach with no reference to the problems of materials. The description on containment in Chapter 5 is good as far as it goes, but it is unfortunate that no mention is made of containment techniques under development such as pressure suppression, independent double layers, and other engineered safeguards that offer a promise of alleviating the siting problems for future reactors. No distinction is made between containment by impenetrable barriers and confinement by filtration.

Chapter 6, dealing with the safety features of water reactors, is an overemphasis of a specific reactor design. It is true that more information exists on the details of excursion in boiling water reactors through the SPERT program than for other types, but it can be argued that a chapter heading of this type ought to be paralleled with others entitled "Safety Features of Gas-Cooled Reactors," ". . . of Sodium-Cooled Reactors," ". . . of Deuterium-Moderated Reactors," and other examples that each can supply from his own prejudice.

Chapter 7 on atmospheric dispersion is an example of detail in excess of that required for the treatment in this volume. Revealing this reviewer's bias, it is to be hoped that ultimately reactor designs and locations, through guaranteed reliable containment and intrinsic self-regulatory features, will not be subject to the statistical approach of atmospheric dispersion and population exposure. In any event, the detailed discussion in this chapter is not in balance with the other chapters.

Chapter 8, "Extent of Possible Damages," is a regurgitation of existing criteria in a more palpable form than is found in regulatory documents. It has a definite place in an introductory text to the problems to be encountered if reactors are not provided with reliable safeguards. Chapter 9, "Site Requirements," can be placed in the same category of offering no new information, but it serves a useful function of presenting site criteria within the same volume that develops the philosophical basis.

Chapter 10 is devoted to a verbatim reprinting of official accounts of selected reactor accidents. The effect of increased distribution of these accounts can only be positive, but in the description, no attempt is made to draw out lessons to be learned or illustrate the preceding lectures with examples.

There follows several appendices, A through E, which are of historical importance in the early considerations of the first United States Reactor Safeguard Committee to formulate siting criteria and reprints of letters by the successor committee, The Advisory Committee on Reactor Safeguards, giving advice to the U. S. Atomic Energy Commission on the specific problems that were presented for consideration.

The index is detailed but misleading. If one wishes to look up the subject of filters, for example, one finds five pages listed:

1. Page 24 contains a casual remark that the Windscale reactors is (was?) equipped with air filters.

2. Page 98 reports that the X-10 reactor has filtration of the discharge air; the Brookhaven reactor has inlet and exit air filtration.

3. Page 99 is a continuation of the last, giving performance specifications or test results (it is unclear which) of the filters used by BNL.

4. Page 300 reports on a Windscale incident wherein volatile fission products passed through the filters (item 1 above).

5. Page 302, same report, includes some particulate material as passing through the filter.

After looking up the five referenced pages, the reader knows very little, if any, more about the subject of filtration of fission products than he did before opening the book.

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Uranium Metallurgy. By W. D. Wilkinson. Interscience, Division of Wiley, New York, 1962. Vol. I, Uranium Process Metallurgy, 775 pp., $18.00. Vol. II, Uranium Corrosion and Alloys, 733 pp., $16.00.

With relief, if not exhilaration, Dr. Walter Dunbar Wilkinson, Senior Metallurgist of the Argonne National Laboratory International Institute of Nuclear Science and Engineering recently completed some seven years of arduous labor on the two subject volumes. This the reader may surmise from the two prefaces, partially identical, neither very profound. The quest for a uranium mineral for each