6. Raman scattering
7. trap analysis by the double correlation technique of deep level transient spectroscopy (DDLTS) in the range from as-irradiated up to ~600°C

is of never ending interest and therefore reported in great detail by the third group mentioned at the beginning. Besides the improvement of measurement equipment and the advent of new systems, the change of the silicon quality justifies a continuous investigation in the sense of material characterization and, as a consequence, establishment of the specification parameters of a well-defined starting material creating an advanced device technology. To show the trend, this year's conference has been organized by the U.S. National Bureau of Standards, Washington, D.C., and in January 1984, the next will be joined to the American Society for Testing and Materials conference.

Heinz Herzer studied physics at the University of Heidelberg where he received the degree of Diplom Physiker in 1967, and in 1971 the degree of Dr. rer. nat. He performed experimental work on ion implantation into silicon and germanium and the fabrication of semiconductor detectors for nuclear radiation at the Max Planck Institute for Nuclear Physics at Heidelberg from 1966 to 1973. He was a research associate from 1971 to 1973.

In 1973 he joined Wacker-Chemitronic and has been working on float zone silicon development and material characterization. In the past six years he completed various projects on the growth of large diameter float-zone crystals, float-zone silicon for extraterrestrial solar cells, and silicon NTD. Herzer was an advising member of the Spacelab Committee in the Ministry for Research and Technology at Bonn from 1973 to 1975. In 1977 he was chairman of the Third International Symposium on Silicon Materials Science and Technology in Philadelphia. In March 1979 he was appointed manager for float-zone silicon at Wacker-Chemitronic.

Nuclear Engineering for an Uncertain Future

Author	Keichi Oshima, Yoshitsugu Mishima, and Yoshio Ando
Publisher	Plenum Publishing Corporation, New York (1981)
Pages	260
Price	$45.00
Reviewer	John M. Christenson

This book contains the edited texts of papers presented at an international symposium on "The Role of Nuclear Engineering for an Uncertain Future." The symposium was held in Tokyo in late 1980 on the occasion of the 20th anniversary of the Nuclear Engineering Department of the University of Tokyo. The 14 papers are all by internationally recognized experts in their fields and are organized under six topics: international cooperation, an acceptable fuel cycle, engineering philosophy on safety, breeder reactors, fusion technology, and nuclear engineering and technical innovation. The volume concludes with a 17-page record of a panel discussion on the future role of university nuclear engineering education and research.

The papers are interesting and well written (all in English) and provide an excellent overview of the current status of most aspects of the energy production applications of nuclear technology. The level of the presentations is surprisingly uniform and should be readily understandable to anyone with a technical background. One of the strengths of the book is the perspective it provides. The authors of the papers are nearly evenly divided between Europe, Japan, and the United States. For example, following Manson Benedict's fuel cycle paper is a paper by Cyril Buck on European fuel reprocessing technology, and this is followed by a paper by Ryohei Kiyose on Japanese fuel cycle developments. Although the information presented is probably common knowledge to most fuel cycle specialists, I do not know of any place else where such an international overview is readily available to the nonspecialist. Similar remarks can be made about most of the other presentations, particularly those on reactor safety, fast breeder reactors, and fusion technology. Of particular interest to this reviewer was the American reaction to the Three Mile Island accident (T. H. Pigford) and the contrasting European perspective (A. Jahns). Such balance can hardly be accidental and the organizers of the symposium are to be commended for producing a worthwhile review of the current status of nuclear technology in many parts of the world.

What is the message of this book about the uncertain future? All of the authors are positive about the role of nuclear technology, and readers of this journal will doubtless share their view, at least in the long term and in the world perspective. However, as W. Kenneth Davis states in the leadoff paper, "Despite the . . . advantageous factual case . . . nuclear power is in critical shape in the United States and is having a variety of difficulties in many other countries." Today, over two years later, one could still make the same remark, and I believe that Davis would agree that most of the problems described in his paper still exist. However, some progress has been made, even though at times it seems agonizingly slow. Perhaps that is the message: the times are critical and the evidence of the last two years does not indicate that this state of affairs is likely to change rapidly. Even so, nuclear power is a well-established technology that continues to survive and to produce an increasing fraction of the world's electric power. If these circumstances continue then perhaps the uncertain future will eventually lead to a new nuclear era.

John M. Christenson has been a faculty member in the Department of Chemical and Nuclear Engineering at the University of Cincinnati since 1970. In 1973 he was an ASEE-Ford Foundation industrial resident with Northern States Power at the Prairie Island Nuclear Generating Plant. On academic leave in 1979, he was a member of the Reactor Safety and Control Division of the Halden Reactor Project. He has served as a consultant for several national laboratories and nuclear utilities. His current interests are in the areas of applied reactor analysis, the determination of reactor operability rules, and the medical applications of nuclear technology.