

lished in the past few years, with more in the works. Among these now available: Alan Boss's *Looking for Earths* stands out as the work of an accomplished participant in the field. Boss is not a planet hunter, but he is a noted theorist who deals with the way solar systems form.

The book is a narrative about scientists in search of planets and the means they use to find those planets. Boss takes us along on the endless academic circuit of conferences, committee meetings, and lectures that consume the time and energy of many experts-in-demand. The reader shares his enthusiasm at milestone announcements of planetary discoveries—and the occasional disappointment when a discovery is later disproved or withdrawn. Where most books on this subject focus on the observational findings, our theorist-guide also recounts the developments within his small circle of specialists on where and how planets form.

Memories are vivid. Boss knows where he was when he heard about 51 Pegasi B, the first accepted extrasolar planet of a Sun-like star, and how he felt when he showed a plot of the latest theoretical computations to a senior colleague. He explains why the manuscript of what is arguably the most important paper in the history of the field, delivered to him by messenger from the offices of *Nature* to be refereed, sat unread for a day or two, despite breathless anticipation. He also details the repeated and finally successful efforts to find brown dwarfs. These are objects with masses below the critical value needed for the onset of sustained nuclear fusion, as in a true star, but otherwise distinguished from planets, although by criteria not yet universally accepted. Boss's tale is personal, one of the relatively rare but welcome accounts in which a scientist shares with the reader the feelings he experienced as, together with colleagues and competitors, he helped lay the groundwork for a new science.

It's the insider's view of committees and advisory panels in *Looking for Earths* that historians of the space program will find most interesting. Boss and friends traveled a long road in their efforts to get the search for Earth-like planets included in the Federal budget. The names of proposed projects and the panels that evaluate them are constantly changing as the tale unfolds, like billboards advertising local attractions on a long highway trip. Fortunately, there's a glossary, so that a reader can distinguish programs such as ASEP, ExNPS, FRESIP, OSI, POINTS, and SIM from consulting groups that include COMPLEX,

PSSWG, SIMSWG, SISWG, and TOPSSWG (I'm not making any of these up). The author is not shy about sharing his impressions of management decisions at NASA and the Jet Propulsion Laboratory or the supposed perfidy of a few insiders, and he doesn't hesitate to label one colleague who emerges victorious from certain program reviews as "fast-talking." Other witnesses, of course, should be heard from.

Anyone who writes his own book is entitled to emphasize his own views. By the start of 1999, there were 17 known planets of Sun-like stars beyond our Solar System. All are at least as massive as Jupiter, yet several reside in very close circular orbits, their periods measured in days rather than years. Such objects were not generally expected. Others, about half of the extra-Solar planets, revolve in notably elliptical orbits having semi-major axes of about 0.2 astronomical unit or larger. Boss terms the latter objects brown dwarfs, with no hint to the reader that most of us call them planets. As brown dwarfs, they fit his formation theories. But as planets, they probably are telling us that more work is needed.

STEPHEN P. MARAN

NASA/Goddard Space Flight Center
Greenbelt, Maryland

Scientific Instruments 1500–1900: An Introduction

▶ Gerard L'E Turner
U. Calif. P., Berkeley, Calif.,
1998. 144 pp. \$40.00 hc
ISBN 0-520-21728-4

Advertised as "a must-have book for the active collector," this thin volume, by Gerard L'E Turner, offers beautiful photographs and brief descriptions of the sort of instruments that one might find in an antique shop or on the auction block. As an introduction to the field, it can't be beat. Collectors with a little experience, however, would do well to consult the more detailed books listed in the bibliography.

Turner adopts the definition of "scientific instrument" that has guided public and private collections for years, placing much more emphasis on instruments designed for practical purposes than on those designed for scientific investigation or demonstration. Accordingly, the bulk of the text pertains to horology, navigation, surveying, drawing, and calculating, weighing and measuring. One short chapter concerns optical instruments (such as microscopes and telescopes), and another concerns instruments used for

natural philosophy (what is now known as physics).

Turner, of Imperial College, University of London, writes for an English audience and gives primacy of place to English examples. Since London was the center of the instrument trade in the 18th century, some of this Anglo focus is warranted. For the 19th century, however, it obscures the important work done by instrument makers in other lands. Turner mentions, for instance, J. J. Lister's invention of achromatic objectives for microscopes, but he ignores the immersion lenses, which originated on the Continent and which British microscopists were slow to adopt. Turner's few references to American instruments indicate an ignorance of recent scholarship in this field.

DEBORAH JEAN WARNER

National Museum of American History
Washington, DC

NEW BOOKS

Particle Physics

Electromagnetic Processes at High Energies in Oriented Single Crystals. V. N. Baier, V. M. Katkov, V. M. Strakhovenko. World Scientific, River Edge, N.J., 1998. 554 pp. \$113.00 hc ISBN 981-02-1603-3

Heavy Flavours II. Advanced Series on Directions in High Energy Physics 15. A. J. Buras, M. Lindner, eds. World Scientific, River Edge, N.J., 1998. 828 pp. \$98.00 hc ISBN 981-02-2215-7

Modulation Spectrometry of Neutrons with Diffractometry Applications. Series on Neutron Techniques and Applications 1. P. Hiismäki. World Scientific, River Edge, N.J., 1997. 177 pp. \$48.00 hc ISBN 981-02-2746-9, Diskette

Physical Electronics

High Speed Diode Lasers. Selected Topics in Electronics and Systems 11. S. A. Gurevich, ed. World Scientific, River Edge, N.J., 1998. 198 pp. \$48.00 hc ISBN 981-02-3237-3

Plasmas and Fusion

Electron Kinetics and Applications of Glow Discharges. NATO ASI Series B, Physics 367. U. Kortshagen, L. D. Tsendin, eds. Plenum, New York, 1998. 557 pp. \$155.00 hc ISBN 0-306-45822-5

Instabilities in a Confined Plasma. Plasma Physics Series. A. B. Mikhailovskii. IOP, Philadelphia, 1998. 462 pp. \$250.00 hc ISBN 0-7503-0532-0

Popularizations

Annals of the Former World. J. McPhee. Farrar, Straus and Giroux, New York, 1998. 696 pp. \$35.00 hc ISBN 0-374-10520-0

Before the Beginning: Our Universe

and Others. M. Rees. Helix Books (Perseus Books), Reading, Mass., 1998 [reissue of 1997 hc]. 291 pp. \$13.00 pb ISBN 0-7382-0033-6

Conquering Calculus: The Easy Road to Understanding Mathematics. J. H. Weaver. Plenum, New York, 1998. 279 pp. \$27.95 hc ISBN 0-306-45988-4

The Earth in Turmoil: Earthquakes, Volcanoes, and Their Impact on Humankind. K. Sieh, S. LeVay. W. H. Freeman, New York, 1998. 324 pp. \$24.95 hc ISBN 0-7167-3151-7

The Einstein Paradox: And Other Science Mysteries Solved by Sherlock Holmes. C. Bruce. Helix Books (Perseus Books), Reading, Mass., 1997. 254 pp. \$12.00 pb ISBN 0-7382-0023-9

Encyclopedia of the Solar System. P. R. Weissman, L.-A. McFadden, T. V. Johnson. Academic, San Diego, Calif., 1999. 992 pp. \$99.95 hc ISBN 0-12-226805-9

Fermat's Enigma: The Epic Quest to Solve the World's Greatest Mathematical Problem. S. Singh. Anchor Books (Doubleday), New York, 1998 [reissue of 1997 hc]. 315 pp. \$12.00 pb ISBN 0-385-49362-2

The Feynman Processor: Quantum Entanglement and the Computing Revolution. *Frontiers of Science.* G. J. Milburn. Helix Books (Perseus Books), Reading, Mass., 1998. 213 pp. \$23.00 hc ISBN 0-7382-0016-6

Great Feuds in Science: Ten of the Liveliest Disputes Ever. H. Hellman. Wiley, New York, 1998. 240 pp. \$24.95 hc ISBN 0-471-16980-3

The New Renaissance: Computers and the Next Level of Civilization. D. S. Robertson. Oxford U. P., New York, 1998. 200 pp. \$25.00 hc ISBN 0-19-512189-9

Patterns in the Sand: Computers, Complexity, and Everyday Life. *Frontiers of Science.* T. Bossomaier, D. Green. Helix Books (Perseus Books), Reading, Mass., 1998. 206 pp. \$23.00 hc ISBN 0-7382-0015-8

The Quantum World Unveiled by Electron Waves. A. Tonomura. World Scientific, River Edge, N.J., 1998. 161 pp. \$38.00 hc ISBN 981-02-2510-5

Ultimate Visual Dictionary of Science. L. Maiklem, ed. DK Publishing, New York, 1998. 448 pp. \$29.95 hc ISBN 0-7894-3512-8

Visions: How Science Will Revolutionize the 21st Century. M. Kaku. Anchor Books (Doubleday), New York, 1997. 403 pp. \$14.00 pb ISBN 0-385-48499-2

A Walk Through Time: From Stardust to Us—The Evolution of Life on Earth. S. Liebes, E. Sahtouris, B. Swimme. Wiley, New York, 1998. 223 pp. \$29.95 hc ISBN 0-471-31700-4

Why Science?. R. S. White. Nova Science, Commack, New York, 1998. 228 pp. \$34.00 hc ISBN 1-56072-531-1

Society and Government

Basic Sciences and Development: Rethinking Donor Policy. M. J. Garrett, C. G. Granqvist. Ashgate Publishing, Brookfield, Vt., 1998. 145 pp. £32.50 hc ISBN 1-85972-562-7

Space and Planetary Science

New Perspectives on Solar Prominences: IAU Colloquium 167. *Astronomical Society of the Pacific Conference Series 150.* Proc. Mtg., Aussois, France, Apr.-May 1997. D. Webb, D. Rust, B. Schmieder, eds. Astronomical Society of the Pacific, San Francisco, 1998. 515 pp. \$44.00 hc ISBN 1-886733-70-8

Solar System Formation and Evolution. *Astronomical Society of the Pacific Conference Series 149.* Proc. Mtg., Rio de Janeiro, Brazil, 1997. D. Lazzaro, R. V. Martins, S. Ferraz-Mello, J. Fernández, C. Beaugé, eds. Astronomical Society of the Pacific, San Francisco, 1998. 194 pp. \$44.00 hc ISBN 1-886733-69-4

Space Physics: An Introduction to Plasmas and Particles in the Heliosphere and Magnetospheres. M.-B. Kallenrode. Springer-Verlag, New York, 1998. 357 pp. \$69.95 hc ISBN 3-540-64126-2

Synoptic Solar Physics. *Astronomical Society of the Pacific Conference Series 140.* Proc. Wksp., Sunspot, N.M., Sep. 1997. K. S. Balasubramaniam, J. W. Harvey, D. M. Rabin, eds. Astronomical Society of the Pacific, San Francisco, 1998. 578 pp. \$44.00 hc ISBN 1-886733-60-0

Statistical Physics and Thermodynamics

A to Z of Thermodynamics. P. Perrot. Oxford U. P., New York, 1998. 329 pp. \$65.00 hc (\$29.95 pb) ISBN 0-19-856556-9 hc (0-19-856552-6 pb)

Fractional Statistics and Quantum Theory. A. Khare. World Scientific, River Edge, N.J., 1997. 309 pp. \$47.00 hc ISBN 981-02-2522-9

Theory and Mathematical Methods

Boundary Value Problems for Transport Equations. *Modeling and Simulation in Science, Engineering and Technology.* V. Agoshkov. Birkhäuser, Boston, 1998. 278 pp. \$69.95 hc ISBN 0-8176-3986-1

Classical and Quantum Mechanics of Noncentral Potentials: A Survey of Two-Dimensional Systems. R. S. Kaushal. Springer-Verlag, New York, 1998. 209 pp. \$59.95 hc ISBN 3-540-64198-X

Classical Dynamics: A Contemporary Approach. J. V. José, E. J. Saletan. Cambridge U. P., New York, 1998. 670 pp. \$125.00 hc (\$54.95 pb) ISBN 0-521-63176-9 hc (0-521-63636-1 pb)

Classical Electrodynamics. T. Tsang. World Scientific, River Edge, N.J., 1997. 411 pp. \$68.00 hc ISBN 981-02-3041-9

Computational Inelasticity. *Interdisciplinary Applied Mathematics 7.* J. C. Simo, T. J. R. Hughes. Springer-Verlag, New York, 1998. 392 pp. \$59.95 hc ISBN 0-387-97520-9

Differentiable Functions on Bad Domains. V. G. Maz'ya, S. V. Poborchii. World Scientific, River Edge, N.J., 1997. 481 pp. \$78.00 hc ISBN 981-02-2767-1

Differential Geometry for Physicists. *Advanced Series on Theoretical Physical*

Science 6. B.-Yu Hou, B.-Yuan Hou. World Scientific, River Edge, N.J., 1997. 546 pp. \$74.00 hc ISBN 981-02-3105-9

Dirac Operators and Spectral Geometry. *Cambridge Lectures Notes in Physics 12.* G. Esposito. Cambridge U. P., New York, 1998. 209 pp. \$34.95 pb ISBN 0-521-64862-9

Finite Element Analysis of Acoustic Scattering. *Applied Mathematical Sciences 132.* F. Ihlenburg. Springer-Verlag, New York, 1998. 224 pp. \$59.95 hc ISBN 0-387-98319-8

Frontiers in Quantum Physics. S. C. Lim, R. Abd-Shukur, K. H. Kwek, eds. Springer-Verlag, New York, 1998. 349 pp. \$79.95 pb ISBN 981-4021-04-0

Lie Groups, Lie Algebras, Cohomology and Some Applications in Physics. *Cambridge Monographs on Mathematical Physics.* J. A. De Azcárraga, J. M. Izquierdo. Cambridge U. P., New York, 1998 [reissue of 1995 hc]. 455 pp. \$49.95 pb ISBN 0-521-59700-5

Mathematical Physics: Applied Mathematics for Scientists and Engineers. B. Kusse, E. Westwig. Wiley, New York, 1998. 668 pp. \$89.95 hc ISBN 0-471-15431-8

Nonequilibrium Statistical Mechanics: Ensemble Method. *Fundamental Theories of Physics 93.* B. C. Eu. Kluwer Academic, Norwell, Mass., 1998. 387 pp. \$173.00 hc ISBN 0-7923-4980-6

A Practical Guide to Heavy Tails: Statistical Techniques and Applications. R. J. Adler, R. E. Feldman, M. S. Taqqu, eds. Birkhäuser, Boston, 1998. 533 pp. \$59.95 hc ISBN 0-8176-3951-9

Probability Theory. V. Rotar. World Scientific, River Edge, N.J., 1997. 414 pp. \$55.00 hc ISBN 981-02-2213-0

Quantum Chance and Non-Locality: Probability and Non-Locality in the Interpretations of Quantum Mechanics. W. M. Dickson. Cambridge U. P., New York, 1998. 244 pp. \$69.95 hc ISBN 0-521-58127-3

Quantum Field Theory: From Operators to Path Integrals. K. Huang. Wiley, New York, 1998. 426 pp. \$74.95 hc ISBN 0-471-14120-8

Quantum Mechanics: A Modern Development. L. E. Ballentine. World Scientific, River Edge, N.J., 1998. 658 pp. \$58.00 hc ISBN 981-02-2707-8

Symmetries in Science X. B. Gruber, M. Ramek, eds. Plenum, New York, 1998. 454 pp. \$139.50 hc ISBN 0-306-45908-6

Wavelet Analysis: The Scalable Structure of Information. H. L. Resnikoff, R. O. Wells Jr. Springer-Verlag, New York, 1998. 435 pp. \$59.95 hc ISBN 0-387-98383-X

Weyl Transforms. *Universitext.* M. W. Wong. Springer-Verlag, New York, 1998. 158 pp. \$44.95 hc ISBN 0-387-98414-3

Undergraduate Texts and Education

All You Wanted to Know About Mathematics but Were Afraid to Ask: Mathematics for Science Students, Vol. 2. L. Lyons. Cambridge U. P., New York, 1998. 382 pp. \$69.95 hc (\$27.95 pb) ISBN 0-521-43466-1 hc (0-521-43601-X pb) ■