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## OF CABBAGES AND KINGS

*Title* Advances in Nuclear Science and Technology, Vol. 4

*Editors* Paul Greebler and Ernest J. Henley

*Publisher* Academic Press, Inc., 1968

*Pages* xiv + 394

*Price* $18.50

*Reviewer* J. Chernick

The proliferation of books, journals, and miscellaneous documents in nuclear science and engineering is staggering to one who is trying to keep abreast of the entire field. The specialist has long since given up the attempt and has narrowed his selection of reading material. Bibliographies and review papers are of some help, but in the end one must concentrate on the work of one's peers in his specialty.

The best review books are still those that are painstaking labors-of-love by individual experts. However, the law of demand and supply has led to reviews with a variety of authors and subjects. Examples of the latter are the USAEC's *Quarterly Technical Progress Reviews, Reactor Technology Selected Reviews* in 1964 and 1965, and the continuing annual publications by Academic Press of *Advances in Nuclear Science and Technology*. Since libraries will buy almost any book, there has been a rush by publishers to print in book form the papers presented at almost any conference. By chance, a good paper in your chosen field just might appear in one of these books.

*Advances in Nuclear Science and Technology*, **4** contains articles on 1) gas-cooled reactor technology, 2) a 1000 MWe fast breeder design, 3) the doppler effect in fast reactors, 4) fast reactor meltdown analysis, 5) optimum control theory, 6) perturbation theory, and 7) industrial uses of ionizing radiations. The authors are respectively 1) H. B. Stewart, C. L. Richard, and G. B. Melese, 2) K. P. Cohen and G. L. O'Neill, 3) R. B. Nicholson and E. A. Fischer, 4) R. A. Meyer and B. Wolfe, 5) J. Lewins and A. L. Babb, 6) J. Lewins, and 7) S. Jefferson, R. Roberts, F. J. Ley, and F. Rogers.

The authors are all recognized experts and make a careful attempt to bring the state of the work in their topic up to date. However, the tendency for review papers to become rapidly dated is shown by the fact that the General Atomic paper does not include recent experience on Peach Bottom, and the General Electric BeO moderated fast reactor design does not include the effect on their design of the recently discovered uncertainties in the capture-to-fission ratio of plutonium at intermediate energies. The paper by Nicholson and Fischer lacks a quantitative discussion of the influence of different spin states for $^{239}$Pu resonances, while the work of Meyer and Wolfe fails to include important recent work such as that of Moss and Rhoades of Atomic International.

Despite such shortcomings, the above papers on fast breeders and advanced gas-cooled power reactors are all thorough critical reviews that are well worth reading.

In addition, the book contains a balanced review of industrial applications of ionizing radiations by a team from the AERE Wantage Research Laboratory. Finally, the two articles, involving J. Lewins as an author, review work using bang-bang theory on reactor control problems, and some possible extensions of perturbation theory including the formulation of perturbation theory for heterogeneous systems.

*Jack Chernick is a senior physicist and Associate Head (for theoretical physics) of the Reactor Physics Division at Brookhaven, where he has been since 1947. An alumnus of the University of Chicago and of Brooklyn College, Fellow of the ANS, and a member of both the Editorial Advisory Committee for* Nuclear Science and Engineering *and Brookhaven's Scientific Council, he has authored numerous papers on reactor physics theory.*

## LUCID, AUTHORITATIVE, AND CURRENT

*Title* Progress in Nuclear Techniques and Instrumentation, Vol. III

*Editor* F. J. M. Farley

*Publisher* North-Holland Publishing Co., 1968

*Pages* 3 + 255

*Price* $13.50

*Reviewer* D. Allan Bromley

This slim volume maintains the high standard that Farley has established for this Progress series. It comprises three articles: by B. W. Montague, of CERN, on Radio Frequency Separation; by G. T. Ewan, of Chalk River, on Semiconductor Spectrometers; and by T. Alväger and J. Uhler, of the Swedish Research Institute of National Defense, on Electromagnetic Isotope Separation for Laboratory Purposes. These four authors are internationally recognized experts, and their articles are lucid, authoritative, state-of-the-art presentations.

In Montague's case, the discussion is focused on the future inasmuch as only three radio frequency separators have yet been realized (and two of these at CERN and Brookhaven are essentially identical). He provides an excellent introduction to separator theory based on the discovery of the previously unsuspected solution to Maxwell's equations—surely considered to have been among the most thoroughly understood physical situations!—leading to the hybrid $E_{11}/H_{11}$ separator cavity mode and discusses its practical applications. Particularly useful is the discussion of limitations of various designs in terms of transmission, maximum momenta, etc. This article is essential reading for anyone seriously interested in the rf separation problem in elementary particle physics.