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Book Reviews

Programming and Utilization of Research Reactors. Proceedings of a Symposium held in Vienna, October 1961, Published for the International Atomic Energy Agency, Academic Press, London, New York, 1962, Vol. 1, 328 pages, $9.00; Vol. 2, 528 pages, $15.00; Vol. 3, 503 pages.

When we first used neutrons, in 1935 at Heidelberg, working under Walther Bothe, our source had a strength of about 10,000 neutrons per second. Most of the 200-odd research reactors in the world emit more than 10^{16} neutrons per second from their surface, and it seems strange that a conference should be necessary on What to Do with My Reactor. Yet, the Symposium on Programming and Utilization of Research Reactors in Vienna, arranged by the International Atomic Energy Agency, with its three volumes of proceedings, was followed by smaller conferences on the same topic in Bankok, in Athens, and now in Brazil; and research-reactor programs are a problem not only in developing countries.

There are three main reasons for the research-reactor headache. First, the safe operation of the reactor, and the control and measurement of fluxes and radiations, pose a number of problems that are common to all reactors and require the attention of an operating staff that, in most cases, has not had too much previous experience. Second, the potential usefulness of the reactor, and the experimental techniques that are appropriate in applying it to problems in many fields, are not well known to most people working in scientific areas where the use of reactor radiations would be helpful. Third, it is not wise to put up a reactor station and then tell the director to make a program for it. A reactor is one tool in research. It does not produce its own problems: the problems should come from other fields, and be worked out by people who have specialized in those fields and know what is needed to promote them.

The proceedings of the Vienna Symposium are a great help in the first two of our three points, and we think they are of lasting value to everybody who is seriously interested in research reactors. Specialists, among them many leading experts from many countries including the Soviet Union, discuss reactor planning, reactor operation and uses under the following headings: Problems in Establishing Nuclear Research Centers and Staff Training; Organization of Reactor Centers; Experience in Utilizing Research Reactors (all of Volume 2); Reactor Engineering and Reactor Physics; Nuclear and Solid State Physics; Radiochemistry, Radiation Chemistry and Reactor Chemistry; Isotope Production and Research in Agriculture, Biology and Medicine. There is a multitude of ideas, viewpoints, and experiences on reactors of all sizes except the very big ones, and there are lively discussions in an international spirit. The reader, like the participants of the conference, has a rare opportunity to compare methods and ideas in various countries, and to get a feeling of a common cause.

The last chapters, which should settle our third point, must fail to achieve their aim even though they contain a wealth of interesting material. It is not possible to present a program in nuclear physics or in radiochemistry without going very deep into these fields. It would have helped if there had been more invited papers. But each of those, again, would have interested only a minority of the participants. The only good solution is to hold topical conferences where all the specialists in a field and those interested to enter the field discuss common problems.

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Atomic and Nuclear Physics, Theoretical Principles. By H. D. Bush. Iliffe (London), Prentice-Hall, Inc. (Englewood Cliffs, N. J.), 1962. 218 pp., $8.95.