

Book Review

Annual Review of Nuclear Science, Volume 17, 1967. Edited by Emilio Segré. Annual Reviews, Inc. (1967). 516 pp.

The *Annual Review of Nuclear Science* first appeared in 1952. Since then it has become a well-established series and, as such, needs no real introduction. The present review contains a dozen chapters. The material is based on literature surveys which closed generally in the first quarter of 1967, and covers topics from "Optical Model of Nucleon-Nucleus Interaction" to "Effects of Ionizing Radiation on DNA." (This last chapter received dual publication, appearing also in the 1967 *Annual Review of Microbiology*, reflecting the interdisciplinary range of nuclear science.)

Between these two are articles of direct primary interest in the field of nuclear engineering—"Thermalization of Neutrons in Condensed Matter" by Beyster and Young and "Materials for High Temperature Nuclear Reactors" by Goeddel and Siltanen. Beyster and Young review briefly the theoretical basis for neutron scattering by condensed systems and the experimental methods for measuring the scattering function. They cover such topics as transient phenomena using pulsed neutrons, the spectrum and differential cross-section measurements in the important moderating materials, and the agreement between experimental measurements and calculations based on the various models of molecular structure. The review concludes with the observation that our inadequate knowledge of the liquid state is hindering our ability to properly represent the thermalization in water. Conversely, the studies of inelastic neutron scattering in water help us to learn more about the molecular structure of this interesting and important liquid. Goeddel and Siltanen review over 200 papers of the recent literature on high-temperature materials. The review is in two sections: one of the materials for high-temperature gas-cooled thermal reactors, and the other on the somewhat different materials and material problems of the high-temperature fast breeder reactors.

Nuclear (as opposed to neutron) physics is represented by an article on "Atomic Beam Techniques" and a survey article on the "Design Characteristics of Typical Particle

Accelerators." Nuclear instrumentation and detection techniques are represented by articles on "Semiconductor Nuclear Radiation Detectors" and an article on "Absolute Disintegration Rates."

Nuclear astronomy is covered in an article on "X-Rays from Stars and Nebulae" and one on "Isotopic Abundance Anomalies in Meteorites."

Rounding out the review are articles on the "Motion of Energetic Particles in Crystals" and on the "Sources of Polarized Ions."

A comparison of Volume 1, covering the literature of 1950, and Volume 17, covering the literature of 1966, shows interesting similarities and differences. In general, the significant areas of interest 18 years ago are still of significance today, although cosmic rays have given way to cosmic x rays. The other significant difference is the length of the reviews. Volume 1 contained more than twice as many individual chapters as Volume 17. The longer reviews of the current volume not only reflect the increase in material to be reviewed, but also reflect the effect of more detailed evaluation and discussion of topics in depth. In general, the current volume is a worthy member of a series which has maintained a valued position in the review literature.

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About the Reviewer: Dick Cohen is now Associate Director of the Science Center/Aerospace and Systems Group of the North American Rockwell Corporation where he has been, in various capacities, since 1949. He received his undergraduate training at Pennsylvania and did his graduate work at Cal Tech. Dr. Cohen is known for his many activities including a continuing reevaluation of the fundamental physical constants. He is a Fellow of the American Physical Society and of the American Nuclear Society, a member of the Editorial Advisory Committee of Nuclear Science and Engineering and the recipient of one of the 1968 E. O. Lawrence Awards.