that level, I think that comprehension will drop off somewhat, but the book is so well presented that anyone with some background in basic astronomy or physics should enjoy reading it.

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Microphysics of Atmospheric Clouds and Precipitation

H. R. Pruppacher, J. D. Klett
706 pp. D. Reidel, Boston, 1978. $41.50

Microphysics of Clouds and Precipitation, by Hans R. Pruppacher and James D. Klett, is an excellent book exhibiting many instances of very scholarly work. It fills a need for a strong, comprehensive text and reference book on the microphysics of clouds. Pruppacher, the senior author and a professor at the University of California at Los Angeles, has made many valuable contributions to the field of cloud microphysics, especially with his carefully controlled laborlatory experiments. Pruppacher and Klett have included well-written textual material for students and useful reference material for scientists in this and related fields.

The book covers the mechanisms of cloud nucleation, particle diffusion growth, collision-coalescence growth and breakup individually and in cloud populations. Cloud dynamics, electricity, optics, radar meteorology and atmospheric chemistry are briefly considered. The authors justify the absence of material on other aspects of the physics of clouds—cloud kinematics, dynamics and macrophysics—on the basis that the discipline is very complex and extends over many orders of magnitude. They agree that this omission could be serious. A text to cover more of these topics would require difficult decisions on what should be included. Perhaps a text to cover the macrophysics of clouds as a companion to Pruppacher and Klett's book is needed. The missing details or omissions may not be evident to a student without background in cloud physics. I highly recommend the book as a text with which an instructor can pull things together in a large-scale framework.

Much of the work in cloud microphysics and cloud dynamics has been carried out in a sterile environment devoid of inhomogeneity, turbulence and electrical forces, factors that are actually an integral part of most situations in the atmosphere. I point this out not as a criticism of the book, but to emphasize how the dichotomy of the subject has led to an overemphasis on microphysical detail without sufficient regard to the influence of the larger-scale meteorological parameters. Caution must be taken in the application of most microphysical research to the real world.

Chapter by chapter, I find that most of the subjects are treated with understanding and are quite well done. Some specific comments about the treatments in chapters 1, 2, 7, 14 and 17 may largely reflect my own preferences.

It is dangerous, as in chapter 1, to find and print the name of the original originator of a concept—someone almost surely will come up with an earlier one. For example, Benjamin Franklin, not mentioned in chapter 1, knew the normal dipole charge structure of clouds was positive above and negative below, and he proposed that the electrostatic attraction of charged particles of opposite sign contributed to the formation of rain, a hypothesis much in vogue at present.

In the second chapter, the descriptions of the microstructure of clouds and precipitation are based on many widely varied airborne measurements of cloud drops, usually by slide impaction—a method fraught with pitfalls in application and calibration. There is also the question of the representativeness of data derived from sampling small volumes separated by large distances. Although an extensive series of observations by impactor slide techniques is shown, there are no reports of high-resolution fast-response observations made with modern electronic and electro-optical probes. Although the proper operation and interpretation of these observations still depend on the skills of each investigator, they provide much better data over large distances.

Chapter 7 is on homogeneous nucleation, which rarely occurs in the atmosphere; one wonders if the chapter is really necessary. Further discussion is needed in chapters 14 and 17 of the studies of the collision–coalescence of cloud drops through laboratory model simulations. These experiments served an important role in the development of further understanding of drop interactions by exaggerating and visualizing vital aspects of the problem.

I strongly recommend the book for scientific libraries, serious cloud physics students, and other scientists who need to go in depth into this subdiscipline.

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Technology Transfer Practice of International Firms

F. R. Bradbury, ed.
312 pp. Sijthoff, Noordhoff, Alphen aan den Rijn, Holland, 1978.
Dfl. 95.00

Technology transfer takes many forms, but no variation is more politically explosive than transfers between multinational corporations as donors and developing countries as recipients. Such interchange carries with it the heavy political overtone that the "haves" compete with the "have nots" for a redivision of the world's economic pie. The United Nations has acknowledged the divisive nature of this issue and has scheduled a conference in late 1979 offering a world forum for the various participants. *Technology Transfer Practice of International Firms* addresses this theme, and others, in a wide-ranging series of case studies.

In 1974 the Organization for Economic Co-operation and Development recog-

nized the complexity of the problem and contracted with the Technological Economics Research Unit of the University of Stirling in Scotland to conduct seven studies providing insights into selected technology-transfer mechanisms. The results were aired at a seminar held in December 1976 with various donors, recipients, and academicians in attendance. This book is the edited version of the seminar proceedings by Frank R. Bradbury, professor of Industrial Science at the University of Stirling, who supervised the studies.

The reader can gain many helpful perceptions of the technology-transfer process for a variety of industries including low-density polyethylene, telecommunications, earth-moving equipment, petrochemicals, business machines, pharmaceuticals, electric motors and ammonia-based fertilizer. The geographies vary, with disproportionate attention paid to India.

Overall, the analyses are uneven in their point of departure and consistency. For instance, the discussions of polyethylene (donor: Imperial Chemical Industries), business machines (donor: IBM) and electric motors (donor: Siemens) do not examine and reflect on actual examples of technology transfer; they address the many factors involved with transferring technology in general, and specifically the products described. Such discussions provide primary guidance without exploring the real-life difficulties, both for donor and recipient, encountered in specific transfers. The generalities are useful to beginners just entering the technology-transfer field, but more experienced practitioners will probably gain little.

Several practical aspects, however, suggest priority areas for companies engaging in transfer activities. For instance, the telecommunications example cited the difficulties in obtaining a wide range of screw sizes and shapes needed for telecommunications equipment. The author suggested the following: "In so far as ancillary support technologies are associated with small firms therefore, balanced industrial infrastructure development in LDCs [Lesser Developed Countries] is hampered by barriers to transfer and LDC governments might do well to make easier the transfer process for the smaller firms." This comment implies that successful technology transfer may require competence in a broad range of technologies, some transcending the specific transfer in question; a constraint that is especially challenging for smaller companies.

Another frequently mentioned problem is the need for stringent quality-control procedures for various products. The study noted that Pfizer—the donor pharmaceutical company—applies more demanding quality-control procedures than the local government of the recipient country. A similar situation occurred in the Siemens transfer of electric-motor manufacturing capability. In particular, it was stated "Quality assurance/quality control is essential in cases where the name of the licensor becomes known to the licensee's customers either directly or indirectly." Here, for different reasons than those noted in the pharmaceutical case, the donor was particularly sensitive to maintaining tight quality control to ensure that its name was not tarnished by subpar production of electric motors carrying the Siemens label but manufactured by the licensee. Several companies, including Caterpillar, attacked this general problem by maintaining very tight control from a central point in the United States. All part changes must be approved from this point, no unilateral action may be taken by satellite facilities.

Prior to the presentation of the case studies, several papers considered overview aspects of the subject. A wide range of considerations was included in these preparatory comments, such as objectives of buyers and sellers of technology, marketing of technology and its products, methods of transfer, financing, costs and

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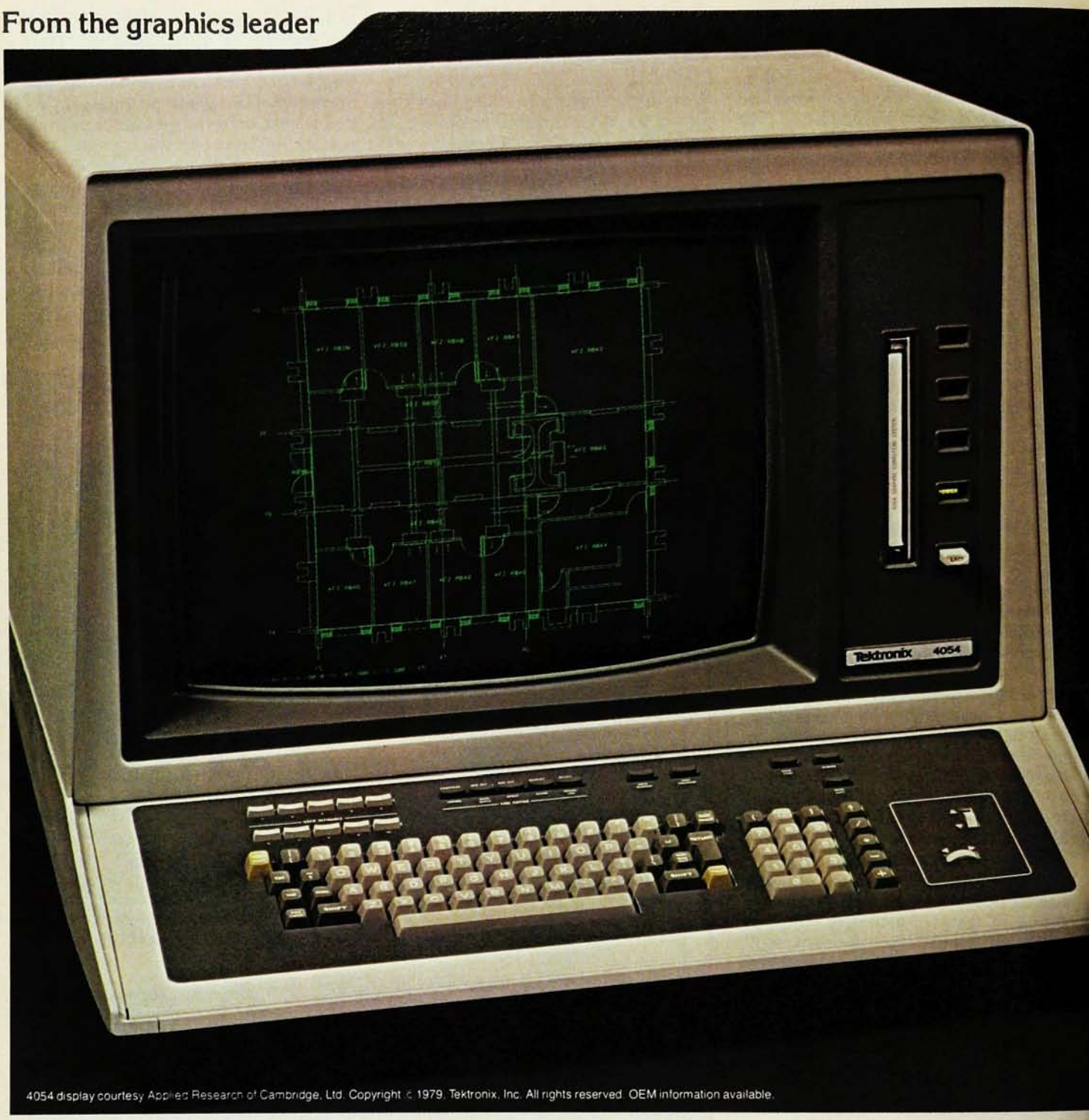

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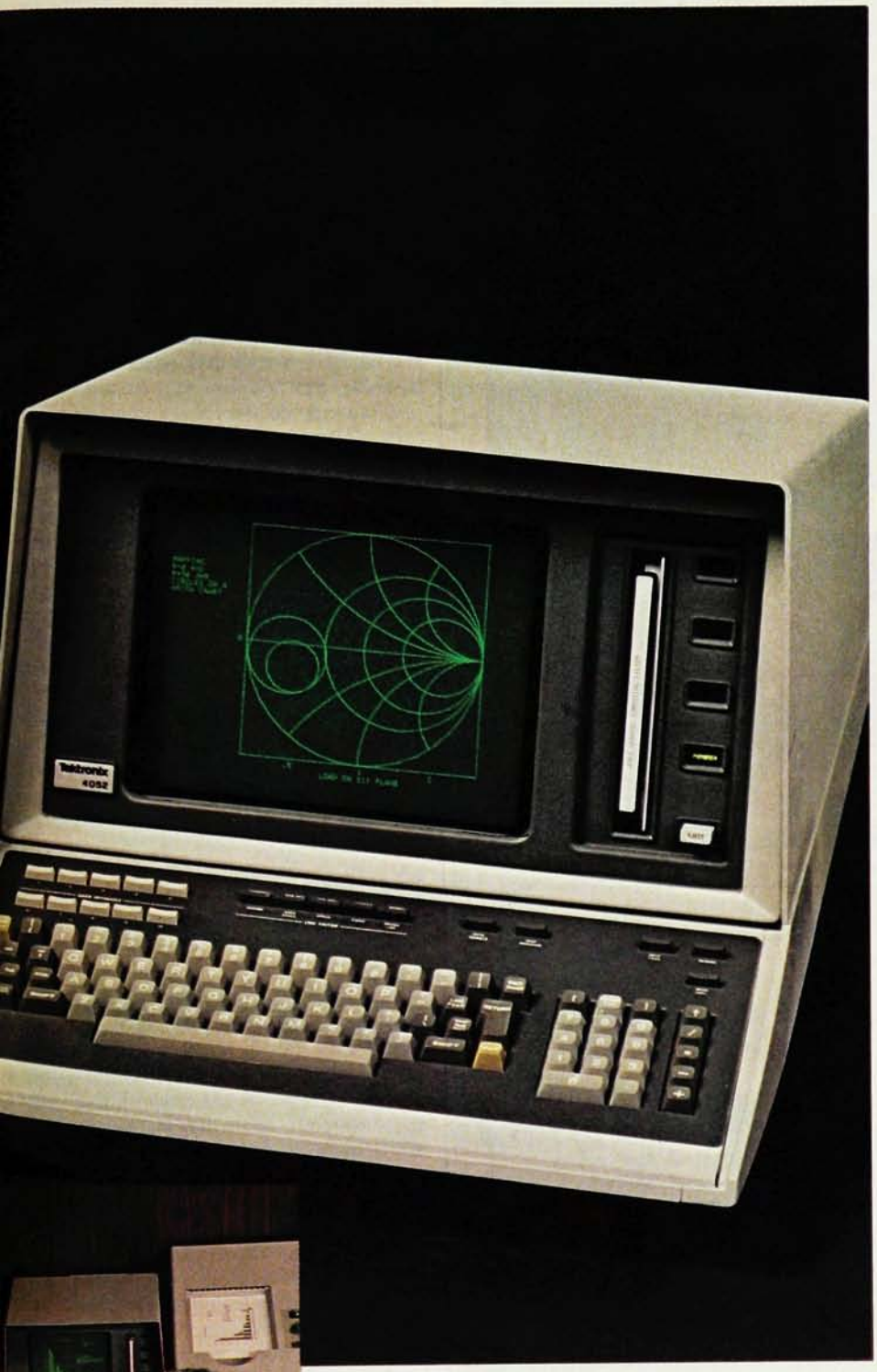

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payments, training and quality assurance, technical improvements and relations with local suppliers, patents and technology protection, and patents and the transfer of technology. In general, the overview discussions considered "landscape" factors that characterized the technology-transfer scene. Although they provided some useful background information for the reader they, too, added few detailed insights.

Overall, the absence of a hard-hitting analysis of real-world experience left much to be desired by a concerned reader. He could have gained a great deal by learning how donors try to anticipate problems, what they did right and what they did wrong, how they would have done things differently, which conditions did not enter into a particular transfer action at all, and in general, what do's and don't's they have discovered via their technology transfer experiences. These practical insights, especially those that are not widely publicized—if they are publicized at all—provide the real critical understanding not available from a recitation of the mechanistic guidelines.

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Concepts of Radiation Dosimetry

K. R. Kase, W. R. Nelson
219 pp. Pergamon, Elmsford, N.Y., 1978.
$17.50 clothbound, $9.50 paperbound

Today there is an ever-increasing concern over the effects of ionizing radiation, be it encountered in an ordinary chest x ray or in the possible emissions from a nuclear power plant. Health physicists and other professionals in the radiation field are being called upon both to estimate the absorbed dose from various radiation sources as well as to provide "safe" and effective shielding from these sources. In this context *Concepts of Radiation Dosimetry* provides a very valuable compendium of information. K. R. Kase and W. R. Nelson first define the concepts used in radiation dosimetry and discuss the manner in which charged particles and photons interact with matter; then they discuss in mathematical detail the concepts of energy deposition at a microscopic level as well as the expressions for energy loss. These concepts and expressions are then applied to dose calculations and measurements.

This book is an extremely good source of valuable information for anyone concerned with the design of shielding or with the calculation of absorbed dose from charged particles or photons. The authors provide an appendix in the form of a series of graphs using various calcula-