Nuclear Radiation Detection. 2nd Edition, (1964). By William J. Price. McGraw-Hill, New York. 430 pp. $12.75.

The author, Dr. William J. Price, is Executive Director, Air Force Office of Scientific Research. Dr. Price has had an extensive background in teaching and research and has personally done research in, among other areas, nuclear radiation detection. As head of the Department of Physics, Air Force Institute of Technology, 1950-1957, he helped to develop AFIT's graduate programs. This book, *Nuclear Radiation Detection,* was developed for use in the Nucleonics Instrumentation course of the Institute.

This is the second edition of *Nuclear Radiation Detection,* the first edition having appeared in 1958. Its general acceptance and the developments that had occurred during the subsequent six years made an updating of material and references desirable. The addition of recent references brings the new total to about 600 and gives the book a favorable currency, a currency which, however, time and the researchers will erode at the usual rate. One of the most substantial changes is the addition of an entirely new chapter on the theory, types, characteristics and applications of semiconductor detectors.

An excellent presentation of the phenomena involved in the interaction of nuclear radiation and matter is presented in the first chapter. It is adequate for the grounding of the non-specialist, and forms a convenient collection of pertinent information for the physicist. The second chapter is a survey of the existing methods of nuclear detection. Taken together, they permit one to "see the forest" quite clearly. The trees are examined meticulously in the later chapters, so that it is possible to enjoy either emphasis by merely turning the pages. Another introductory chapter of a helpful nature is that on statistics of detection systems, in which the author sets forth the minimum statistical concepts required for detection measurements.

An extensive examination of detectors then begins. Principles of operation are discussed, construction is described and illustrated, associated measuring instruments are analyzed, and signal characteristics are explained. Gas-filled detectors—ionization chambers (Ch. 4), Geiger Müller counters (Ch. 5), and proportional counters (Ch. 6) —are explained in detail together with their associated systems. A comprehensive coverage of scintillation detectors follows in Chapter 7, and Chapter 8 is the new chapter on semiconductor detectors. Chapter 9 concerns itself with photographic emulsions, cloud chambers, Čerenkov detectors, chemical dosimeters, and calorimeter methods. A separate chapter is devoted to neutron-detection methods.

The last chapter, "Electronics for Nuclear Radiation," is a treatment of the special circuits involved in detection measurements. This second edition includes some recent transistor circuits. With a modicum of electronics knowledge, one can skip the design considerations and read this chapter profitably for the general picture. The expert in electronics will find useful design information peculiar to this field, commingled with some material already familiar to him. References provide a guide to further specialization.

There are approximately 100 problems given, and as usual they carry no answers. For this the publisher is entitled to the usual silent maledictions of all who purchase the book for self-study. The 250 figures include many tables, graphs and schematics from original journal sources, and there is a wealth of construction detail to be found in the many section views of the detectors. Original figures account for about ten percent of the whole.

Nuclear Radiation Detection demands a little more of the reader than does, say, the usual college text, for there is little attempt to amplify the explanations beyond a forthright simple presentation. The presentation is logically organized, direct and unembellished, the style almost telegraphic in places. It often lacks grace, but it is always lucid. The book is notable for its combination of such a range of information and such specific detailed treatment. Topics are discussed from basic theory to practical detail, supported by a profusion of figures, and are exhaustively referenced. For anyone interested in nuclear radiation detection, this volume will prove a very useful collection of basic information presented at a professional level.

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Received October 19, 1964

About the Reviewer: Frank B. Hall, P.E., received his BSEE from Illinois Institute of Tech. in 1949, and his Jur. D from DePaul Univ. in 1956. His four and one-half years at Argonne National Laboratory have been spent with the Reactor Engineering Div., Instrumentation and Controls Group, and with Particle Accelerator Div., Electronic Systems Group. He has been associated with the EBR-II project and with the Zero Gradient Synchrotron.