melts, for it is surprisingly true that no silicate liquidus diagram has yet been successfully predicted ab initio from calorimetrically derived thermodynamic data. In order for magmas to serve as probes into the interior of Earth and other planets, or as guidelines for condensation sequences in the early solar system, such calculations would be most helpful. A chapter by Burnham makes great progress in the matter, not starting from calorimetry but using one phase diagram, with a minimum set of assumptions, to solve a sequence of other phase diagrams. Perhaps this is the beginning of wisdom. At least it has the elegance of Bowen's approach and something of its humor.

Historians of science should have a good time with this book and with Bowen. Having the master's book brought up to date by his able followers is in itself a rare experiment, particularly when preceded by such an explosion of discovery. That such a format could even be contemplated is impressive testimony to the prophetic integrity of the original. That it should succeed is a modest triumph of common purpose and good sense.

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Space Research

Solar System Plasma Physics. E. N. PARKER, CHARLES F. KENNEL, and LOUIS J. LANZEROTTI, Eds. North-Holland, Amsterdam, 1979 (U.S. distributor, Elsevier, New York). In three volumes, illus. Vol. 1, Solar and Solar Wind Plasma Physics. x, 344 pp. + index. $73.25. Vol. 2, Magnetospheres. x, 402 pp. + index. $66.75. Vol. 3, Solar System Plasma Processes. x, 378 pp. + index. $66.75. The set, $186.25.

These three volumes are a fitting commemoration for the 20th anniversary of space research. In most previous works of this genre on space research, the authors have stayed safely away from the forefront of research. The result is that the books are five to ten years out of date and neither exude the excitement of basic research nor yield material useful for graduate students, teachers, or researchers in peripheral fields. The chapters in these three volumes avoid this pitfall. The authors seem to have pushed deeply into their topics and, in most cases, have identified the crucial and exciting questions currently occupying theorists and experimentalists alike.

In some sense these volumes mark the transition of solar system plasma physics from the era of exploration, exemplified by the Explorer I spacecraft, into one of understanding and application. By application I do not necessarily mean the type summarized in the section entitled Technological Impact of Solar System Plasma Physics (although the brief expositions there are quite interesting), but the possibility for the application of the results of solar system plasma physics research in astrophysics and in experimental and theoretical plasma physics.

In the near space region of the earth, which includes the ionosphere, magnetosphere, and interplanetary medium, detailed study of cosmic-scale plasma physical systems can be made. These regions are remarkably rich in physical processes and span the vast ranges of parameter space. Some regions of the ionosphere are so quiescent that the largest perturbations present, other than the odd passage of a whistler or other electromagnetic wave, are thermal fluctuations in the medium. In fact, as is pointed out in the chapter on the ionospheric plasma, the detection of thermal fluctuations via the incoherent-scatter radar method and the explanation of the scattered spectrum was a triumph of engineering on the

"W. Von Braun, J. A. Van Allen, and W. H. Pickering triumphantly holding aloft a model of Explorer I on the occasion of the first announcement of its discoveries." The saturation of the simple Geiger counter carried on board the spacecraft, launched in January 1978, "attributed correctly to the presence of high fluxes of particles trapped in the earth's magnetic field, provided the catalyst for the following two productive decades of scientifically-instrumented spacecraft studying of solar system plasmas." [From *Solar System Plasma Physics*]

one hand and plasma physics on the other. One of the keystones of modern plasma physics, the concept of Landau damping, was first experimentally verified in detail via the study of incoherent scatter from the ionosphere. This is but one example of the pivotal role space research has had in the historical development of plasma physics as a discipline.

Compare this quiescence to the explosive energy releases discussed in the chapter on solar flares and the magnetospheric substorms mentioned in several chapters. In both cases energy stored in the form of magnetic fields is virtually instantaneously converted to particle and photon energy. Crucial to most theories of both of these phenomena is the concept of magnetic field reconnection. A separate and quite lengthy chapter is devoted to this process. After diligently reading through it, however, I am left with a double Chinese restaurant syndrome—hungry for more but nervous at the same time. Magnetospheric reconnection has to be considered a prime problem for both the theorist and the experimentalist. For example, although a prima facie case for reconnection has been made, definitive observations are lacking and we are not even sure where on the front side of the magnetosphere reconnection occurs.

One remarkable asset of solar system exploration is the ability to compare magnetospheres of different dipole moments and subject to different solar wind conditions. Several excellent chapters deal with the magnetospheres of all the inner planets plus Jupiter and are followed by a summary chapter in which general principles of comparative magnetospheres are presented in a very clear manner.

The editors admit to the omission of a chapter on the auroral acceleration region recently discovered at an altitude of about one Earth radius. The detailed exploration and ultimate understanding of this region may be as important as reconnection and I regret the absence of this topic.

The book is an excellent resource for graduate and undergraduate courses in upper atmosphere and space research. Many excellent figures have been produced which conceptualize complex interactions and three-dimensional systems. The fact that the physics has not been diluted assures that many chapters will continue to be useful reviews, even in fast-changing fields, for many years.

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Books Received

Advances in Biomedical Engineering. Vol. 7. J. H. U. Brown, Ed. Academic Press, New York, 1979. xiv, 242 pp., illus. $25.

Advances in Pharmacology and Chemotherapy. Vol. 16. Silvio Garattini, A. Goldin, F. Hawking, I. J. Kopin, and R. J. Schnitzer, Eds. Academic Press, New York, 1979. xii, 302 pp. $31.

Advances in Polymer Science. Vol. 31. H.-J. Cantow and 13 others, Eds. Springer-Verlag, New York, 1979. iv, 180 pp., illus. $46.20.

The Burmese Cat. Robine Pocock, Dorothy Silkstone Richards, Moira Swift, and Vic Watson. Scribner, New York, 1979. x, 182 pp. + plates. $12.95.

Cancer Chemotherapy. Howard E. Skipper. Published for American Society of Clinical Oncology by University Microfilms International, Ann Arbor, Mich., 1979. Vol. 2, On Reducing Treatment Failures Due to Overgrowth of Specifically and Permanently Drug-Resistant Neoplastic Cells. xiv, 54 pp. Paper, $7.75. Vol. 3, Idealized Hypothetical Illustrations of the Effects of Specifically Drug-Resistant Leukemia Cells on End-Results Achievable with Single Drugs and Combinations. xiv, 84 pp., illus. Paper, $9.25.

The Cancer Patient. Social and Medical Aspects of Care. Barrie R. Cassileth, Ed. Lea and Febiger, Philadelphia, 1979. xii, 332 pp., illus. Paper, $12.50.

Development of Therapeutic Agents for Sickle Cell Disease. Proceedings of a meeting, Paris, July 1978. Jean Rosa, Yves Beuzard, and John Hercules, Eds. North-Holland, Amsterdam, 1979 (U.S. distributor, Elsevier, New York). xviii, 262 pp., illus. $44. INSERM Symposia, No. 9.

The Diagnosis and Treatment of Alcoholism. Jack H. Mendelson and Nancy K. Mello, Eds. McGraw-Hill, New York, 1979. x, 406 pp. $17.50.

Electroanalytical Chemistry. A Series of Advances. Vol. 11. Allen J. Bard, Ed. Dekker, New York, 1979. xii, 370 pp., illus. $45.

Energy for Industry. A Collection of Scientific and Engineering Papers Concerned with Utilising Energy with Maximum Efficiency in Industry. Paul W. O'Callaghan. Pergamon, New York, 1979. xxii, 412 pp., illus. $50.

The Functions of Language and Cognition. Grover J. Whitehurst and Barry J. Zimmerman, Eds. Academic Press, New York, 1979. xiv, 314 pp., illus. $21.

Genesis on Planet Earth. The Search for Life's Beginning. William Day. House of Talos Publishers, East Lansing, Mich., 1979. xiv, 408 pp., illus. $9.95.

Genetic Control of Autoimmune Disease. Proceedings of a workshop, Bloomfield Hills, Mich., July 1978. Noel R. Rose, Pierluigie Bigazzi, and Noel L. Warner, Eds. Elsevier/North-Holland, New York, 1979. xiv, 466 pp., illus. $50.

Group Psychotherapy. Practice and Development. Baruch Levine. Prentice-Hall, Englewood Cliffs, N.J., 1979. xvi, 332 pp. $12.95.

Handbook of Analytical Control of Iron and Steel Production. T. S. Harrison. Horwood, Chichester, England, and Halsted (Wiley), New York, 1979. 602 pp., illus. $99.50. Ellis Horwood Series in Analytical Chemistry.

The Invertebrates. R. McNeill Alexander. Cambridge University Press, New York, 1979. viii, 562 pp., illus. Cloth, $49.50; paper, $16.95.

Kin and Communities. Families in America. Proceedings of a symposium, Washington, D.C., June 1977. Allan J. Lichtman and Joan R. Challinor, Eds. Smithsonian Institution Press, Washington, D.C., 1979. 336 pp. Cloth, $17.50; paper, $7.95. Smithsonian International Symposia Series.

Laboratory Text for Organic Chemistry. A Source Book of Chemical and Physical Techniques. Daniel J. Pasto and Carl R. Johnson. Prentice-Hall, Englewood Cliffs, N.J., 1979. xvi, 542 pp., illus. Paper, $15.95.

Mammals. Their Latin Names Explained. A Guide to Animal Classification. A. F. Gotch. Blandford Press, Poole, Dorset, England, 1979 (U.S. distributor, Sterling Publishing Company, New York). 272 pp., illus. $13.95; library edition, $10.99.

Man and the Water Hyacinth. Godofredo G. Monsod, Jr. Vantage Press, New York, 1979. x, 48 pp. $4.95.

Notes from the Nordic Spring Symposium on Atomic Inner Shell Phenomena. Geilo, Norway, Apr. 1978. J. M. Hansteen and R. Gundersen, Eds. University of Bergen Department of Physics, Bergen, Norway, 1979. Two volumes. Vol. 1, Extended Resumes. xxvi, 134 pp., illus. Vol. 2, Lecture Notes. viii, 208 pp., illus. Paper.

Oncogenic Viruses and Host Cell Genes. Proceedings of a seminar, Lake Yamanaka, Japan, Sept. 1977. Yoji Ikawa and Takeshi Odaka, Eds. Academic Press, New York, 1979. xx, 492 pp., illus. $25.

Pathophysiology of Cerebral Energy Metabolism. Proceedings of a symposium, Belgrade, Sept. 1977. B. B. Mršulja, Lj. M. Rakić, I. Klatzo, and Maria Spatz, Eds. Plenum, New York, 1979. x, 476 pp., illus. $42.50.

A Perspective of Environmental Pollution. M. W. Holdgate. Cambridge University Press, New York, 1979. x, 278 pp., illus. $35.

Phenology of Cultivated Rhododendrons in the Lower Mainland of British Columbia. L. Keith Wade. University of British Columbia Botanical Garden, Vancouver, Canada, 1979. viii, 226 pp., illus. Paper, $8.25. Technical Bulletin No. 10.

RPG II with Business Applications. Stanley E. Myers. Reston (Prentice-Hall), Reston, Va., 1979. xvi, 592 pp., illus. $17.95.

Saharan Dust. Mobilization, Transport, Deposition. Papers from a workshop, Gothenburg, Sweden, Apr. 1977. Chister Morales, Ed. Published for the Scientific Committee on Problems of the Environment of the ICSU by Wiley, New York, 1979. xviii, 298 pp., illus. Paper, $33. SCOPE 14.

Schistosomiasis IV. Condensations of the Selected Literature, 1963–1975. Donald B. Hoffman, Jr., and Kenneth S. Warren, Eds. Hemisphere, Washington, D.C., 1978. Two volumes, xvi, 538 pp. $90.

Technology Transfer in Industrialized Countries. Proceedings of a conference, Estoril, Portugal, Nov. 1977. Sherman Gee, Ed. Sijthoff & Noordhoff, Alphen ann den Rijn, The Netherlands, 1979. xiv, 450 pp. $35.

Theoretical Computer Science. Papers from a conference, Aachen, Germany, Mar. 1979. K. Weihrauch, Ed. Springer-Verlag, New York, 1979. viii, 324 pp., illus. Paper, $16. Lecture Notes on Computer Science, vol. 67.

The World Energy Book. An A-Z, Atlas and Statistical Source Book. David Crabbe and Richard McBride, Eds. MIT Press, Cambridge, Mass., 1979. 260 pp., illus. Paper, $12.50. Reprint of the 1978 edition.

A World of Children. Daycare and Preschool Institutions. Nancy M. Robinson, Halbert B. Robinson, Martha A. Darling, and Gretchen Holm. Brooks/Cole, Monterey, Calif., 1979. xiv, 250 pp., illus. Paper, $8.95.