

Preface

Travel far from city lights on a clear and moonless night, allow your eyes to adjust to the dark, then lie back and gaze skyward. It is almost impossible not to be awestruck by the magnificence of the cosmos. With this panorama spread out above you, it is also hard not to be inspired to consider some fundamental questions, such as where did the universe come from, what part do we play in it and how will it appear in the future? A little over a hundred years ago, it would have been common for people to be able to gaze at an entirely dark sky. However, with the invention of electric light, and the resultant light pollution, this situation has changed. It is thought that in the modern world, as many as two-thirds of the global population cannot even see the Milky Way, given the prevailing urban conditions. Instead, most of us must now rely on magazines, TV and the Internet to view the wonders of the night sky.

In this book we examine the thoughts and beliefs that have their genesis in a time before the contemporary world wiped out the night sky for most people. We bring together two different facets of the gains to be had from looking up and questioning the nature of the universe. The reason that the book is called *The Great Canoes in the Sky* will become obvious as we proceed. However, it is important from the start that we explain what is meant by the terms *astronomy* and *star lore* that appear in its subtitle.

Scientific Astronomy

In modern times, the English term *astronomy* is used to cover many different things. Typically, astronomy is considered to be the scientific study of the universe and the celestial objects within it, such as stars, planets, moons, comets, nebulae and galaxies. Today's technology allows most of us to watch astronomy documentaries that describe the latest scientific research, made all the more fascinating by the spectacular views of the universe that contemporary astronomical photography can capture as well as computerised models and simulations. But astronomy is also perhaps the only science that anyone can still practice themselves without any formal training, by simply going outside on a clear night and *stargazing*—learning constellations, spotting comets, counting meteors, observing the movements of the planets and the phases of the Moon and so on. In addition, with very modest telescopes and binoculars, anyone can get a glimpse of astronomical objects that are invisible to the naked eye and, with the aid of a digital camera, is even able to take dramatic photographs of some of them. Furthermore, by using such equipment, the amateur may be lucky enough to make a scientific discovery such as spotting a new supernova or a previously unknown comet and may even, in conjunction with professionals, discover an exoplanet—a planet orbiting a distant star.

Sometimes the term *western astronomy* is used to refer to the above description of astronomy because many of the early important scientific discoveries about the cosmos occurred in Europe and America, which is often referred to as the *west*. However, this term is inappropriate in the context of this book in two ways.

Firstly, one of the crucial aspects of astronomy as outlined above, which is essential to any scientific understanding of the cosmos, is the practical observing of the position and motion of celestial bodies—stars, planets, comets, the Moon and the Sun—as well as the recording and monitoring of astronomical phenomena such as supernovae and aurorae. These essential observations have been made by cultures all over the world for thousands of years. This is attested to by the countless ancient monuments designed in accordance with accurate astronomical observations, such as Stonehenge in England, which is 5000 years old, as well as the many ancient recorded astronomical observations, such as those of eclipses by the Chinese which date back 2500 years.

We shall see throughout this book that all the cultures discussed have practised this facet of scientific astronomy and that it has gone hand in hand with all their other beliefs about the night sky.

Secondly, in the modern era, to refer to scientific astronomy as *western astronomy* is to patronise and disenfranchise those people from cultures such as in India and China that are not ‘western’ but which, nevertheless, are leading the way in scientific astronomical research. Scientific astronomy in one form or another is open to all, regardless of the nation, culture, religion or ethnic group to which they belong, and so scientific astronomy is a global enterprise and not a western one. In this book, we shall therefore not use the term *western astronomy*. Rather, we shall simply use the term *scientific astronomy* to refer to the study of the universe that uses empirical data and observation to make predictions and propose testable theories. It is important to acknowledge, however, that all scientific astronomical claims and theories are only ever conjectural and will therefore change if and when new empirical evidence is discovered.

Star Lore

As scientific astronomy dates back thousands of years, it is no surprise that it has had profound effects on most cultures and many aspects of the everyday lives of people. As we shall see, the scientific observations and recordings of the movements of celestial bodies have been useful for many practical aspects of everyday life, from working out the best time to plant crops and catch food to navigating across long distances. Although the actual scientific observations of celestial bodies are the same at any particular latitude, the explanations for what these bodies are, and why they appear and where and when they do, differs widely from culture to culture. It is these different explanations that lead us to the other central theme of the book—star lore.

It is the fact that the night sky is to a great extent permanent, and behaves in a largely predictable manner, that has enabled it to be studied scientifically for thousands of years. And it is this very permanence and predictability that has also helped to shape the great variety of star lore—the stories, legends, tales and myths—that help cultures to make sense of their scientific observations. Although the scientific, empirical observations may have been important for many practical reasons, this star lore has been equally as important in other ways, as we shall discover in this book.

What makes the study of star lore so important and fascinating is that, unlike scientific astronomy, it is something that is specific to different peoples and cultures. Thus, we can talk about the star lore of the ancient Britons, the Greeks, the Māori and so on. The beliefs that encapsulate these different star lores can differ widely even when they are based upon observations of the same part of the night sky. Star lore therefore stands apart from scientific astronomy in a number of important ways. First, it is specific to a particular culture in a particular geographical area. Second, although the scientific observations that have given rise to the star lore are empirical, the actual star lore itself is not. This means that star lore is not conjectural and open to revision, should new evidence be found, and hence it has a culturally important timeless quality.

Constellations

The English word constellation comes from the Latin *constellation*, which means ‘group of stars’. As we shall see in Chap. 4, the form of any particular constellation has no scientific basis; rather, it is simply the result of different cultures noticing arbitrary arrangements of stars in the night sky and therefore attributing unique names and meanings to them. Thus, we can speak of Māori constellations, ancient Greek constellations and so on.

However, although the particular way in which stars are arranged into different constellations has no real scientific significance, constellations are nevertheless useful to scientific astronomy because they are a convenient way of cataloguing celestial objects for universal scientific study. The International Astronomical Union (IAU) is a body comprised of professional astronomers from all over the world, and one of its functions is to provide designations for all celestial objects, such as stars, planets, asteroids, comets, extrasolar planets, craters on moons and so on. In 1922 it formulated a list of 88 different constellations, which are sometimes referred to as *western constellations* because their names originate in European cultures. However, these constellations are now of central importance to anyone undertaking scientific astronomy irrespective of culture, and so we shall therefore refer to these 88 constellations not as *western constellations* but as the IAU constellations.

Common Names of Stars

Individual stars have been named in a variety of ways over time, both by different cultures and by scientific astronomers. There are a variety of scientific catalogues in use, the most famous of which is based on Johann Bayer's *Uranometria* of 1603. He named stars according to the constellation in which they were found and distinguished each one by a different Greek letter. So, for example, in his catalogue, the brightest star in the constellation Centaurus is designated Alpha Centauri and the second brightest Beta Centauri. However, many common names also exist for these stars, and these differ from culture to culture the world over. So, for example, in English the second brightest star in the constellation Orion, Beta Orionis, has the common name Rigel, whereas to the Māori it is known as Puanga. Likewise, the brightest star in the constellation Scorpius has the English common name Antares, whereas to the Tahitians it is known as 'Anā-mua'. As the English names are likely to be the most familiar to this book's demographic, we shall use the English common names as standard and introduce the names specific to the particular star lore as and when they are relevant. Where no common name exists, we shall use the Bayer designation.

Deep Sky Objects and Astronomical Photographs

Deep sky astronomical objects such as galaxies, nebulae and star clusters also have catalogue names that are essential for scientific purposes. One of the most famous of such catalogues was that produced by the eighteenth-century French astronomer Charles Messier. In this catalogue, deep sky objects are numbered and prefixed with the letter M. However, as is the case with individual stars, many of these objects also have common names that are recognised globally. So, for example, the nebula catalogued by Messier as M20, is commonly known as the Trifid Nebula. For ease of reading, we have used the most common names for these objects where they exist rather than using their catalogue numbers.

As most modern astronomy is undertaken using photography, it is necessary to include examples of these photographs so that the reader can get a sense of what the objects look like to the scientific astronomer. However, as we shall see in Chap. 9, modern astronomical photographs reveal much more detail than can be perceived with the naked eye, and so it can sometimes be difficult to see from a photograph why a particular object, named before the age of photography, has the common name it has. Furthermore, in other cases, the object has a contemporary name that relates to the way it appears in photographs, and, if viewed with the naked eye, it would be difficult to see why such a name is in circulation. The key here is to use the imagination just as the cultures under consideration did when they named the shapes made by the arrangements of naked-eye stars above their heads.

Why the South Pacific?

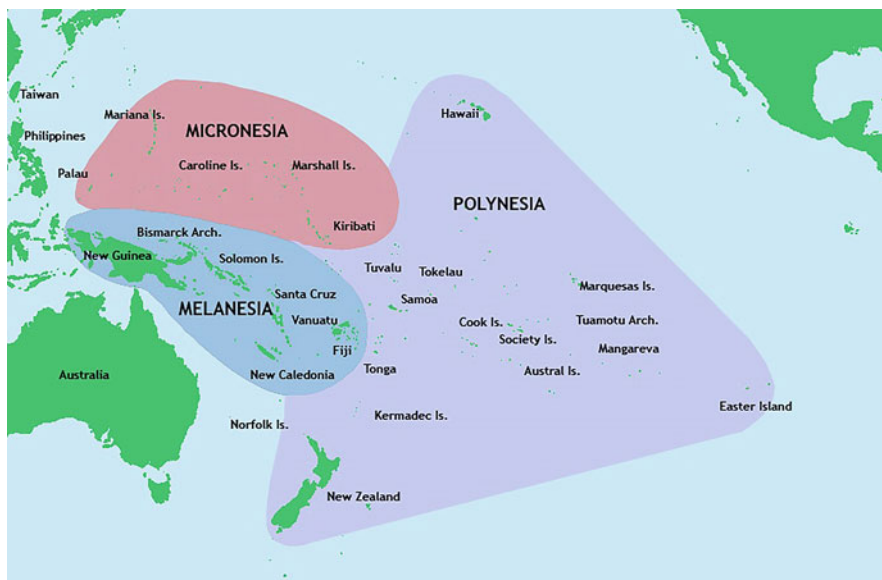
Although scientific astronomy and star lore is prevalent the world over, this book has a narrow scope. It concentrates on one area of the world—the South Pacific.

Many people who have not travelled north or south of the equator are actually unaware of how different the night sky appears in the Northern and Southern Hemispheres. Just a casual glance at the sky reveals different constellations and stars, and even those constellations that are visible from both hemispheres, such as Orion, are oriented differently. However, the majority of works written about star lore in English concern themselves with the cultures of the north and thus ignore the lore associated with the view of the sky from southern latitudes. So, for example, there are plenty of books concerned with the classical cultures of antiquity, namely, the Egyptian, Greek, Roman and Mesopotamian civilisations. Likewise, the great wheel of the zodiac is often a common theme, but this only contains stars that are visible, at least part of the year, in the Northern Hemisphere.

In many ways, however, the southern sky is more spectacular than its northern counterpart, as it has a larger variety of interesting astronomical objects observable both to the naked eye and through the telescope. This book goes some way to correcting this imbalance by concentrating on the stars and astronomical objects that are visible from the Southern Hemisphere. The star lore that accompanies these comes from diverse traditions, many of which are unfamiliar to northern cultures, both contemporary and ancient.

For this book, we have concentrated our survey of the southern sky on the cultures of the South Pacific region. We will be exploring Australia and Papua New Guinea on the ocean's western edge and the three regions that dominate the Pacific. The first of these is the vast triangle of Polynesia, which stretches from Hawaii in the north to Easter Island in the east and New Zealand in the southwest. The second, between Australia and Polynesia in the western Pacific, are the numerous archipelagos of island Melanesia. Finally, straddling the equator, running east to west from north of Papua New Guinea towards the centre of the Pacific lie the numerous island chains of Micronesia. Though much of Micronesia lies within 10° north of the equator, their culture and history derive from the same movements of people into the Pacific that populated Polynesia, and so we shall include them here, as the map in this preface illustrates.

Whether from the sandy deserts of central Australia, the uplands of Papua New Guinea or the low-lying sandy atolls of the Pacific Ocean, sky watchers observed the heavens, noted the movement of celestial bodies, named them and theorised about what they saw. These observations were different from those of sky watchers in the Northern Hemisphere.



Outline of the Book

In order to achieve our aim of investigating both the scientific astronomy and the star lore of the South Pacific, we have divided the book into nine thematic chapters. In the first chapter, we examine the celestial objects that lie closest to our own planet—those that reside in the Solar System—as well as various atmospheric phenomena caused by Earth’s own characteristics. In Chaps. 2 and 3, we turn to the largest single objects that can be viewed with the naked eye—the galaxies known as the Milky Way and the Clouds of Magellan.

A single major theme in the star lore of the South Pacific—the ocean and all that it contains—is the subject of Chap. 4, and this is followed, in Chap. 5, by an investigation into the way astronomy was traditionally used to navigate the vast expanse of sea that characterises Oceania. The distinctive birdlife that has become written in the stars is discussed in Chap. 6. Chapter 7 is devoted to the star lore that pertains to one of the most famous star clusters the world over, namely, the Pleiades. In Chap. 8, the cosmologies that underpin the star lore that has been presented throughout the book are surveyed, while the final chapter discusses how, in the modern era, a new way of observing the sky—through astronomical photography—has changed our understanding of the cosmos. We end by examining some of the interesting philosophical questions that arise when we consider this contemporary form of stargazing.

Stephen Robert Chadwick
Martin Paviour-Smith

The Great Canoes in the Sky

Starlore and Astronomy of the South Pacific

Chadwick, S.R.; Paviour-Smith, M.

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