is rather easier to understand than this 23-page summary. The final chapter on wave scattering treats this matter in a very interesting way, although being short it cannot deal in depth with any of the areas touched upon.

The book is translated into English in masterly fashion by H. S. H. Massey, one of the leaders of the plasma-physics field, from a Russian book published in 1964.

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Electronics and electron physics

ADVANCES IN ELECTRONICS AND ELECTRON PHYSICS. VOL. 23. L. Marton, ed. 490 pp. Academic Press, New York, 1967. $22.50

by Gerald Rothberg

This volume contains articles on superconductivity, magnetic fields, plasmas, semiconductors and image intensifiers. Despite the wide range of topics, L. Marton and his editorial board have done an outstanding job in presenting articles that are uniformly good in exposition. The more device-oriented articles impress me, an experimentalist, as being truly *useful* in that they discuss the real problems of interest to specialists. In addition the first few pages of each article are introductory material that on the whole provides excellent perspective on the significance of the topics discussed and a survey of the theoretical concepts involved. These introductions could be especially valuable in broadening the background of graduate students.

There are two articles on superconductivity: E. A. Lynton and W. L. McLean, "Type II Superconductors," and C. Laverick, "Superconducting Magnet Technology;" the latter, by the way, unfortunately is not included in the table of contents. The relatively short article by Lynton and McLean is a summary of theory with an emphasis on physical models. An appendix contains a particularly lucid discussion of the Gibbs and Helmholtz free energies in the presence of a magnetic field. The article by Laverick is a survey of current practices and problems in superconducting-magnet design with detailed discussion of some recent magnets. Among the topics covered are magnet materials and conducting-cable design, refrigeration, pulsed magnets and the economics of large magnets. On page 388 the author states erroneously that superconductivity is an example of a Bose–Einstein condensation and that the energy of the superconducting electron pairs is proportional to their momentum. Since all high-field magnets involve type II superconductors, the theoretical discussion by Lynton and McLean is particularly appropriate here.

In "Measurement of Weak Magnetic Fields by Magnetic Resonance," P. A. Grivet and L. Malnar discuss nuclear magnetic resonance and optical-pumping techniques for measuring magnetic fields of the order of 1 micro-Gauss. Before proceeding to detailed discussions of particular systems they give an interesting survey of non-resonant methods and discussion of the important characteristics of geomagnetic and interplanetary fields. A brief description is given at the end of the article of the use of superconducting interferometers as magnetometers, and as an article is scheduled for a future volume by J. E. Mercereau and D. J. Langenberg on the Josephson effect and devices, we may expect to see a more elaborate discussion.

The longest article in the volume is by H. Motz and C. J. Watson on "The Radio-Frequency Confinement and Acceleration of Plasmas." As the authors point out, earlier pessimism over the feasibility of these techniques discouraged people from performing experiments, and the few that were done are not always directly related to theory. Consequently this article is divided into about two thirds theory and one third discussion of experiments. Among other things, the authors point out that although the technical problems are still immense, they believe it may be possible to obtain a *net power output* from a radio-frequency-fed and confined thermonuclear reactor provided that losses in the cavity walls are reduced with superconducting materials. This possibility is discussed.

The two remaining articles are by E. R. Chennette, "Noise in Semiconductor Devices" and by W. C. Livingston, "Properties and Limitations of Image Intensifiers Used in Astronomy." Chennette's article summarizes theoretical results on junction diodes, bipolar transistors and field-effect transistors, and gives some comparison with experimental results. It also discusses some practical considerations in de-

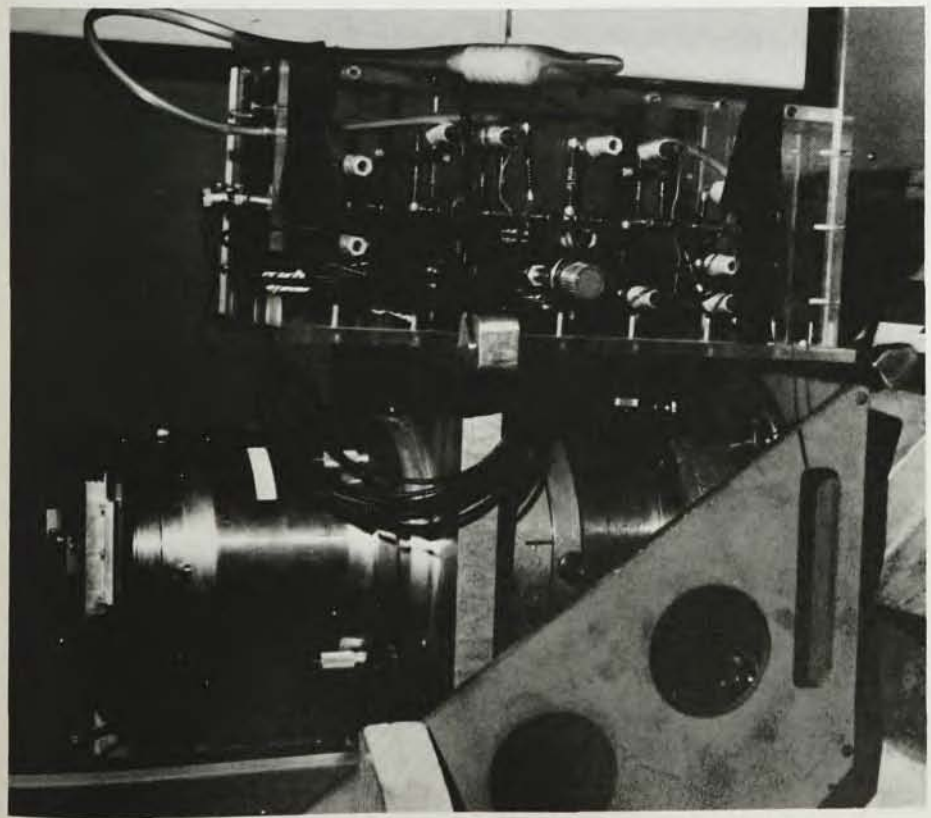
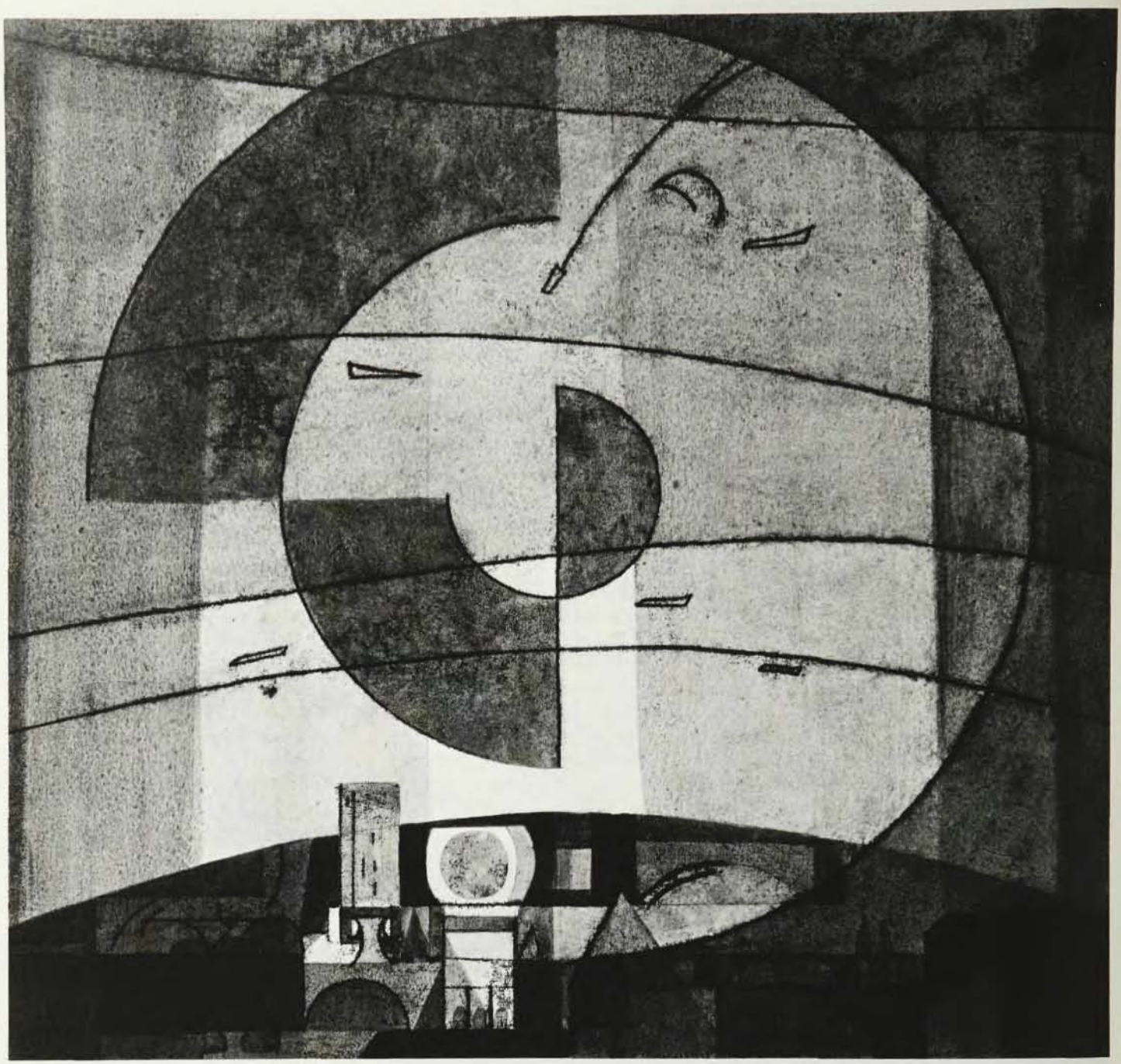


IMAGE INTENSIFIER TUBE SYSTEM at the Kitt Peak National Observatory. Intensified spectrum images are photographed in the plateholder on the left.



IMAGINATION In Systems Research

Systems and operations research at CAL takes imaginative shape in both military and civilian forms: in ballistic missile defense and in community ecology; in methods of penetration for tactical aircraft, and in basic studies of the country's water resources. Included in that spectrum are reconnaissance and surveillance, weapon system analysis, mathematical modeling of physical systems, ordnance research, quantitative decision making, and environmental research. Because the Laboratory is engaged in advancing the state of the art in numerous fields of physical research, it is useful to treat the systems research as an interrelated part of the total program. The system models we develop thus are able to reflect the real world, and the physical research in turn is often guided into areas where new knowledge is needed. □ If your imagination isn't being challenged quite as much as you would like, we invite you to consider participating in this stimulating program of independent, nonprofit research. For more about the Laboratory and your future in it, write today to Mr. S. T. Rentschler, Cornell Aeronautical Laboratory, Inc., Box 235, Buffalo, New York 14221. (CAL offers equal employment opportunity to all.)

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signing low-noise amplifiers. The article by Livingston is aimed at providing practical information for people interested in using image tubes. On the basis of actual use the author considers the advantages and disadvantages for astronomical purposes of the following types of tubes: Lallemand, cascade, transmission secondary emission and image orthicon.

One thing that struck me about this volume was that in four of the six articles some aspect of superconductivity is discussed. Does this mean that the technology of superconductivity is finally coming of age?

For those directly involved with the areas discussed this volume should be very attractive because of its summary of a great amount of theoretical and experimental information. It should also prove worthwhile to the more casual reader who, by reading the first few pages of each article, will be introduced to the important developments and the problems that remain.

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Scientist as decision maker

THE POLITICS OF SCIENCE: READINGS IN SCIENCE, TECHNOLOGY AND GOVERNMENT. William R. Nelson, ed. 495 pp. Oxford U. Press, London, 1968. Paper $3.95

by Craig Hosmer

The scientist searching for clues regarding his role in the political decision-making process affecting his profession will no doubt glean interesting tidbits from William R. Nelson's new book, *The Politics of Science*. The chances are, however, that he will learn more about the subject than he really cares to know.

Lt. Col. Nelson, a multidegreed assistant professor of political science at the Air Force Academy, has combed books, periodicals, government and "think-tank" publications and congressional committee hearings to gather a group of essays assessing the roles of science and scientists in modern American society.

The fact that these roles still remain somewhat undefined is less a reflection on Nelson's diligence as an editor than proof that they are still evolving along with technology.

The readings first trace the post-World-War-II development of atomic, space and computer sciences, and the government's organization for major involvement in the management and financing of research and development. The subject matter then turns to the scientists' past and present influence as decision makers vis-à-vis domestic and foreign policies and includes some hints regarding the future interplay between science and politics.

Nelson, mercifully spares the reader the chore of burrowing through all 495 pages by grouping the essays into six chapters. The final three chapters ("The Scientist as a Decision-Maker," "Science and Foreign Policy," and "Government and the Future of American Science") will be of considerable interest and enlightenment to the professional. The first three chapters are of historical nature and will be of interest primarily to the student.

Unfortunately some of the chapter titles and introductions are terse and unrevealing, a condition which also applies to the specific readings. Notably missing are abstracts of the individual readings and biographies to establish the credentials of their authors. Some men, such as Vannevar Bush ("Science: The Endless Frontier") come from an earlier generation. Others, such as Burton H. Klein ("Policy Issues Involved in the Conduct of Military Development Programs") work obscurely behind the RAND curtain. It may even be that younger readers will be receiving their first introduction to such venerables as Albert Wohlstetter ("Scientists, Seers and Strategy").

Possibly the book's most useful chapter deals with the scientist as a decision maker. Its essays on the H-bomb decision, the intrascientific conflict over a nuclear test ban and the problems of big, expensive science are timeless readings.

One article of particular interest this election year is the recounting of how science and engineering were mobilized by the "Scientists and Engineers for Johnson–Humphrey" committee during the 1964 presidential campaign.

Although the volume intends coverage only of the US science–political scene, it is enhanced by a reading on Soviet science by John Turkevich.

Somewhat disappointingly the various authors pay due attention to the evolving role of the scientist in the political process but ignore the changing role of the politician in the scientific process. Although Nelson cannot