

# Preface

In my previous book, *Star Maps: History, Artistry, and Cartography*, now in its second edition, I commented that antiquarian celestial books and atlases used two types of illustrations to describe the heavens: constellation maps and cosmological maps. The first type focused on the location of the stars and other heavenly bodies in the sky with reference to constellations and coordinate systems that measured celestial latitude and longitude (or declination and right ascension in modern parlance). *Star Maps* generally dealt with these kinds of images.

In contrast, the book you hold in your hand, *Solar System Maps: From Antiquity to the Space Age*, focuses on the second type of image and in a sense is a sequel to the first book. It traces how we have conceptualized our place in the cosmos and illustrates this using world view and solar system images from antiquity to the Space Age. Cultural factors are woven into the story from both European and non-European perspectives. Initially, there was no distinction between our solar system and the rest of the universe. The Earth was simply the center of everything, with the planets and stars surrounding it in aethereal shells. Gradually, this world view shifted, with the Sun becoming the center, then its retinue of planets being separated from the rest of the cosmos as a true solar system. This required dramatic paradigm shifts in the way we viewed the heavens, sparked by the telescope and our ability to think critically.

In telling this story, I have enhanced the text using images from antiquarian books and atlases, from powerful telescopes on Earth and in space, and from instruments on space probes visiting the planets and their moons. The result is a mapping of the solar system that shows not only the way its grand scheme has been visualized over the centuries, but also the way each component (such as a planet or moon) presented itself topographically and has been interpreted by the observer. A notable exception is the Earth. Entire books have been devoted to terrestrial maps and to images of our planet's surface from space, and to include our home planet in this book would exceed its space limitations (no pun intended!).

Chapter 1 introduces the reader to the general theme of the book, discusses the concepts of world views and paradigm shifts, considers how early maps of the solar system were really maps of the cosmos, and orients the reader to the sky as seen from an Earth-bound perspective. Chapter 2 discusses and illustrates the geocentric Earth-centered world view/solar system model developed by the Classical Greeks, provides an overview of their constellation system, and describes the continuation of their ideas into the Roman period.

Chapter 3 considers the world views of megalithic Britain and a number of non-European cultures in Sub-Sahara Africa, Egypt, Mesopotamia, India, China, Australia and Polynesia, and the Americas. Chapter 4 continues the Greek geocentric focus into the Middle Ages and early Renaissance, covering Islamic, Byzantine, and central European contributions. Chapter 5 deals with three major paradigm shifts and their sequelae: the development of a heliocentric model by Copernicus (and the various geoheliocentric hybrids that competed with it), the conceptualization of elliptical planetary orbits by Kepler, and the observations made through the telescope by Galileo. Chapter 6 discusses the notions that the universe may be unbounded, that there is a plurality of worlds, and that our solar system can be discussed separately from deep-sky objects (e.g., star clusters, nebulae, galaxies). Chapter 7 describes the conceptualizations of the solar system up to the Space Age, dealing with our Sun, Moon, and the planets and their moons. Chapter 8 continues this story with the special case of Pluto, asteroids, meteors, comets, and components of the Kuiper Belt and Oort Cloud. There is also a discussion of the observations of exoplanets in other star systems. Chapter 9 takes us away from Europe and into the United States, reviewing how this young country quickly moved from being a relative backwater to a major player in the way our solar system and universe are observed and mapped. Finally, Chapter 10 describes advances made since the launch of Sputnik in how our solar system is conceived and visualized.

In an effort to make the text flow more naturally, detailed information and references are placed at the end of the book in separate notes, bibliography, and glossary sections. A unique feature is the inclusion of comparable images from both antiquarian and Space Age sources, which allow the reader to compare and contrast traditional views of the heavens with the latest images acquired by Earth-orbiting telescopes and traveling space probes. Hopefully, these images will enhance the text and provide a vivid reminder of the beauty of our solar system.

Nick Kanas  
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*To my wife Carolynn, who continues to be my partner in celestial map  
collecting and who has encouraged me to write this book.*

Solar System Maps

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