

# Geared to the Stars



THE EVOLUTION OF PLANETARIUMS, ORRERIES  
AND ASTRONOMICAL CLOCKS

HENRY C. KING

in collaboration with John R. Millburn

# Geared To The Stars The Evolution Of Planetariums Orreries And Astronomical Clocks

**David King**



## **Geared To The Stars The Evolution Of Planetariums Orreries And Astronomical Clocks:**

**Geared to the Stars** Henry C. King, John R. Millburn, 1978      **Orreries, Clocks, and London Society** Tony Buick, 2020-12-23 Orreries mechanical models of the Solar System and its motions are found everywhere They appear in paintings on computers across natural landscapes and in museums all over the world The more you look the more you find yet their significance is often overlooked aside other great astronomical inventions This book reclaims the history of the orrery offering a fascinating look into its evolution over the centuries With a particular focus on London society and clockmakers it weaves together historical narrative with practical know hows and scientific fact showing how the orrery changed from a fanciful toy to a high tech instrument to a vessel for art and education The first edition Orrery explained what an orrery is and how it got its name This revised edition goes several steps further tracing the instrument back to the time of Ptolemy and forward to planetariums and star projectors In addition it features new sections on how to construct your own orrery at home This book will appeal to anybody interested in astronomical mechanical devices scientific instruments horology or the history of clocks      **The Universe Unveiled: Instruments and Images Through History** Bruce Stephenson, Marvin Bolt, Anna Felicity Friedman, 2000-11-13 The Universe Unveiled documents the human desire through history to explore and understand our world Taking a unique approach it focuses on the instruments books and maps people have created to decipher the Universe from the late fifteenth through to the nineteenth century Throughout the book is richly illustrated with over 270 full color images including those of rare and unusual artifacts from all over the world kept in the world renowned collection at the Adler Planetarium and Astronomy Museum in Chicago With clear and informative text it covers our discovery of Space and Time and our ever expanding understanding of Earth and the Heavens describing in particular the shift from an Earth centered to a Sun centered view of the Universe and the mapping of the stars using telescopes It also examines the technologies of navigation and of measuring and mapping the Earth as well as the discovery of ways to keep time      Theaters of Time and Space Jordan D. Marché, 2005 Every year millions of Americans visit planetariums and are captivated by their strikingly realistic portrayal of the night sky Today it is indeed difficult to imagine astronomy education without these magnificent celestial theaters But projection planetariums first developed in Germany have been a part of American museum pedagogy only since the early twentieth century and were not widespread until the 1960s In this unique social history former planetarium director and historian of science Jordan D March II offers the first complete account of the community of individuals and institutions that during the period between 1930 and 1970 made planetariums the popular teaching aids they are today March addresses issues such as the role of gender and social developments within the planetarium community institutional patronage and the popularization of science He reveals how at different times various groups including financial donors amateur scientists and government officials viewed the planetarium as an instrument through which they could shape public understanding and perceptions of astronomy and space science

Offering an insightful wide ranging look into the origins of an institution that has fascinated millions Theaters of Time and Space brings new perspectives to how one educational community changed the cultural complexion of science helped shape public attitudes toward the U S space program and even contributed to policy decisions regarding allocations for future space research

In Synchrony with the Heavens, Volume 2 Instruments of Mass Calculation David King, 2005-06-01 This is the first investigation of one of the main interests of astronomy in Islamic civilization namely timekeeping by the sun and stars and the regulation of the astronomically defined times of Muslim prayer The study is based on over 500 medieval astronomical manuscripts first identified by the author now preserved in libraries all over the world and originally from the entire Islamic world from the Maghrib to Central Asia and the Yemen The materials presented provide new insights into the early development of the prayer ritual in Islam They also call into question the popular notion that religion could not inspire serious scientific activity Only one of the hundreds of astronomical tables discussed here was known in medieval Europe which is one reason why the entire corpus has remained unknown until the present A second volume also to be published by Brill deals with astronomical instruments for timekeeping and other computing devices

100 Years of Planetaria Matthew McMahon, Pedro M. P. Raposo, Mike Smail, Katherine Boyce-Jacino, 2025-01-30 This book marks the centenary of the remarkable invention of an opto mechanical planetarium projector the Zeiss Mk I In May 1925 the first public planetarium opened at the Deutsches Museum in Munich In the ensuing decades this invention spread all over the world becoming an integral part of modern life The book presents a global narrative of the modern planetarium and its history through a selection of 100 objects and their stories Written by a varied international group of contributors including planetarium professionals scientists historians and other experts these object stories highlight major developments in planetaria as they relate to advances in astronomy and space science as well as changes in society and culture at large The objects featured in this book show how planetaria gained a central place in modern life at the intersection between science education art and entertainment They also connect the reader with the diverse people who have made the modern planetarium a reality and continue to pave the way for its future be they planetarium staff scientists architects artists engineers educators or planetarium visitors

The Wayward Comet Martin Beech, 2016-01-01 Comets have not only blazed across the celestial vault throughout human history they have embellished the night sky since the Earth itself formed some 4.5 billion years ago Comets were among the first born solid bodies in the solar system and their frozen nuclei tell of the primordial chemistry and chaos that ultimately resulted in the formation of the planets the evolution of life and us For all this however comets have long been celestial oddities they baffled our distant ancestors and human society continues to marvel and speculate wildly at their appearance even to the present day Cutting against the perceived constancy of the stars comets seemingly present themselves at random times and they are often interpreted as harbingers of terrestrial change both good and ill How then are we to tame the comet where do they form how do they move and can their appearances be predicted Such questions have

preoccupied astronomers for centuries but comets have only gradually allowed the secrets of their wayward flight to be revealed In this book I explore the historical struggle to understand not only the place of comets within a societal context but also the scientific quest to make their paths amenable to mathematical certitude The latter narrative is the more technical in content but it took tactile form with the invention in 1732 of the cometarium a mechanical device to demonstrate the first two of Kepler s planetary laws And this development was later paralleled in the mid to late 19th century by the development of various mechanical devices analog computers to help obtain solutions to Kepler s Problem the problem which asks exactly where in its orbit is a given comet at some specific set time The telling of the wayward comets story covers the past two millennia of human history and it takes us from the phenomenological musings of Aristotle through the exactitude of Newton s gravitational theory and calculus to the truly incredible study of comet 67P Churyumov Gerasimenko by the European Space Agency s Rosetta spacecraft in the modern era

*Dissemination of Cartographic Knowledge* Mirela Altić, Imre Josef Demhardt, Soetkin Vervust, 2017-09-07 This book gathers 22 papers which were presented at the 6th International Symposium of the ICA Commission on the History of Cartography in Dubrovnik Croatia on 13-15 October 2016 The overall conference theme was The Dissemination of Cartographic Knowledge Production Trade Consumption Preservation The book presents original research by internationally respected authors in the field of historical cartography offering a significant contribution to the development of this field of study but also of geography history and the GIS sciences The primary target audience includes researchers educators postgraduate students map librarians and archivists

**The Harmony of the Sphere** Silvia De Bianchi, 2013-08-19 The contributors to *The Harmony of the Sphere* include professional historians of science philosophers of science and scientists who offer different perspectives from which Kant s and Herschel s systems can be approached The title *The Harmony of the Sphere* is an evocative one In it the reader will hear an echo of Kepler s cosmological system In fact however this title refers to the new model of the world defended by Kant and Herschel This model dismissed the idea of a finite static cosmos and introduced an evolutionary perspective This volume represents a contribution to studies that integrate the history and philosophy of science It presents for the first time a comparative study of Kant and Herschel in order to highlight the historical and philosophical underpinnings of their worldviews worldviews which would in turn have a crucial influence on the development of nineteenth and twentieth century astronomy and cosmology

*Aristotelianism and Magic in Early Modern Europe* Donato Verardi, 2023-06-15 Reframing Aristotle s natural philosophy this wide ranging collection of essays reveals the centrality of magic to his thinking From late medieval and Renaissance discussions on the attribution of magical works to Aristotle to the philosophical and social justifications of magic international contributors chart magic as the mother science of natural philosophy Tracing the nascent presence of Aristotelianism in early modern Europe this volume shows the adaptability and openness of Aristotelianism to magic Weaving the paranormal and the scientific together it pairs the supposed superstition of the pre modern era with modern scientific

sensibilities Essays focus on the work of early modern scholars and magicians such as Giambattista Della Porta Wolferd Senguerd and Johann Nikolaus Martius The attribution of the Secretum secretorum to Aristotle the role of illusionism and the relationship between the technical and magical all provide further insight into the complex picture of magic Aristotle and early modern Europe Aristotelianism and Magic in Early Modern Europe proposes an innovative way of approaching the development of pre modern science whilst also acknowledging the crucial role that concepts like magic and illusion played in Aristotle s time

**Cartography in France, 1660-1848** Josef Konvitz,1987 French scientists engineers and public officials were responsible for the most important and distinctive innovations in cartography in eighteenth century Europe By expanding the analytical uses of maps by establishing unprecedented standards of accuracy and by nurturing institutional frameworks to sustain mapping projects over many years the French contributed to one of the central concepts of modern times that man through direct observation and accumulated information can better understand and manage his affairs Concentrating on how and why new concepts and techniques of making and using maps were introduced Josef Konvitz skillfully traces the modernization of cartography during the French Enlightenment The story he unfolds is not merely a narrative of who did what but an analysis of how the map itself influenced attitudes toward the land and the consequent effects on planning and the development of resources Throughout Konvitz demonstrates the significant relationship between cartography and political economic and military life He emphasizes efforts to enlarge the practical applications of maps in government and the impact of government policy on the evolution of cartography

**Shaping the Day** Paul Glennie,Nigel Thrift,2009-02-12 Timekeeping is an essential activity in the modern world and we take it for granted that our lives are shaped by the hours of the day Yet what seems so ordinary today is actually the extraordinary outcome of centuries of technical innovation and circulation of ideas about time Shaping the Day is a pathbreaking study of the practice of timekeeping in England and Wales between 1300 and 1800 Drawing on many unique historical sources ranging from personal diaries to housekeeping manuals Paul Glennie and Nigel Thrift illustrate how a particular kind of common sense about time came into being and how it developed during this period Many remarkable figures make their appearance ranging from the well known such as Edmund Halley Samuel Pepys and John Harrison who solved the problem of longitude to less familiar characters including sailors gamblers and burglars Overturning many common perceptions of the past for example that clock time and the industrial revolution were intimately related this unique historical study will engage all readers interested in how telling the time has come to dominate our way of life

*Adams of Fleet Street, Instrument Makers to King George III* John R. Millburn,2017-07-05 G Adams in Fleet Street London is the signature on some of the finest scientific instruments of the eighteenth century This book is the first comprehensive study of the instrument making business run by the Adams family from its foundation in 1734 to bankruptcy in 1817 It is based on detailed research in the archival sources as well as examination of extant instruments and publications by George Adams senior and his two sons George junior and

Dudley Separate chapters are devoted to George senior's family background his royal connections and his new globes George junior's numerous publications and his dealings with van Marum and to Dudley's dabbling with medico electrical therapeutics The book is richly illustrated with plates from the Adams's own publications and with examples of instruments ranging from unique museum pieces such as the Prince of Wales microscope and globes to the more common even mundane items of the kind seen in salesrooms and dealers the surveying navigational and military instruments that formed the backbone of the business The appendices include facsimiles of trade catalogues and an annotated short title listing of the Adams family's publications which also covers American and Continental editions as well as the posthumous ones by W S Jones

**An Intellectual History of Science in the Renaissance** Raffaele Pisano, 2025-09-09 This first of a two part volume Book I deals with a unit intellectual cultural history of science in the Renaissance within fundamental frameworks An intellectual cultural history of science examines how human and their intellectual experiences have been expressed in and emerged by scientific ideas Taking into account the excellence of the essays which cover several branches and disciplines in history and epistemology of science this book also provides perspectives on the enduring influence of a historiographical tradition e.g. the emergence of fundamental works on mathematics and geometry household's principal functions food and culture clock instrumentation surgery as a practical branch of medicine It describes the ways it differently accounted for variation in unlike countries and consequently how its results remain still nowadays a debated question as well as due to constraints preventing an extensive exploration of its remarkable historiography This volume gathers selected and double peer review contributions by historians of physics mathematics science as new fundamental perceptions in the history of science during the Renaissance ranging across several fields of science within its intellectual and cultural history The book is an accessible avenue to understanding cultural issues to develop scientific ideas by leading authorities who offer much needed historical insights into the field of intellectual and fundamental history of science It provides an absorbing and revealing read for historians philosophers and scientists alike

**Oriental Networks** Bärbel Czennia, Greg Clingham, 2020-12-18 Oriental Networks explores forms of interconnectedness between Western and Eastern hemispheres during the long eighteenth century a period of improving transportation technology expansion of intercultural contacts and the emergence of a global economy In eight case studies and a substantial introduction the volume examines relationships between individuals and institutions precursors to modern networks that engaged in forms of intercultural exchange Addressing the exchange of cultural commodities plants animals and artifacts cultural practices and ideas the roles of ambassadors and interlopers and the literary and artistic representation of networks networkers and networking contributors discuss the effects on people previously separated by vast geographical and cultural distance Rather than idealizing networks as inherently superior to other forms of organization Oriental Networks also considers Enlightenment expressions of resistance to networking that inform modern skepticism toward the concept of the global network and its politics In doing so

the volume contributes to the increasingly global understanding of culture and communication Published by Bucknell University Press Distributed worldwide by Rutgers University Press     Encyclopedia of Time Samuel L. Macey,2013-04-11 In this encyclopedia some 200 international scholars in 360 articles explore subjects such as physics archeoastronomy astronomy mathematics time s measurements and divisions as well as covering other scientific and interdisciplinary areas biology economics and political science horology history medicine geography geology and telecommunications

World-maps for Finding the Direction and Distance to Mecca David King,2021-09-06 Two remarkable Iranian world maps were discovered in 1989 and 1995 Both are made of brass and date from 17th century Iran Mecca is at the centre and a highly sophisticated longitude and latitude grid enables the user to determine the direction and distance to Mecca for anywhere in the world between Andalusia and China Prior to the discovery of these maps it was thought that such cartographic grids were conceived in Europe ca 1910 This richly illustrated book presents an overview of the ways in which Muslims over the centuries have determined the sacred direction towards Mecca qibla and then describes the two world maps in detail The author shows that the geographical data derives from a 15th century Central Asian source and that the mathematics underlying the grid was developed in 9th century Baghdad     **Greek and Roman Technology** Andrew N. Sherwood,Milorad Nikolic,John W. Humphrey,John P. Oleson,2019-10-23 In this new edition of Greek and Roman Technology the authors translate and annotate key passages from ancient texts to provide a history and analysis of the origins and development of technology in the classical world Sherwood and Nikolic with Humphrey and Oleson provide a comprehensive and accessible collection of rich and varied sources to illustrate and elucidate the beginnings of technology Among the topics covered are energy basic mechanical devices hydraulic engineering household industry medicine and health transport and trade and military technology This fully revised Sourcebook collects more than 1 300 passages from over 200 ancient sources and a diverse range of literary genres such as the encyclopaedic Natural History of Pliny the Elder the poetry of Homer and Hesiod the philosophies of Plato Aristotle and Lucretius the agricultural treatises of Varro Columella and Cato the military texts of Philo of Byzantium and Aeneas Tacticus as well as the medical texts of Galen Celsus and the Hippocratic Corpus Almost 100 line drawings indexes of authors and subjects introductions outlining the general significance of the evidence notes to explain the specific details and current bibliographies are included This new and revised edition of Greek and Roman Technology will remain an important and vital resource for students of technology in the ancient world as well as those studying the impact of technological change on classical society     **Reckoning with Matter** Matthew L. Jones,2016-11-29 From Blaise Pascal in the 1600s to Charles Babbage in the first half of the nineteenth century inventors struggled to create the first calculating machines All failed but that does not mean we cannot learn from the trail of ideas correspondence machines and arguments they left behind In Reckoning with Matter Matthew L Jones draws on the remarkably extensive and well preserved records of the quest to explore the concrete processes involved in imagining elaborating testing and building



calculating machines He explores the writings of philosophers engineers and craftspeople showing how they thought about technical novelty their distinctive areas of expertise and ways they could coordinate their efforts In doing so Jones argues that the conceptions of creativity and making they exhibited are often more incisive and more honest than those that dominate our current legal political and aesthetic culture

**Desiring Rome** Richard Jackson King, 2006 During his last two decades ca 2 BCE 17 CE Ovid composed but never completed his *Fasti* an elegiac representation of Rome's rites and festivals only six of twelve month books remain Earlier scholars have claimed that this is due either to Ovid's exile from Rome which put him out of touch with the Roman literary world or else his frustration over the Roman calendar's discontinuity Drawing upon recent scholarship in gender studies and Lacanian film theory Richard J King analyzes this exilic incompletion as inviting the citizen male reader into what he calls an angular or skewed viewpoint which interrogates the Roman hierarchical and male dominated social order insofar as it is mirrored in the Roman calendar of rites and festivals Ovid already well known and even infamous as the composer of erotic poems and the *Metamorphoses* does this by emulating the civic gesture of calendar presentation whereby upwardly mobile adult male citizens caused calendars to be carved in stone and set up in conspicuous public places to reflect the city's pride and to build their own prestige as public figures In this innovative study King discusses the *Fasti* as Ovid's socially strategic use of this gesture Interrupted by exile and filled with varying explanations of Roman festivals Ovid's poetic version manifests a form whose brokenness comments on the fractured identity of the exiled poet and citizen subjects generally in an imperial order ambivalent toward its greatest poet *Desiring Rome* expands upon recent recognition of the *Fasti*'s centrality to early imperial politics by situating the poem's failure within broader negotiations of identity between early imperial citizen subjects and the cultural ideology of Roman manhood

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