

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announcements of planetary discoveries—and the occasional disappointment when a discovery is later disproved or withdrawn.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.

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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.

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