

Book Review

Venus Revealed—A New Look Below the Clouds of Our Mysterious Twin Planet

David H. Grinspoon, Addison–Wesley, Reading, MA, 1997, 351 pp., \$27.50

Atlas of Venus

Peter Catermole and Patrick Moore, Cambridge University Press, Cambridge, England, UK, 1997, 148 pp., \$29.95

Venus II—Geology, Geophysics, Atmosphere, and Solar Wind Environment

S. W. Bougher, D. M. Hunten, and R. J. Phillips (Eds.), University of Arizona Press, Tucson, AZ, 1997, 1362 pp., \$100.00

The successful landing of the *Pathfinder* spacecraft on Mars on July 4, 1997, once again focused the public's attention on space exploration. The dramatic pictures of the landscape of Mars and the maneuvers of the robotic vehicle *Sojourner* generated resurgent interest in planetary exploration. In September the *Global Surveyor* spacecraft entered Mars orbit and began positioning itself for an extensive survey of the surface of Mars. Even as data from these missions begin to return to Earth, scientists have continued to analyze and interpret data from previously successful missions to our closest neighbor, Venus. These three recent books on Venus are thus timely. They present impressive new results from missions such as *Magellan* showing how, in a relatively short time, unmanned missions have revolutionized knowledge of Venus, thereby enhancing the process of understanding the secrets of our own planet.

Since 1961 there have been 23 Venus missions; 18 were Soviet spacecraft, and 5 were from the United States. The first spacecraft to approach Venus was the Soviet *Venera 1* in February 1961, but it lost communications with Earth and failed to transmit any data. After a launch failure of *Mariner 1* in 1962, the U.S. spacecraft *Mariner 2* made the first successful planetary flight and flyby of Venus in December 1962. *Mariner 2* transmitted data showing that the surface of Venus was so hot as to preclude liquid water, that there was no detectable magnetic field, and that the atmosphere was chiefly carbon dioxide and confirmed a very long rotation rate already indicated by radar. In the late 1960s several Soviet *Venera* spacecraft flew by Venus and inserted probes into the atmosphere. In the early 1970s *Venera* spacecraft landed on the surface, and in October 1975 *Venera 9* transmitted the first photograph of the surface. In 1978 the U.S. *Pioneer–Venus* spacecraft provided the first global maps of the planet. The most recent mapping mission was the U.S. *Magellan* spacecraft, which arrived at Venus in August 1990. It completed four 243-day mapping cycles that provided extensive high-resolution images and radiometric, altimetric, and gravity data. Contact with *Magellan* was lost in October 1995.

David H. Grinspoon, an Assistant Professor of Astrophysical and Planetary Sciences at the University of Colorado, Boulder, has written a provocative book on Venus with an emphasis on comparative planetology. *Venus Revealed* is provocative because of its approach. In an introductory chapter, he states, "This book is written not for planetary scientists but for everyone else." His approach has several novel elements: he writes in the first person; he uses nontechnical language with references to popular culture; he uses conventional U.S. units rather than SI units; and by choice very few sources are given. He writes, "Here I don't name names of living scientists involved in current research because I prefer to emphasize the collective human experience of the planets." The lack of documentation is inconsistent with precedent and ultimately frustrating for the curious reader because it fails to provide references to recent Venus literature and precludes delving further into the facts behind arguments presented.

The book is organized into five chapters; the chapter titles and section headings capture the flavor of the book. The chapter titles are Venus Before the Telescope: Goddess at the Edge of Night, Venus Through the Telescope: Earth's Twin, In the Time of Spacecraft: Descent into Hell, Chance or Necessity?: Sizing Up the Planets, and Long Lost Sister: *Magellan* and the Rediscovery of Venus. The section headings for Chapter 1 are representative: Something in the Way She Moves, Venus at Your Fingertips, Five Against Eight, The Piper At the Gates of Dawn, Venus in the City, and The Edge of Night. Throughout the book there are some interesting explanatory sidebars on a variety of topics. The sidebars have intriguing titles such as Men are from Venus—Women are from Mars, About Phase, Why Chemistry?, Who Cares?: Water Abundance, Greenhouse 101, Variations on a Theme: Feedback, Why Convection?, Brush with Plate-Tectonics, and Life Signs? There are a number of illustrations, both line drawings and excellent photographs. Drawings by Carter Emmart with hand-style lettering are attractive.

Some of the writing and analogies are quite effective. For example, in Chapter 6, the well-written section A

Long Hot Venusian Afternoon describes what it would be like on Venus. Less effective are sections in which the author speculates or fantasizes. Although the book is clearly not well-suited for *everyone* besides planetary scientists as the author claims, a good audience for the book is undergraduate college students. The language is likely to be appealing to the younger generation, for whom the humor is relevant and popular culture clearer.

Atlas of Venus is a much more traditional book. Written by two well-known and widely published authors, the book is more factual in approach than the expository *Venus Revealed*, as an atlas should be. *Atlas of Venus* consists of 12 relatively short chapters and 6 appendices. The first six chapters describe Venus and its exploration before spacecraft and then the spacecraft missions through *Magellan*. Chapters 7–10 describe surface features of Venus, and Chapter 11 discusses the history of Venus. Chapter 12 is a one-page commentary on the future of the study of Venus. The appendices present supplementary information, such as a summary of spacecraft missions, names of features, and a reference map. A selected bibliography lists 16 references.

A scientific meeting was held in Tucson, Arizona, in January 1995 to review what is known about the geology, interior structure, atmosphere, and solar wind environment of Venus and to study questions and competing theories. *Venus II* is an impressive outgrowth of that meeting; it is a collection of 36 scholarly papers by 100 collaborating authors. It is organized into nine parts with papers addressing the Solar Wind Environment, the Upper Atmosphere, the Lower Atmosphere, Surface Processes, Geologic Structure, Volcanism, Tectonism, Impact Cratering, and Geodynamics. A typical paper begins with an abstract, is organized into several sections, and contains tables, figures, black-and-white images of Venus, and numerous references. Papers generally conclude by identifying outstanding research questions. A helpful 31-page glossary contains about 250 definitions. The volume also includes an extensive index. A CD-ROM included with the book contains text, graphics, software, and various data from book authors.

Earl A. Thornton
University of Virginia

UNITED STATES POSTAL SERVICE™

Statement of Ownership, Management, and Circulation
(Required by 39 U.S.C. 3685)

1. Publication Title Journal of Spacecraft and Rockets	2. Publication No. 0 0 2 2 - 4 6 5 0	3. Filing Date 1/25/98
4. Issue Frequency BI-Monthly	5. No. of Issues Published Annually 6	6. Annual Subscription Price \$45/\$75
7. Complete Mailing Address of Known Office of Publication (Street, City, County, State, and ZIP+4) (Not Printer) American Institute of Aeronautics and Astronautics 1801 Alexander Bell Drive, Reston, VA, 20191		
8. Complete Mailing Address of Headquarters or General Business Office of Publisher (Not Printer) (above)		
9. Full Names and Complete Mailing Addresses of Publisher, Editor, and Managing Editor (Do Not Leave Blank) Publisher (Name and Complete Mailing Address) Norma Brennan- AIAA (address above) Editor (Name and Complete Mailing Address) E. Vincent Toby, NASA Langley Research Center, MS 408A, Hampton, VA, 23681 Managing Editor (Name and Complete Mailing Address) Mary Ellen Lanham- AIAA (address above)		
10. Owner (If owned by a corporation, its name and address must be stated and also immediately thereafter the names and addresses of stockholders owning or holding 1 percent or more of the total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a partnership or other unincorporated firm, its name and address as well as that of each individual must be given. If the publication is published by a nonprofit organization, its name and address must be stated.) (Do Not Leave Blank.)		
Full Name American Institute of Aeronautics and Astronautics	Complete Mailing Address 1801 Alexander Bell Drive, Reston, VA, 20191	
11. Known Bondholders, Mortgagees, and Other Security Holders Owning or Holding 1 Percent or More of Total Amount of Bonds, Mortgages, or Other Securities. If none, check here. <input checked="" type="checkbox"/> None		
Full Name	Complete Mailing Address	
12. For completion by nonprofit organizations authorized to mail at special rates. The purpose, function, and nonprofit status of this organization and the exempt status for federal income tax purposes. (Check one) <input checked="" type="checkbox"/> Has Not Changed During Preceding 12 Months <input type="checkbox"/> Has Changed During Preceding 12 Months (If changed, publisher must submit explanation of change with this statement)		

PS Form 3526, October 1994 (See Instructions on Reverse)

13. Publication Name Journal of Spacecraft and Rockets	14. Issue Date for Circulation Data Below November/December 1997	
15. Extent and Nature of Circulation	Average No. Copies Each Issue During Preceding 12 Months	Actual No. Copies of Single Issue Published Nearest to Filing Date
a. Total No. Copies (Net Press Run)	2338	2311
b. Paid and/or Requested Circulation (1) Sales Through Dealers and Carriers, Street Vendors, and Counter Sales (Not Mailed)		
(2) Paid or Requested Mail Subscriptions (Include Advertisers' Proof Copies/Exchange Copies)	1734	1758
c. Total Paid and/or Requested Circulation (Sum of 15b(1) and 15b(2))	1734	1758
d. Free Distribution by Mail (Samples, Complimentary, and Other Free)		
e. Free Distribution Outside the Mail (Carriers or Other Means)		
f. Total Free Distribution (Sum of 15d and 15e)		
g. Total Distribution (Sum of 15c and 15f)	1734	1758
h. Copies Not Distributed (1) Office Use, Leftovers, Spoiled	535	484
(2) Return from News Agents		
i. Total (Sum of 15g, 15h(1), and 15h(2))	2338	2311
Percent Paid and/or Requested Circulation (15c / 15g x 100)	74.2%	76.1%
16. This Statement of Ownership will be printed in the Jan/Feb 98 issue of this publication. <input type="checkbox"/> Check box if not required to publish.		
17. Signature and Title of Editor, Publisher, Business Manager, or Owner <i>Norma Brennan, Publications</i>	Date 1/27/98	
I certify that all information furnished on this form is true and complete. I understand that anyone who furnishes false or misleading information on this form or who omits material or information requested on the form may be subject to criminal sanctions (including fines and imprisonment) and/or civil sanctions (including multiple damages and civil penalties).		

Instructions to Publishers

- Complete and file one copy of this form with your postmaster on or before October 1, annually. Keep a copy of the completed form for your records.
- Include in items 10 and 11, in cases where the stockholder or security holder is a trustee, the name of the person or corporation for whom the trustee is acting. Also include the names and addresses of individuals who are stockholders who own or hold 1 percent or more of the total amount of bonds, mortgages, or other securities of the publishing corporation. In item 11, if none, check box. Use blank sheets if more space is required.
- Be sure to furnish all information called for in item 15, regarding circulation. Free circulation must be shown in items 15d, e, and f.
- If the publication had second-class authorization as a general or requester publication, this Statement of Ownership, Management, and Circulation must be published; it must be printed in any issue in October or the first printed issue after October, if the publication is not published during October.
- In item 16, indicate date of the issue in which this Statement of Ownership will be printed.
- Item 17 must be signed.

Failure to file or publish a statement of ownership may lead to suspension of second-class authorization.