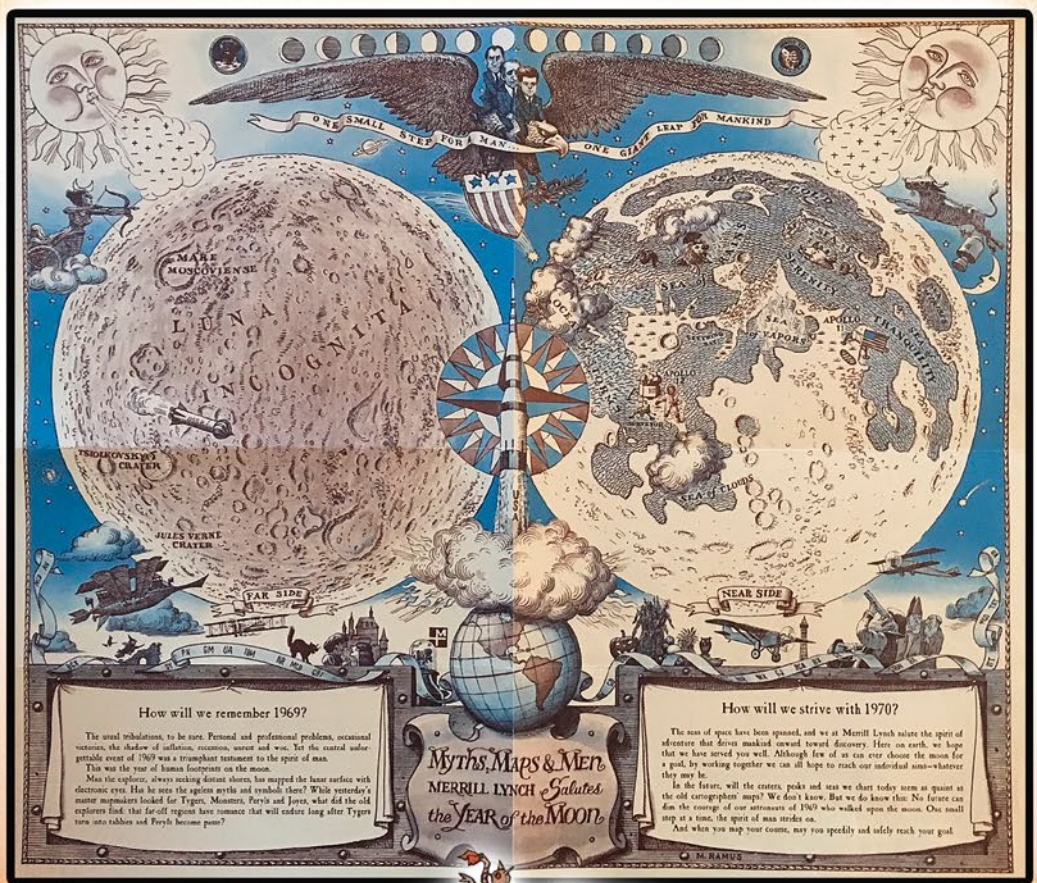
NICK KANAS

Star Maps

History, Artistry, and Cartography

THIRD EDITION



PRAXIS
Springer

Star Maps

History, Artistry, and Cartography
Third Edition

Nick Kanas

Star Maps

History, Artistry, and Cartography

Third Edition

Springer

Published in association with
Praxis Publishing
Chichester, UK

PRAXIS

Nick Kanas, M.D.
Professor Emeritus
University of California
San Francisco, USA

SPRINGER-PRAXIS BOOKS IN POPULAR ASTRONOMY

Popular Astronomy
ISSN 2626-8760 ISSN 2626-8779 (eBook)
Springer Praxis Books
ISBN 978-3-030-13612-3 ISBN 978-3-030-13613-0 (eBook)
https://doi.org/10.1007/978-3-030-13613-0

Library of Congress Control Number: 2019935495

Cover design: Jim Wilkie

This Springer imprint is published by the registered company Springer Nature Switzerland AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

To Carolynn, Andrew, Peter, Gena, Yuly, and the new generation of sky observers:
Adonis, Allison, Joshua, Nathan, and Syany

Contents

APPENDICES

Preface to Third Edition

Star Maps: History, Artistry, and Cartography was first published in 2007. A second edition was published in 2012, which added over 50 new pages, 44 new images, over 60 additional references, and several new sections that included a large section on frontispieces and title pages.

Now it is time for this third edition, with a number of significant changes and additions from the previous two. At the request of many readers, this edition is hardcover, making it more durable. In addition, the color plates have been incorporated into the text, rather than being placed in a separate section at the end. Two new chapters have been added: Chapter 11 on *Terrestrial and Celestial Pictorial Maps*, and Chapter 12 on *Celestial Images in Artistic Paintings*. Five clearer replacement figures and 54 new figures have been added: 20 in Chapter 11, 28 in Chapter 12, and several more in the preceding text (i.e., Figures 4.9, 6.4, 6.5, 8.61, 8.62, and 8.63). There are 83 new references reflecting information published since the second edition, along with corresponding updates in the text. There is a new Section 4.3.4 on the *Impact on the Islamic World* of new constellations resulting from the Age of Exploration. There also is a new Section 8.7.6 on *Frontispiece cost-cutting measures*. Finally, the text has been reread, typos have been corrected, and clarifications and additions have been made (especially to the Islamic and Byzantine sections and Section 8.1 on *Celestial globes and gores*). All in all, much is new in this book, for the ease and edification of the reader. Enjoy!

Kentfield, CA, USA

Nick Kanas
March 2019

Foreword to First Edition

The representation of celestial bodies (stars, planets, comets and other extraterrestrial phenomena) has been an important part of cartography for millennia. Star maps of early Chinese, Indian, Mesopotamian, Egyptian and other cultures are significant in their own right but also because of their influence on Greek, Roman, Islamic and, later, European celestial cartography. The history of changing images and practices in this field up to the present is discussed and illustrated in admirable detail in *Star Maps*, by Nick Kanas.

As with a number of others interested in cartography, the author is a medical doctor who has devoted a great deal of time and resources to studying and writing about his long-term avocation. However, most collectors have an interest in a limited time period or geographical area (e.g., the eighteenth century or Jamaica). By contrast, Dr. Kanas has a longer and larger agenda: the representation of the heavens from antiquity to the present, as illustrated by maps and charts.

In order to cover his wide-ranging subject, Nick Kanas' book features over 200 images, 76 in color. Each of these images is discussed in the text in appropriate detail. Most of the illustrations are miniaturized, but they are generally well reproduced and remarkably readable. Similarly, the text is lucid and can be appreciated by specialists, but also by collectors and others. In addition to the maps and their descriptions, the volume contains a glossary and other reading aids.

Undoubtedly, *Star Maps* will become an important reference work in civic, institutional, college and university libraries, but individuals who are interested in the topics it covers will want to have their own copy. The distinguished scientific publishing house of Springer, in association with Praxis of Chichester, U.K., is to be commended for undertaking to make such a valuable body of knowledge available to a potentially larger audience. Because of its wide coverage, its many

illustrations and other features, and because of the importance of the subjects it treats, *Star Maps* will become an indispensable library accession. It should also be acquired for their own private collections by all of those who are interested in the large and important body of knowledge it covers.

Norman J. W. Thrower
Professor Emeritus
University of California, Los Angeles,
Los Angeles, CA, USA

Preface to First Edition

In the 17th and 18th Centuries, a number of beautiful sky atlases were produced in Europe that showed the constellations as allegorical representations of classical Greek heroes, heroines, and monsters. But these constellation images also had a scientific purpose, in that they were placed in coordinate systems of celestial latitude and longitude that allowed the stars to be mapped in the sky. In addition, many of these atlases depicted diagrams of the solar system that reflected both contemporary and ancient cosmological systems, thus tracing the development of our view of the heavens over time.

Such images have generally disappeared from modern-day celestial charts, which instead focus on showing thousands of stars and deep-sky objects such as galaxies and nebulae that are not visible to the naked eye. With the discovery of ever more wonders in space and with plans to finish the International Space Station and then move on to explore the Moon and Mars, there is a renewed interest in the heavens. Increasing numbers of people are buying telescopes and becoming amateur astronomers, and they are using star charts to help them navigate in the sky. But, at the same time, the beauty and awe generated by the celestial void has captured our imagination and delighted our aesthetic sense, and there is a longing for the old images. For example, antiquarian map societies are prospering, and celestial maps are now viewed as a specialty of map collecting.

Up until now, discussions of star maps have been found in either general histories of astronomy or in catalogs of celestial atlases that have failed to trace their development over time. What is needed is a more integrated book that discusses celestial cartography in terms of constellation development, changing views of the universe, and advances in mapmaking techniques, while at the same time capturing the beauty of the heavens using images from antiquarian celestial prints and atlases. This, in a nutshell, is the intention of this book.

My decision to write this book is the culmination of a number of factors having to do with my long-standing interests in amateur astronomy (from childhood) and antiquarian map collecting (from young adulthood). How I got here from there may serve as an example of the appeal of these two activities.

———

Since the launch of Sputnik I, the world's first artificial satellite, on October 4, 1957, I have been hooked on space. Although I read science fiction novels and joined the space cadet secret decoder club before then, trying to find Sputnik moving through the sky one evening on a bluff overlooking the Willamette River in Portland, Oregon, made me realize that the night sky was pretty interesting. This notion was reinforced by viewing Saturn and its rings through a telescope that someone had set up the same night. Shortly thereafter, I received a 6-cm (2.4-inch) refracting telescope as a holiday present, and I began my 50+ year avocation as an amateur astronomer. Subscribing to *Sky & Telescope* magazine, I looked forward to the monthly star charts in order to see what I could see in the heavens. Although my range was limited, my imagination wasn't, and I dreamed of viewing more of the planets and deep-sky objects that I had been reading about.

This was realized when I finished my schooling and took my first professional job in 1977 as a psychiatry professor at the University of California in San Francisco, a position I still hold. Now, I could afford to buy a larger 20-cm (8-inch) reflecting telescope, and I joined the San Francisco Amateur Astronomers. After my first club "star party" one cold November night on a mountain north of the city, I realized two things: I needed a warmer jacket (even in California), and I needed a good star atlas. I bought a copy of *Norton's Star Atlas*, and I was on my way. As my interests expanded, I bought additional star atlases to help me locate the dim objects I wanted to see. I found these star maps to be fascinating, especially those that showed actual constellation images. I read up on some of the mythology behind the images (mostly from the Ancient Greeks) and imagined being a part of this folklore as I scanned the heavens looking for my deep-sky prey.

While visiting relatives in Rhode Island one summer in 1982, my wife and I chanced upon an antique store in Newport that was displaying two antiquarian constellation prints on a wall. One featured Sagittarius and the other showed a number of constellations around the southern celestial pole. I bought them for a whopping $24 (total!). I subsequently found out that these prints were from the 1776 French edition of a sky atlas written by John Flamsteed, the first English Astronomer Royal. Several years later in 1989, while on a sabbatical in London, I visited a special exhibit on celestial cartography at the British Museum, and I really became hooked at the beauty and sense of history of these old star maps. Since then, I have continued to acquire antiquarian celestial prints and books. I have joined the California Map Society, the Washington Map Society, and the International Map Collectors' Society (based in London), and I have learned a great deal about collecting old maps through these associations.

But I was frustrated by the fact that there was not a single book on celestial cartography that could inform me about the various aspects of my collecting, such as the meaning behind the squiggly lines that accompanied the epicycles of my cosmologically oriented charts, who some of the people were who produced the great classical star atlases, how celestial maps evolved and changed over time, ways to protect and preserve them, etc. What I needed was a book that not only was a primer for the collector but also had sufficient reference detail to allow me to identify and understand my maps. Nothing like this appeared, so I decided to write such a book some day.

And here it is, "only" 25 years after I acquired my first antiquarian star maps! This book has been written for three of my alter egos: (1) amateur astronomers who want to know more about star maps and their development, (2) antiquarian map collectors who want to expand their horizons from terrestrial to celestial maps, and (3) people out there who can appreciate the beauty and history behind these wonderful works of art and science and who want to know more about them. I have tried to tell the story of how star maps came into being and evolved over time, as well as to illustrate their artistry through the figures. Except where indicated, all of the images in the book are from the pieces that my wife and I have acquired over the years from here and there. I have digitally photographed nearly all of the illustrations in this book from actual celestial prints, in part to show their diversity, and in part to provide actual examples for the collector who may want to compare his or her prints with someone else's.

The story of star map development is written and illustrated in the 10 chapters of the book, which may be summarized as follows. Chapter 1 defines the two types of celestial maps: those illustrating cosmological systems, which generally include members of our solar system, and those showing constellation images and the locations of stars in coordinate grids. In addition, this chapter discusses basic orienting concepts that are necessary for the understanding of the maps. Chapter 2 deals with the cosmologies and constellations of four non-European areas that either influenced or were influenced by European star map development: China, Mesopotamia, Egypt, and India. Also in this chapter is a section on ancient astrology. Chapter 3 presents a review of European cosmology from the pre-Socratic philosophers to the time of Newton, with an emphasis on topics relevant to understanding what is shown in the cosmological type of star map (e.g., geocentric versus heliocentric cosmologies, deferents and epicycles). Included are sections on printing and medieval astrology. Chapter 4 traces the development of constellations in Europe, with an emphasis on topics relevant to understanding what is shown in the constellation type of star map (e.g., constellation images depicted at different times in history, currently obsolete constellations). The astronomically sophisticated reader may wish to skip Chapters 3 and 4. However, as in all the chapters, the figures in Chapters 3 and 4 are taken from antiquarian celestial books

and prints, so even skimming readers may wish to take a look at them in order to enhance their familiarity with the range of such images.

The text of the remaining chapters deals more specifically with antiquarian celestial maps. Chapter 5 reviews early star maps found in manuscripts and printed works up to 1600. Chapter 6 discusses the Golden Age of star maps with constellation images from 1603 to 1801 in Europe, with a special focus on four of the most influential cartographers: Bayer, Hevelius, Flamsteed, and Bode. Chapter 7 continues the discussion of the Golden Age in terms of other important contributors in Europe. Chapter 8 discusses special topics that are relevant to mapping the heavens: celestial globes and gores, volvelles, astronomical instruments before and including the telescope, and members of our solar system. Chapter 9 focuses on the history of star mapping in early America. Finally, Chapter 10 deals with the transition to star maps without constellation images in the 1800s, and the importance of astrophotography, along with improvements in the graphic arts and computer technology, in producing the star-rich and precise atlases of Norton, Becvar, Tirion, and others up to the present day.

The first four appendices are designed for advanced amateur astronomers, map collectors, and collector-wannabees who wish to know more about the process of collecting and who want a general reference for specific maps that go beyond the material found in the chapters. A glossary and index round out the book

The legends to the figures contain dimensions in centimeters (cm). This not only gives an indication of the size of the print or page for the general reader, but it also allows collectors to compare their maps with my images to help in establishing authenticity and state of printing. For maps and other images with a border, I have followed the convention of giving the vertical by horizontal dimensions as measured from the inner borderlines. If these don't exist, I have given the height and width of the block mark (for woodblocks) or plate mark (for engravings), or indicated the page dimensions. Where there are hemispheres and planispheres, I have usually given the diameter, again in cm.

It is my hope that this book will stimulate *you* to take a look at the heavens with a new eye, appreciating their scientific wonders for sure, but at the same time seeing the sky as a haven for beauties and beasts of old. You can become a direct participant: economically priced telescopes are available, antiquarian celestial maps can still be found, and there are many amateur astronomy and map-collecting organizations that are ready to help you along the way. Have a pleasant journey!

Kentfield, CA, USA — Nick Kanas
April 2007

Acknowledgments

A book of this type cannot be written in a vacuum, and I would like to thank a number of people for their help and support. First and foremost is my wife Carolynn, who has spent hours looking at celestial prints with me and who has encouraged me to write this book despite its intrusion into our personal time. Andrew and Peter have also been patient over the years hearing about dad's esoteric hobby and listening to explanations about epicycles and cosmologies.

Norman Thrower, Professor Emeritus of Geography (Cartography) at the University of California, Los Angeles, has provided helpful cartographic and editorial advice to an earlier draft of this book, as well as moral support through our mutual association in the California Map Society. Owen Gingerich, Professor Emeritus of Astronomy and History of Science at the Harvard–Smithsonian Center for Astrophysics, has likewise provided helpful editorial suggestions and valuable astronomical advice. Although I have included the suggestions of Professors Thrower and Gingerich in the final version of this book, the responsibility for its content and accuracy remain mine.

Others have helped me in different ways. My friend and fellow celestial map collector, Bob Gordon, has given me moral support, confirmatory information on some questions I had on some of the maps, and digital images of pieces from his wonderful celestial map collection. He has responded graciously to my myriad requests for print dimensions and exact labeling content on some of his maps, and I have appreciated his patience and responsiveness. Peter Barber, Head of Map Collections at the British Library, and his staff have been enormously helpful during my trips to London to research celestial maps and atlases from their vast holdings. Specifically, I would like to thank Nicola Beech, Sue Young, Geoff Amitage, and especially Carlos Corbin for their patience and assistance.

I would also like to mention several people who provided me special assistance in obtaining images for this book: Sandra Powlette at the British Library; Doris

Nicholson at the Bodleian Library at Oxford University; Devon Pyle-Vowles at the Adler Planetarium & Astronomy Museum in Chicago; Stacey McCarroll Cutshaw at the Boston University Art Gallery; Linda Schubert at Rand McNally & Company in Skokie, Illinois; and Jonathan Potter, who kindly provided me with two digital images from his map shop in London and gave me his input on a draft of Appendix A from a dealer's perspective.

I also would like to thank Professor Gingerich, Mr. John Ventre at the Cincinnati Observatory Center, and Mr. Paul Luther at Astronomy Books in Bernardston, Massachusetts, for providing me with information on O.M. Mitchel's edition of Burritt's book and atlas (see Section 9.6.2 in Chapter 9).

Several of my friends and colleagues in the International Map Collectors Society, the California Map Society, the San Francisco Amateur Astronomers, and the amateur astronomy publication world have also provided me with support and encouragement in writing this book. Some have served as referees of my book proposal and provided helpful advice. I would especially like to thank the following: Robert Clancy, Susan Gole, David Kalifon, Hans Kok, Joshua Roth, Phil Simon, and James C. White.

Clive Horwood, my publisher at Praxis Publishing Ltd. in Chichester, England, has been very supportive during the process of producing this book, and as an author juggling a number of competing projects and struggling with deadlines, I have appreciated his patience. Neil Shuttlewood, whose company Originator Publishing Services in Norfolk, England, has been responsible for the copyediting, has been very responsive to my questions about digital photography and page proof production. Finally, Rhea Siegel, Esq., at Springer Publications in New York, has given me helpful advice about permissions and copyrights.

For the new material in the Third Edition, a number of people have been helpful: Terry and Paula Trotter at the Trotter Galleries in Carmel and Pacific Grove, CA, for information on Jo Mora, especially his "Celebration of Pan" mural, and comments on a draft of Chapter 11; Peter Hiller, Collection Curator for the Jo Mora Trust, Carmel, CA, for information on Jo Mora, especially his "Celebration of Pan" mural, and comments on a draft of Chapter 11; Paul Ayers, Glendale, CA, and John Caragozian, Sunkist Growers, Inc., for Information on the citrus packing industry in the San Fernando Valley, CA; Jim Rowerdink, Board Member, San Fernando Valley Historical Society, for information on the citrus packing industry in the San Fernando Valley, CA; David Rumsey of the David Rumsey Map Collection (carto@davidrumsey.com), for permission to use several images and comments on a draft of Chapter 11; Stephen J. Hornsby, Ph.D., University of Maine for comments on a draft of Chapter 11; Prof. Ulrich Lotzmann at the Medical Faculty of the Philipps University in Marburg, Germany, who gave me valuable insights into the paintings of astronaut Alan Bean; and Manar Harb for her insights into the Arab text of the astrological map shown in Figure 4.9.

Unless otherwise indicated, the figures in this book have been produced from digital photographs taken from antiquarian books and prints that are part of the Nick and Carolynn Kanas Collection. Permissions to use and photograph the images from other sources have been obtained, and these sources are acknowledged in the legends to the figures. Every effort has been made to source the original copyright holders, and I apologize to any that I may have missed through oversight or inability to contact via e-mail or phone.

Figures