

Unfortunately, precisely because there is no other recent introduction to the history of geology, newcomers to the field have little choice.

The French Ministry of Culture and Communication gave financial aid towards the translation and publication of *A* (note, not *The*) *History of Geology*. Well, they would, wouldn't they? □

Peter J. Smith is in the Department of Earth Sciences, The Open University, Milton Keynes MK7 6AA, UK.

Close encounters

Clark R. Chapman

Wanderers in Space: Exploration and Discovery in the Solar System. By Kenneth R. Lang and Charles A. Whitney. Cambridge University Press: 1991. Pp. 316. £35, \$54 (hbk); £15.95, \$24.95 (pbk).

THE subject of this book is, literally, everything under the Sun. And a big subject it is too, for we have recently acquired a new understanding of the Solar System thanks to the 'golden age of planetary exploration'. Accounts of the planets published in the early and middle decades of this century seem quaint and mostly wrong today. They were based on the painstaking observations of astronomers, staring at small, blurry images in their telescopes. Astronomers also attached crude instruments (such as spectrometers and bolometers) to their telescopes to analyse planetary radiation.

One can admire the intellectual feat of learning about other worlds from such paltry data. Sometimes the astronomers got it right; often they got it very wrong. But now space-age technology allows cameras and instruments to fly past planets, or even land on their surfaces, and measure them close up. The results of this new technology have been truly revolutionary, changing our concept of our own world and how we came to be here. (The increasing recognition of the role of impacts in shaping planetary history points even to the possible catastrophic end of civilization as we know it.)

The detective skills of astronomers, generalizing from meagre data, have been superseded by the very different skills of geologists, atmospheric scientists, cosmochemists and others who try to make sense of compact-disk libraries full of planetary data. Magellan's radar mapping of Venus is itself testing the limits of how rapidly we can acquire and process vast quantities of data. And



Reaching for Jupiter — a mosaic of Voyager 1 images taken in violet light in 1979. (From *The Journeys of Voyager* by R. Kerrod, published by Prion.)

what we are learning about Venus is being understood not by astronomers but by geoscientists long familiar with discerning essential relationships from the wealth of data provided by our own planet.

With our rapidly changing knowledge of the planets, there is always room for a new summary of what we have learned. And *Wanderers in Space* is a nicely produced, readable and competent attempt at that. There are chapters on each of the planets (and their satellite systems), as well as on comets, asteroids and the origin of the Solar System. Although not explicitly intended as such, this well-organized volume could serve as an introductory text.

With the exception of a series of rather crude, hand-drawn diagrams that purport to summarize each planet, the volume is well illustrated. Paintings and historical illustrations supplement the more usual smattering of graphs and colour photographs taken by planetary spacecraft. Several pages, including four photographs, are devoted to Voyager's 1989 encounter with Neptune.

A problem, though, is that the book is written by two astronomers. I found little that is factually wrong with their accounts of modern planetary science, although sometimes they miss the central points. Often they have intriguing or amusing ways of explaining arcane concepts to the general reader. But we learn more about the authors' education in a field with which they have little professional connection than we learn about planetary science as it is actually researched. Planetary geology and especially cosmochemistry are largely ignored.

The chapter on the Moon is a case in point. Lang and Whitney tell us about what the Moon looks like through a telescope, about its tides, about its gravity field, and about possible theories of its origin. But the geology and geo-

chemistry of the Moon, and the results of the extensive analyses of Moon rocks collected by astronauts, are ignored and trivialized. Indeed, there are several books devoted to lunar basaltic volcanism, but Lang and Whitney reduce the topic to two sentences, one of which bizarrely defines basalt as a kind of rock that on Earth is "associated with lava flows that have solidified in the form of tall columns".

The authors have sometimes failed in the difficult task of keeping fully abreast of rapidly changing fields. It was true a decade ago that only 2,500 asteroids were known but the number is twice as large today. The main developments in planetary science up to the mid-1980s are noted, but are incomplete thereafter. The annotated bibliography is particularly useful until roughly 1989.

In general, the book provides a useful and accessible astronomical view of the Solar System. It should be supplemented by other books that view our world, its environs and its neighbours from the perspectives of the other disciplines that comprise planetary science: space physics, cosmochemistry, planetary geology and geophysics, the atmospheric sciences and even exobiology. □

Clark R. Chapman is in the Planetary Science Institute, 2421 East Sixth Street, Tucson, Arizona 85719, USA.

■ Two related books have recently been published: *Space Commerce* by John L. McLucas (with a foreword by Arthur C. Clarke) relates the history of private enterprise in space and discusses its influence on world space policy and research (Harvard University Press, price £19.95); and *Space Weapons and the Strategic Defense Initiative* in which Crockett L. Grabbe surveys the developments in space weapon systems since SDI, assessing the prospects, weaknesses and potential dangers of strategic defence against nuclear missiles (Iowa State University Press, price \$27.95). □