This is a ground-breaking study of the astronomical culture of sixteenth-century Europe. It examines, in particular, the ways in which members of the nascent international astronomical community shared information, attracted patronage and respect for their work, and conducted their disputes. Particular attention is paid to the Danish astronomer, Tycho Brahe (1546–1601), known for his observatory Uraniborg on the island of Hven, his operation of a printing press, and his development of a third world-system to rival those of Ptolemy and Copernicus. Adam Mosley examines the ways in which Tycho interacted with a Europe-wide network of scholars, looking not only at how he constructed his reputation through print, but also at his use of correspondence and the role that instruments played as vehicles for data and theories. The book will be of interest to historians of science, historians of the book, and historians of early modern culture in general.

Adam Mosley is Lecturer in History at Swansea University.
BEARING THE HEAVENS

Tycho Brahe and the Astronomical Community of the Late Sixteenth Century

ADAM MOSLEY
For my parents
Contents

List of illustrations ix
Acknowledgements xii
List of abbreviations xiv

1 Bearing the heavens 1
   I Coelifer: Atlas as bearer of the heavens 4
   II Astronomy and kingship: disciplinary history and princely practice 19
   III Tycho Brahe, Prince of Astronomers 25

2 Tycho Brahe’s astronomical letters 31
   I Tycho Brahe and the Republic of Letters 33
   II Epistolary origins: the beginning of the Hven–Kassel exchanges 39
   III Weddings, merchants, and other hindrances to goodwill 50
   IV Epistolary calibration: instruments, refraction and cosmology at Uraniborg and Kassel 55
   V Intellectual property, credit, and the exchange of gifts 99
   VI Conclusion 111

3 Books and the heavens 116
   I From manuscript to print 119
      (i) To please all men of learning and goodwill? 119
      (ii) A dedicated gift . . . ? 126
      (iii) . . . or an astronomical text? 137
   II Astronomical readers 149
      (i) Textual astronomy 149
      (ii) The astronomical library 166
      (iii) Readings hostile and authorial 182
   III A melancholy conclusion 205

4 Instruments 209
   I Globi Tychonici 217
   II Printing and privilege: books, globes, and gifts 243
Contents

III Moving heaven and earth: models of celestial motion 265
IV Conclusion 284

5 Concluding remarks 289

Appendix: Known and presumed owners of Tycho’s works prior to 1602 298
References 307
General index 340
Index of correspondence 352
Illustrations

1.1 (a) Tycho’s ‘great equatorial armillary of one-and-a-half-circles’. (b) Detail. Courtesy of the Whipple Library, University of Cambridge. 


1.3 Atlas, from G. Reisch, *Margarita Philosophica* (Freiburg, 1503), m2v. By permission of the Syndics of Cambridge University Library.

1.4 Atlas, from the title-page of Hartmann Beyer’s *Quaestiones in libellum de sphaera Ioannis de Sacro Busto* (Frankfurt, 1551). Courtesy of the Whipple Library, University of Cambridge.

1.5 Atlas, from J. Schönér, *Opusculum geographicum* (Nuremberg, 1533), Btr. By permission of the British Library [BL 713.f.31].

1.6 Armillary sphere by Christoph Schissler of Augsburg, borne by Hercules. By permission of the Bayerisches National Museum [Inv. Nr. Phys. 27].

1.7 Tycho’s geoheliocentric world-system, from his *De mundi aetherei recentioribus phaenomenis* (Uraniborg, 1588), 189. Courtesy of the Whipple Library, University of Cambridge.

2.1 A diagrammatic representation of the astronomical community of the late sixteenth century.

2.2 The matched portraits of Wilhelm and his wife Sabine, painted in 1577, probably by the artist Caspar van der Borcht. By permission of the Astronomisch-Physikalisches Kabinett, Staatliche Museen Kassel.

2.3 The method of transversal scale division, as illustrated in Tycho’s *De mundi aetherei recentioribus phaenomenis*
List of illustrations

(Uraniborg, 1588), 461. Courtesy of the Whipple Library, University of Cambridge. 55

2.4 The instrument-beams with the rimulae or slit-sights, as illustrated in Tycho’s *De mundi aethereis recentioribus phaenomenis* (Uraniborg, 1588), 462. Image courtesy of the Whipple Library, University of Cambridge. 56

2.5 Tycho’s *quadrans minor* (or *mediocris*), as illustrated in the *Astronomiae instauratae mechanica* (Wandsbek, 1598). Courtesy of the Whipple Library, University of Cambridge. 57

3.1 The portrait of Tycho placed at the beginning of the *Epistolae astronomicae* (Uraniborg, 1596). By permission of the Syndics of Cambridge University Library. 127

3.2 (a) The front cover of a presentation copy of the *Epistolae astronomicae* (Uraniborg, 1596), displaying Tycho’s portrait. (b) The back cover, showing the Brahe arms and Tycho’s motto. Courtesy of the Herzog August Bibliothek, Wolfenbüttel [Astronomica 8]. 130

4.1 (a) The zodiacal armillary and (b) the second equatorial armillary depicted in Tycho’s *Astronomiae instauratae mechanica* (Wandsbek, 1598), from the later 1602 ‘edition’ of the work sold under the Nuremberg imprint of Levinus Hulsius. Courtesy of the Whipple Library, University of Cambridge. 211

4.2 A ‘Louain-style’ planispheric and universal astrolabe, c.1570. Image courtesy of the Whipple Museum of the History of Science, University of Cambridge [Wh 1467]. 215

4.3 Tycho Brahe’s *Globus Magnus Orichalcicus*, or Great Brass Globe. Courtesy of the Whipple Library, University of Cambridge. 219

4.4 The plan of Uraniborg. Courtesy of the Whipple Library, University of Cambridge. 224

4.5 Tycho’s mural quadrant. Courtesy of the Whipple Library, University of Cambridge. 228

4.6 The single extant celestial globe produced by the van Langren firm of Amsterdam in 1594. Photograph by Ursula Seitz-Gray, reproduced by permission of the Historisches Museum Frankfurt [HMF X 14609]. 231

4.7 Detail of the van Langren globe of 1594, clearly showing the portrait of Tycho. Photograph by Ursula Seitz-Gray,
List of illustrations

reproduced by permission of the Historisches Museum Frankfurt [HMF X 14609].

4.8 A gilt-brass waywiser by Christoph Trechsler, dated 1584. By permission of the Staatliche Kunstsammlungen Dresden, Mathematisch-Physikalische Salon [Inv. Nr. C.III.a.4].

4.9 The planetary clock by Baldewein, Bucher and Diepel, manufactured at Marburg and Kassel between 1563 and 1568 for Elector August of Saxony. By permission of the Staatliche Kunstsammlungen Dresden, Mathematisch-Physikalische Salon [Inv. Nr. D.IV.d.4].

4.10 A gilt mechanical celestial globe, with terrestrial globe below and armillary sphere above, produced by Georg Roll and Johannes Reinhold in Augsburg in 1586. By permission of the Staatliche Kunstsammlungen Dresden, Mathematisch-Physikalische Salon [Inv. Nr. E.II.2].

4.11 (a) Table-clock produced by Jost Bürgi, c.1591, with a case by the goldsmith Hans Jakob Emck. (b) A detail from the case, showing Copernicus with a diagram of his world-system. By permission of the Astronomisch-Physikalisches Kabinett, Staatliche Museen Kassel [Inv. Nr. U 24].

4.12 The diagram of Ursus’ world-system, as published in his Fundamentum Astronomicum (Strasbourg, 1588). By permission of the British Library [BL 8561.c.56].
It is only appropriate, in a book that is concerned with scholarly communication and collaboration, to acknowledge the debts that I have incurred in researching and writing it. Some of those debts have been financial. Accordingly, I gratefully acknowledge funding received from the British Academy; the Master and Fellows of Trinity College, Cambridge; the Isaac Newton Trust; Princeton University; and the Worshipful Company of Instrument Makers. A greater proportion of support received has been intellectual. A number of scholars have generously shared with me their time, expertise, encouragement, and – in several instances – their published and unpublished work. I would like to thank, in particular, my doctoral supervisors Nick Jardine and Liba Taub; Anthony Grafton, who stood, academically, in loco parentis during my time as a Jane Eliza Procter Fellow at Princeton University; and Sachiko Kusukawa.

Other scholars to whom I am individually indebted include Silke Ackermann, John Christianson, Mordechai Feingold, Owen Gingerich, Miguel A. Granada, Jürgen Hamel, Richard Kremer, Dieter Launert, Michel-Pierre Lerner, Bruce Moran, John North, Günther Oestmann, Alain Segonds, Gerard L’Estrange Turner, Karin Tybjerg, Steven Vanden Broecke, and Peter Zeeberg. It has been my great privilege to study and work at a number of institutions where the boundaries between professional collegiality, intellectual exchange, and friendly conviviality have been happily blurred. In addition to those already mentioned, I would like to thank the staff and students of the Cambridge University Department of History and Philosophy of Science, especially the members of the Cambridge Latin Therapy Group and EPACTS; the staff and students of the Program in History of Science of Princeton University 1999/2000, and the graduate intake to the History Department in that year; the Fellows of Trinity College, Cambridge; and the staff of the History Department of the University of Wales, Swansea. I am particularly grateful to the following individuals: Eric Ash, Alex Bueno-Edwards, Brooke Blower, Stuart Clark,
Acknowledgements

Jennifer Downes, Catherine Eagleton, Marina Frasca-Spada, Dan Healey, Tamara Hug, Jill Lewis, Volker Menze, Jo Miles, Clara Oberle, Richard Serjeantson, Kemal de Soysa, Andrew Taylor, and Adelheid Voskuhl. I have also benefited enormously from the collections and the expertise and helpfulness of the staff at the following institutions: the British Library; Cambridge University Library; Det Kongelige Bibliotek, Copenhagen; and the Whipple Museum, Cambridge.

I would also like to thank a number of other individuals who have, over the years, contributed to the completion of this book through the provision of welcome and necessary distractions: Stephen Balchin, David Chart, James Goodman, Ian Halverson, Jennifer Jellicorse, Marisa Lohr, Robin Oakley, Mike Pitt, Geoff Pradella, and Helen Steele.

Finally, I must thank my editors at the Press, and all those involved in the production of this book, including the anonymous readers.

It takes a great many people to support the production of what, somewhat unfairly, is known as a monograph – a fact that may usefully be borne in mind when reading this book. Nevertheless, just one person is responsible for any errors and omissions in the finished work, and that is the author. I look forward to the correction, criticism, and development of this study that publication provokes.
Abbreviations


