panspermia, which seemed doomed before the possibility of transport of organic material within comets offered a shield against sterilizing interstellar radiation.

There are some rich alternatives open in the mystery of the origin of life. SETI is a program taking action on this matter of deep interest to human beings.

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High-Pressure Physics

Frontiers of High-Pressure Research. HANS D. HOCHHEIMER and RICHARD D. ETTERS, Eds. Plenum, New York, 1992. xii, 497 pp., illus. $125. NATO Advanced Science Institutes Series B, vol. 286. From a workshop, Fort Collins, CO, July 1991.

Pressure is an important thermodynamic parameter that can be used to squeeze information from biological, chemical, geological, or physical systems. As such, it is similar in importance to temperature or electric and magnetic fields. The main advantage of high pressure is that it provides a way of changing density and interatomic distances over a wide range. This is of great use for studying the behavior of organisms of the deep sea, investigating chemical reaction rates in liquids and solids, understanding the interior of the earth, or testing theories of condensed matter, to name just a few applications.

The potential of pressure for such purposes is becoming more widely recognized. This is not surprising, since, for example, the handling of a diamond anvil cell, the workhorse of the modern high-pressure laboratory, is so simple that an undergraduate can easily use it. Also, high-pressure experiments can be combined with a wide range of techniques to cover the other parameters mentioned above and make the phenomena of interest accessible to a wide range of probes. Furthermore, high pressure provides ways of synthesizing materials that are unattainable with other techniques. Though there are some instances when high-pressure experiments seem to be done just for the sake of the pressure itself, most high-pressure papers are published in journals of general scope, which is a favorable situation, since it indicates that high-pressure scientists are involved in problems of broad interest and draws the attention of others to the use of high pressure. At the same time journals and meetings devoted especially to high-pressure studies offer the opportunity to exchange technical tricks or hear about subjects one might otherwise ignore.

The publication of *Frontiers of High-Pressure Research* should provide a stimulus for further interaction among fields. As the editors write in the introduction, the workshop of which it is the proceedings was motivated by the role of high-pressure experiments in the discovery of high-T_c superconductors, in the tailoring of materials for optoelectronic devices, in advances toward producing metallic hydrogen, and in polymer research. This is an interesting mix of fundamental and applied subjects of physics, although it may disappoint biologists, chemists, and geophysicists who might be attracted by the broad title. Unfortunately, the meeting was a little too early to capture the excitement over fullerenes.

The workshop was also intended as a forum for young scientists, and this goal was achieved, judging from the editors' report and the authorship of the papers. It is a good sign that in addition to familiar names in high-pressure physics, many other researchers were present. However, the number of theoretical papers is unfortunately low, especially compared to the contents of a meeting held in 1981 to which the editors compare this more recent one. Nevertheless, the experimental papers in the volume illustrate to an outsider the wide range of techniques applicable under different thermodynamic conditions at high pressure, among them NMR, resistivity measurements, AC susceptibility, and Mössbauer, Brillouin, Raman, photoluminescence, and nonlinear optical spectroscopy at high magnetic field and at low or high temperatures.

The contents have been subdivided according to four subjects: polymers and low-dimensional systems, molecular systems, quantum wells and semiconductors, and high-T_c superconductors. At the end of each section, the highlights of roundtable discussions are presented. Two papers in the volume are particularly outstanding.

A description of the behavior of organic metals is given by I. Marsden *et al.* They start out with an overview of the organometallic molecules and proceed by giving a simple explanation of Peierls distortions and charge- and spin-density waves. Subsequently, they describe the high-pressure behavior of $Cs[Pd(dmit)_2]_2$. This substance shows a metal-insulator transition at low temperature, but with increasing pressure the conductivity of the low-temperature phase increases, maybe owing to a transition to a semimetallic phase. Even though the insulating phase does not seem to be a simple Peierls distortion of the metallic phase, the experimental results provide a clear illustration of the theoretical points discussed in the introduction of this paper.

N. W. Ashcroft discusses the influence of ordering on the stability of the phases of hydrogen in the megabar pressure regime, where metallization and dissociation are expected. It is explained in a didactic way that orientation of the protons is important, since neither a Mott model with fixed protons on a Bravais lattice nor a uniform proton distribution gives very realistic metallization pressures. But this is a formidable complication, since it is quite possible that the molecules could have fixed but random orientations. Ashcroft discusses the highly interesting possibility that in the state where band overlap occurs (and this is predicted to happen for spherically averaged configurations), the randomness could preclude the diffusion of electrons, or, in other words, Anderson localization. This in turn would prevent the observation of a Drude absorption or reflectivity edge, which is one of the most important experimental probes.

The roundtable discussions should certainly be of interest to a broad audience, since the panel members give brief overviews of their work and discuss future directions. The discussions of molecular solids and superconductors are especially enjoyable, since the chairmen have managed to clearly abstract the lively discussions. The discussion sections are probably useful reading before one makes a selection of papers to read.

I would recommend *Frontiers of High-Pressure Research* for the overview it gives of an exciting field of condensed matter science. The description of interesting and new techniques is important for specialists, and most of the papers are clear enough, apart from some jargon, that graduate students should be able to understand them.

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Other Books of Interest

Muscular Contraction. ROBERT M. SIMMONS, Ed. Cambridge University Press, New York, 1992. xii, 299 pp., illus. $69.95. Based on a meeting, Cambridge, U.K., June 1989.

By the time Andrew Huxley was awarded the Nobel Prize for his work on nerve conduction his research interests had turned to muscle contraction, and when his associates undertook to honor him at a conference in 1989, that was the subject he

chose for it. This collection of 16 papers is the result of the conference. As a prelude to the contributions on muscle Robert Stämpfli provides a biographical essay recounting something of Huxley's family background and some personal reminiscences focused on the period during which the neurophysiological research that led to the 1963 prize, shared with Alan Hodgkin and John Eccles, was being conducted. (On Hodgkin's contribution to this work see the review of his autobiography in *Science*, 2 October.) Stämpfli's essay is followed by another by Simmons that describes in a similar vein Huxley's research on muscle, which began in 1951 at a time when (he is quoted as saying) "there was . . . no obvious way of pushing the analysis of excitation to a deeper level." In the remaining papers 19 authors from six nations who have worked in Huxley's laboratory give more technical accounts of their own work on such subjects as inactivation of human sodium channels (Rüdel and Fakler), calcium-induced calcium release in skeletal muscle (Endo), hypodynamic tension changes in the frog heart (Niedergerke and Page), high-speed digital imaging microscopy of isolated muscle cells (Taylor and Roos), and the mechano-chemistry of negatively strained cross-bridges in skeletal muscle (Goldman). In addition to the extensive bibliographies of Huxley's own works that follow the two opening essays there is a combined reference list for the volume as a whole, and a brief index is included.

—*Katherine Livingston*

The Biology of Millipedes. STEPHEN P. HOPKIN and HELEN J. READ. Oxford University Press, New York, 1992. xii, 233 pp., illus. $70.

Dispelling an assumption that might be made by the literal-minded, the authors open this work by reporting that the "world champion" among the millipedes has only 375 pairs of legs. Most of the approximately 10,000 species in the class (Diplopoda) make do with fewer than 50, and these are distinguished from those in the other classes of myriapods in being arranged two pairs, rather than only one, to a body segment, a feature that enables the millipedes to "exert a considerable forward thrust." Noting that the millipedes are the only major group of terrestrial invertebrates that have not been the subject of an introductory text in English, Hopkin and Read have set out to remedy that deficiency. The treatment follows the conventional format for such works, beginning with systematics, evolution, and zoogeography and proceeding, in a total of 10 chapters, through basic anatomy, feeding and metabolic arrangements, the nervous system, reproduction, and development and life history to broader considerations of the group's place in the world. Ecologically, millipedes feed primarily on decaying plant material, playing roles of varying importance in soil processes; appear to have achieved much of their worldwide dispersal by passive means; and aggregate in large numbers for reasons that are unclear but with effects that include such inconveniences as the delay of railroad trains. As to the direct importance of the group to humanity, the authors otherwise make only modest claims and conclude the book by advocating the study of these "dare we say it, endearing creatures" for their own sake.

—*Katherine Livingston*

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Books Received

Accretion Power in Astrophysics. Juhan Frank, Andrew King, and Derek Raine. 2nd ed. Cambridge University Press, New York, 1992. xvi, 294 pp., illus. $79.95; paper, $37.95.

The Adrenal Gland. Vivian H. T. James, Ed. 2nd ed. Raven, New York, 1992. xiv, 513 pp., illus. $138. Comprehensive Endocrinology.

Aging and Alzheimer's Disease. Sensory Systems, Neuronal Growth, and Neuronal Metabolism. John H. Growdon *et al.*, Eds. New York Academy of Sciences, New York, 1991. xiv, 303 pp., illus. $75. Annals of the New York Academy of Sciences, vol. 640. From a meeting, Zurich, Switzerland, Feb. 1991.

Aging and Neuropsychological Assessment. Asenath La Rue. Plenum, New York, 1992. xvi, 369 pp., illus. $45. Critical Issues in Neuropsychology.

Biology of the Grapevine. Michael G. Mullins, Allain Bouquet, and Larry E. Williams. Cambridge University Press, New York, 1992. xii, 239 pp., illus. $59.95. Biology of Horticultural Crops.

Biosynthesis. Molecular and Cell Biochemistry. Smith and Wood. Chapman and Hall, New York, 1992. xiv, 226 pp., illus. Paper, $27.

Butterfly Conservation. T. R. New. Oxford University Press, New York, 1992. xii, 224 pp., illus. Paper, $29.95. Reprint, 1991 ed.

C. P. Snow and the Struggle of Modernity. John de la Mothe. University of Texas Press, Austin, 1992. xx, 242 pp., illus. $35.

The Care and Conservation of Geological Material. Minerals, Rocks, Meteorites and Lunar Finds. Frank M. Howie, Ed. Butterworth-Heinemann, Stoneham, MA, 1992. xvi, 138 pp., illus. $74.95. Butterworth-Heinemann Series in Conservation and Museology.

Catastrophe Theory. V. I. Arnold. 3rd ed. Springer-Verlag, New York, 1992. xiv, 150 pp., illus. Paper, $24. Translated from the Russian by G. S. Wassermann.

Dinosaur Systematics. Approaches and Perspectives. Kenneth Carpenter and Philip J. Currie, Eds. Cambridge University Press, New York, 1992. xvi, 318 pp., illus. Paper, $29.95. From a symposium, Drumheller, Alberta, Canada, June 1986. Reprint, 1990 ed.

Discrete Mathematics for Computing. John E. Munro. Chapman and Hall, New York, 1992. x, 306 pp. Paper, $27.50.

Disease-Mongers. How Doctors, Drug Companies, and Insurers Are Making You Feel Sick. Lynn Payer. Wiley, New York, 1992. xiv, 292 pp. $22.95.

Economics. Mathematical Politics or Science of Diminishing Returns?. Alexander Rosenberg. University of Chicago Press, Chicago, 1992. xviii, 266 pp. $32.50. Science and Its Conceptual Foundations.

Engineering and the Mind's Eye. Eugene S. Ferguson. MIT Press, Cambridge, MA, 1992. xvi, 241 pp., illus. $24.95.

Engineering Field Theory. With Applications. Leo Setian. Cambridge University Press, New York, 1992. xii, 354 pp., illus. $80; paper, $34.95.

Fission-Track Dating. Günther Wagner and Peter Van Den Haute. Enke, Stuttgart, and Kluwer, Norwell, MA, 1992. xiv, 285 pp., illus. $99. Solid Earth Sciences Library, vol. 6. Based on a workshop, Besançon, France, Sept. 1988.

Foraging Strategies and Natural Diet of Monkeys, Apes and Humans. A. Whiten and E. M. Widdowson, Eds. Clarendon (Oxford University Press), New York, 1992. viii, 138 pp., illus. $65. From a meeting, London, May 1991. Also published in *Philosophical Transactions of the Royal Society* B, vol. 334.

Frontiers of Stellar Evolution. David L. Lambert, Ed. Astronomical Society of the Pacific, San Francisco, CA, 1992. viii, 626 pp., illus. $44.50. Astronomical Society of the Pacific Conference Series, vol. 20. From a symposium, Alpine, TX, July 1989.

Genetics of Hearing Impairment. Robert J. Ruben, Thomas R. Van De Water, and Karen P. Steel, Eds. New York Academy of Sciences, New York, 1991. viii, 331 pp., illus. $122. Annals of the New York Academy of Sciences, vol. 630. From a conference, New York, Sept. 1990.

Gravitational-Electromagnetic Field Theory. Fran de Aquino. Vantage, New York, 1992. vi, 138 pp., illus. $18.50.

Green Plants. Their Origin and Diversity. Peter R. Bell. Dioscorides (Timber Press), Portland, OR, 1992. 315 pp., illus. $39.95; paper, $24.95. New edition of *Diversity of Green Plants*.

Handbook of Gene Level Diagnostics in Clinical Practice. Victor A. Bernstam. CRC, Boca Raton, FL, 1992. xxiv, 695 pp. $99.50.

Ivory Diptych Sundials, 1570–1750. Steven A. Lloyd. Harvard University Collection of Scientific Instruments, Cambridge, MA, 1992 (distributor, Harvard University Press, Cambridge). vi, 169 pp., illus. $50.

Japan's Growing Technological Capability. Implications for the U.S. Economy. Thomas S. Arrison *et al.*, Eds. National Academy Press, Washington, DC, 1992. viii, 235 pp., illus. Paper, $30. From a symposium, Washington, DC, Oct. 1991.

Larvae and Evolution. Toward a New Zoology. Donald I. Williamson. Chapman and Hall, New York, 1992. xvi, 223 pp., illus. $39.95.

The Logic of Typed Feature Structures. With Applications to Unification Grammars, Logic Programs and Constraint Resolution. Bob Carpenter. Cambridge University Press, New York, 1992. viii, 270 pp. $34.95. Cambridge Tracts in Theoretical Computer Science.

The Logical Foundations of the Marxian Theory of Value. Adolfo García de la Sienra. Kluwer, Norwell, MA, 1992. viii, 226 pp. $76. Synthese Library, vol. 223.

Making Science. Between Nature and Society. Stephen Cole. Harvard University Press, Cambridge, MA, 1992. xiv, 290 pp. $39.95.

The Male Germ Cell. Spermatogonium to Fertilization. Bernard Robaire, Ed. New York Academy of Sciences, New York, 1991. xii, 510 pp., illus. $106. Annals of the New York Academy of Sciences, vol. 637. From a workshop, Montreal, Quebec, April 1991.

Maternal Substance Abuse and the Developing Nervous System. Ian S. Zagon and Theodore A. Slotkin, Eds. Academic Press, San Diego, CA, 1992. xvi, 377 pp., illus. $89.95.

Methodological Issues in Applied Social Psychology. Fred B. Bryant *et al.*, Eds. Published for the Society for the Psychological Study of Social Issues by Plenum, New York, 1992. xxiv, 304 pp., illus. $49.50. Social Psychological Applications to Social Issues, vol. 2.

Microscopic Simulations of Complex Hydrodynamic Phenomena. Michel Mareschal and Brad Lee Holian, Eds. Plenum, New York, 1992. xiv, 438 pp., illus. $115. NATO Advanced Science Institutes Series B, vol. 292. From an institute, Alghero, Sardinia, July 1991.

Modern Gas-Based Temperature and Pressure Measurements. Franco Pavese and Gianfranco Molinar. Plenum, New York, 1992. xx, 514 pp., illus. $220. International Cryogenics Monograph Series.

Motivation and Personality. Handbook of The-