A Supercontinent

Gondwana Five. Papers from a symposium, Wellington, New Zealand, Feb. 1980. M. M. CRESSWELL and P. VELLA, Eds. Balkema, Rotterdam, 1981 (U.S. distributor, MBS, Salem, N.H.). x, 340 pp., illus. $48.

An organic chemist residing on one of the fragments of the former supercontinent of Laurasia could readily be forgiven for thinking that *Gondwana Five* might be the most recent episode in the *Star Wars* saga. Indeed, there was a time when the vast majority of Northern Hemisphere geologists believed that the Gondwana supercontinent, like its Northern Hemisphere counterpart, belonged in the realm of science fiction. The main proponents of continental drift during the 1930's, 1940's, and 1950's were geologists such as Alexander du Toit, Arthur Holmes, and Lester King with experience of the present southern continents. *Gondwana Five* reflects the marriage of classical Gondwana stratigraphy with sea-floor spreading and plate tectonics. Three of the four previous Gondwana symposiums concentrated on the type Gondwana sedimentary sequences and their correlation. Only at Canberra in 1973 did the symposium participants get their feet wet and devote significant time to marine sequences. Hence the fifth Gondwana symposium was a milestone in the development of thought concerning the supercontinent.

It is appropriate that Wellington should have been the site of this meeting because, as the editors of the book point out, the New Zealand microcontinent has tended to be neglected in reconstructions of Gondwana, ironically even in the one forming the frontispiece of the book. Central to the new view of Gondwana that emerges from the volume is the recognition that much of New Zealand and West (Lesser) Antarctica, as well as the Pacific margin of South America, is not merely a late Mesozoic and Cenozoic "Andean" orogen as shown on many tectonic maps but constitutes the Paleozoic and early Mesozoic Pacific (or Panthallassic) convergent margin of the Gondwana supercontinent. Understanding of this margin is crucial not only to the jigsaw puzzle of Gondwana reconstruction in the complex area between South America and eastern Australia, but also to important problems involving paleocirculation, paleoclimate, and paleobiogeography. Another significant departure taken in the book is the acknowledgement that the Gondwana supercontinent existed from late Precambrian or early Paleozoic time and that several portions of southern Asia from Turkey to Indochina, not just India, were probably parts of Gondwana rifted away during the Paleozoic before ultimate fragmentation. Thus two papers on the geology of China are included with contributions on Australia, India, South America, Africa, Antarctica, and New Zealand. Together with general papers these amount to a total of 47 papers, in addition to which there are 13 abstracts in the volume.

The book was prepared from author-supervised camera-ready typescripts, and the length of the contributions had to be severely limited. It is understandably, therefore, not a "handsome" volume and does not contain any lengthy papers rich in new data. It can, however, be recommended strongly as an overview of the state of the art in Gondwana geology sensu lato. It is particularly valuable because it has been published while the meeting is still fresh in the minds of even the participants.

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Planets and Satellites

The New Solar System. J. KELLY BEATTY, BRIAN O'LEARY, and ANDREW CHAIKIN, Eds. Cambridge University Press, New York, and Sky Publishing Corporation, Cambridge, Mass., 1981. viii, 224 pp., illus. $19.95.

In the 12 years that have elapsed since the first man walked on the moon, our knowledge about the solar system we inhabit has grown dramatically. Objects that were once little more than points of light in the sky are now familiar worlds. Though some of this new wisdom is highly technical, much of it is accessible to anyone curious enough to examine a picture. And what sights the effort will reveal! We have now surveyed every planet known to the ancients, finding phenomena as diverse as sulfurous volcanoes on Io, cratered terrains on Mercury, and frozen carbon dioxide polar caps on Mars. As this is being written, the second Voyager spacecraft is moving steadily closer to Saturn, where its sister craft has already discovered intricate structures beyond expectation in the planet's famous rings and new moons with unusual orbits that help to keep these rings in place.

All of these discoveries, the technical and the pictorial, are discussed in a pleasing way in this handsome new book. With studies of the solar system proceeding at a breakneck pace, it is impossible for any book to be truly current. This one takes us through the highlights of the November 1980 Voyager encounter with Saturn.

The range of topics covered is very comprehensive. The book begins with a historical introduction by Noel Hinners that describes how the NASA programs developed. John Eddy's chapter on the sun is the first of 19 scientific chapters, which end with a general review of current theories on solar system origin by John Lewis. Along the way, there are chapters on some individual planets and other chapters that group objects to discuss surfaces, atmospheres, or phenomena such as collisions and magnetospheres. This necessarily leads to some redundancy. But, given the level of controversy surrounding many of these new discoveries and interpretations, more than one point of view is often desirable. There is even an engaging on-the-scene account by Bradford Smith of the activities of the Voyager imaging team during the high points of the Jupiter and Saturn encounters. The sense of intimacy with the process of scientific exploration is sustained in many of the other chapters by the authors' use of the first person in describing their own work.

The book most resembles a kind of encyclopedia, in which an interested reader can delve for current information about a particular subject. But because it is so comprehensive and so fresh, it is also a pleasure simply to read right through it. The illustrations are of high quality and are often new or unusual, and there is a pleasing blend of results from spacecraft, telescopes, laboratories, and even fieldwork on earth.

A difficulty in a book of this type is that there is no narrative thread that carries the reader along; the bits and pieces aren't always stitched together to form a pattern, as they are in a conventional account. Thus the reader must struggle to relate James Pollack's review of atmospheric evolution to Harold Masursky's description of the history of water on Mars and Gerald Soffen's discussion of the search for life on that enigmatic planet. Similarly, there are ten chapters devoted to moons, craters, asteroids, meteorites, and comets, and each is more or less independent of the others. The editors have helped by adding cross-references, and the diligent reader will want to peruse these related chapters more than once before trying to