Asteroids III

by William F. Bottke Jr., Alberto Cellino, Paolo Paolicchi & Richard P. Binzel (Eds)

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It has finally arrived: the latest landmark publication in the Space Science Series from the University of Arizona Press. It is almost 14 years since its predecessor, *Asteroids II* appeared and a great deal has happened since that time to revolutionise this subject.

This book, made possible by contributions from 150 collaborating authors, brings together the latest information obtained by spacecraft, combined with astronomical observations and theoretical modelling, to present our best current understanding of asteroids and the clues they reveal for the origin and evolution of the Solar System. It builds on the fine tradition established by the previous two generations of this book, and sets out to become the definitive source on asteroids for the next decade.

Although it is now more than two centuries since Piazzi discovered Ceres, the first asteroid, the last decade or so has marked a rapid acceleration in our knowledge of these distant tiny worlds. We now know of many examples of binary asteroids, and of objects that spin with periods of a few minutes, which by their very nature must be monolithic. Instead of always being seen as remote near-point sources of light, radar observations of near-Earth objects (NEOs) have been so refined that Arecibo now achieves a spatial resolution as small as 15 metres, and spacecraft missions, including the highly-successful *NEAR-Shoemaker* probe to Eros, have provided us with wonderful close-up imagery. New insights are being gained into asteroid-meteorite connections and into the relationships with comets and even with meteoroid streams. Tremendous advances have been made in determining orbital characteristics and this work has permitted the hazards posed by asteroids colliding with the Earth to be quantified with unprecedented accuracy. Ground-based surveys have become highly automated enhancing the discovery rate for new objects especially in the search for NEOs.

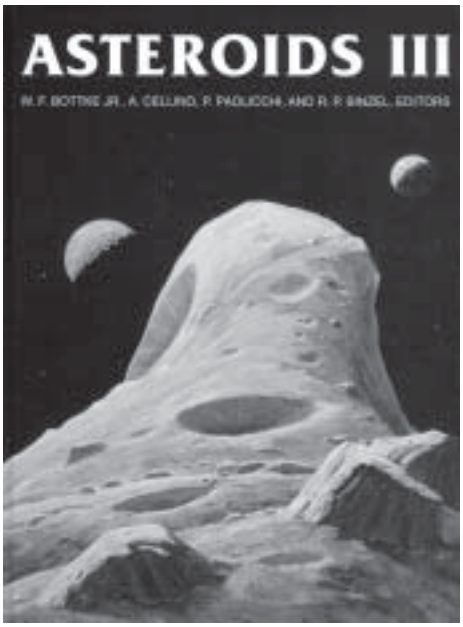
Asteroids III is a large book: it has to be, to be able to bring together so much information in one volume. It contains 8 colour plates, 52 halftones and 247 line illustrations embedded in an 8.5" × 11" format weighing over 2kg. Reproduction is on archival-quality paper in a cloth binding with a resilient hard-backed cover illustrated front and back, and clearly intended to last the test of time.

The book is a compilation of 51 articles, the large majority of which are multi-authored. What I particularly liked is the way in which each of these articles reviews the past history of its topic before going on to describe current advances as well as providing masses of references (including their titles) thus making the entire volume an invaluable resource. There is no need to have access to the two forerunner volumes, this is indeed a stand-alone text. There is even an article dedicated to the dawning of the subject, the so-called problem of the 'missing planet' and the discovery of Ceres, from a historical perspective.

Given that our understanding of asteroids has progressed dramatically in recent years, it has now been possible for many of the articles to draw on the comparisons between asteroids and meteorites, comets and interplanetary dust. Indeed, one article describes the way in which comets may evolve to become dormant or extinct comet candidates among the asteroid population. We also now have a detailed understanding of the chronology of asteroid formation, and of the way in which collisions have aged the population to where it is today. Asteroids can now be classified in upwards of 50 families based on their orbital characteristics. Many of these families and even specific asteroids can be reliably associated with certain meteorite groups. So although this book is unambiguous in its title, if you want to know more about the links between asteroids, comets and meteorites then this book is for you also.

There is no CD associated with the book but the last article is on the subject of data archiving and gives a description of the NASA Planetary Data System, which includes a section devoted to small bodies including asteroids and comets. Reference is also made to other important asteroid archives available via the World Wide Web.

Although the contributions come from virtually all of the recognised international authorities on the subject around the world, the quality of the writing is exceptionally good, being accurate and making full use of the English language. Indeed, I commend the editors for their achievement in assembling such a marvellous book, which from my reading so far appears to be error free. Given the immense collection this book represents, I still have many happy hours ahead of me exploring its contents further.



Richard Miles

Dr Richard Miles has followed this topic for many years, having served as Assistant Director of the Asteroids and Remote Planets Section of the BAA since 1984