

Contents

Acknowledgments	vii
Preface	ix
1 The Origin of Cometary Thought	1
<i>Aristotle's Meteorologica</i> , 2	
<i>Seneca's Natural Questions</i> , 6	
<i>The Natural History of Pliny the Elder</i> , 10	
<i>The Tetrabiblos of Ptolemy and the Centiloquy</i> , 14	
<i>Summary</i> , 16	
2 Medieval Views	19
<i>The Period to About 1200: Theology and Superstition</i> , 19	
<i>1200–1577: The Rebirth of Scientific Observations</i> , 24	
<i>The Comet of 1577</i> , 33	
<i>Early Chinese Contributions to the History of Comets</i> , 42	
<i>Summary</i> , 48	
3 Johannes Kepler, Galileo, and the Comets of 1607 and 1618	51
<i>The Ephemeral Comets of Johannes Kepler</i> , 52	
<i>The Devil's Advocate: Galileo Galilei</i> , 57	
<i>Early Seventeenth Century Views on Comets</i> , 62	
<i>Summary</i> , 67	

Contents

- 4 The Comet of 1664: Confusion Reigns** 69
Closed Orbits: The Comet of 1664 as a Permanent Object, 70
*Rectilinear Orbits: The Comet of 1664 as a
Transitory Object*, 78
Summary, 93
- 5 The Comet of 1680: Newton's View from the
Shoulders of Giants** 95
Kirch and Dörffel, 96
Newton and Flamsteed, 99
Summary, 108
- 6 The Return of Comet Halley** 111
The Predicted Return of Comet Halley, 111
The Race for Recovery, 123
Recovery at Last, 131
Summary, 136
- 7 The Eighteenth Century: The Orbit Computers** 141
Theoretical Work, 141
The Orbit Computers, 152
Cometary Thought in the Eighteenth Century, 160
Summary, 168
- 8 The Nineteenth Century: The Shrinking Orbit of
Comet Encke, the Disintegration of Comet Biela,
and the Meteor Showers** 169
Comet Encke and the Resisting Medium, 169
The Short Life of Comet Biela, 181
Comets and Meteor Showers, 188
Summary, 201
- 9 The Physics of Comets** 203
The Introduction of Photography, 205
Composition of the Cometary Atmosphere and Tail, 213
The Formation of Cometary Tails, 230
The Cometary Nucleus, 241
Summary, 253

Contents

10 Comet Halley	255
<i>The Returns of Comet Halley</i> , 256	
<i>The Halley Spacecraft Armada, the International Halley Watch, and the International Cometary Explorer</i> , 273	
<i>Halley's Dust and Gas Atmosphere</i> , 280	
<i>Comet Halley's Nucleus</i> , 292	
<i>Chemical Clues for the Origin of Comet Halley</i> , 297	
11 The Births and Deaths of Comets	301
<i>Interstellar and Solar System Sources of Comets</i> , 302	
<i>The Oort Cloud of Comets</i> , 313	
<i>Further Refinements and Alternatives to the Oort Cloud</i> , 321	
<i>A Possible Inner Oort Cloud and a Comet Belt Beyond Neptune</i> , 332	
<i>Cometary End States</i> , 337	
<i>Summary</i> , 356	
Epilogue	359
Appendix: Naked-Eye Comets Reported Through A.D. 1700	361
Bibliography	425
Index	475