uranium refining are presented in block diagrams. The authors stress the older, more conventional aqueous extraction and precipitation methods for uranium purification. The modern techniques involving ion exchange and solvent extraction are discussed only briefly and in a manner which lacks authoritativeness. The production of uranium tetrafluoride by precipitation from aqueous solution is described in some detail.

One short chapter devoted to the production of the oxides of uranium contains little useful information. The authors have missed completely the common method for large-scale production of uranium trioxide by thermal decomposition of uranyl nitrate. In another chapter which discusses the gas/solid reaction schemes employed for many years in the U. S. and elsewhere for the production of uranium dioxide and uranium tetrafluoride, the authors appear to have only sketchy knowledge. These schemes are referred to in the book as new methods which " . . . have been appearing in the literature recently." The authors are similarly unaware of the importance of the newest method for producing refined uranium hexafluoride by fractional distillation of crude uranium hexafluoride made from ore concentrates. The book displays little understanding or appreciation for the most modern technological methods, such as the use of the fluidized bed for the production of uranium compounds. The authors confuse fluidized beds with moving beds in some descriptions.

Although the book is weak in the areas mentioned above, it contains a good review of the aqueous separation chemistry of uranium. It can serve as a useful reference for research and process workers concerned with the extraction of uranium from its ores, and for analytical chemists and others interested in the separation of uranium from various materials.

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Heavy Water Lattices. Report of a Panel held in Vienna, 18-22 February 1963. International Atomic Energy Agency, Vienna 1963. Distributed in U. S. by International Publications, Inc., New York, New York 10016. $13.00; 647 pp.

Among the oldest of topics in reactor physics, the study of heavy-water lattices does not reflect the confidence felt by those working with light-water systems. This second panel report is more than four times the size of the first panel report (published in 1960) and represents a large increase in experimental and theoretical investigations of heavy-water lattices. Were heavy-water design methods as well documented as the light-water methods we should expect a decrease in report size. It is now apparent that in the period 1960-1963 considerable progress was made and future reports will, hopefully, be more specialized if not thinner.

The report is divided into three major sections prefaced by a general summary by the panel chairman, R. Ramanna. The first section, "Status Reports" consists of ten papers which review the depth and scope of various national programs of heavy-water-lattice study. These papers are, of course, largely descriptive and they serve to illustrate the wide variations in lattice designs in use or under study. If there is any conclusion to be drawn from these papers it is that the versatility of D_2O as a moderator is being fully exploited; this is a major source of trouble in arriving at self-consistent widely applicable design methods.

The second section, "Summary of Discussions" is much too brief for so important a subject. All six papers are only one to two pages in length, and each is intended to cover a major topic on the conference agenda: techniques for lattice evaluation, calculations of lattice parameters, summary of computing techniques, neutron spectra, power, temperature and void coefficients, and burnup physics. With only seven months between the conference and publication of the report it would be unreasonable to expect a major review of the discussions, but the summaries here are too brief to do more than report sketchily the background for the panel's recommendations.

As it stands, this report is no substitute for a thorough, analytical review of the technical papers presented. Indeed the third section's title, "Supporting Papers" begs the question: "Supporting what?" is the query—there is no substantial superstructure to be supported. There are twenty-four papers, plus two abstracts, in this section. Of these, the first is a review of recent experience at Chalk River. The next is a review of work performed at the AQUILON facility. With exceptions

for the reports of the EACRP recommendations and Blagovolin's review of methods used in the USSR, all the remaining papers are of the type usually published in scientific journals.

Under these conditions the reader is left to make his own technical review, however much he may have expected to find one in this book. A group of British papers by Hicks, Leslie and Terry, and Newmarch furnish a sound presentation of theoretical methods; Crandall, *et al.* have written a critique of experimental physics studies which is most welcome in this field.

Crandall's paper (as well as Spinrad's remarks) points out that there is a growing sophistication in the presentation of experimental data. Nevertheless, bucklings are still referred to as measured (presumably with an inverse square meter) but some data as to the type of traverse actually made are frequently included. Fission and cadmium ratios are much more frequently quoted now than the related quantities, ϵ and p. Often, a defining equation is given. Nevertheless there is still a deplorable tendency to refer to a measured value of f.

It is to be hoped that publication in regular scientific journals will not be neglected in favor of reports such as this for technical work not of a review nature. On the other hand, the existence of this report demonstrates a growing need for a journal of reviews even though this function is ill served in the present instance.

In summary, this Second Panel Report is a valuable reference for reactor physicists concerned with methods and experimental data on D_2O systems. Use as a reference requires, however, much critical analysis and cross referencing between articles.

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