

Book Review

Steven R. Gullberg and Cesar Augusto Zen Vasconcellos, editors

Cultural Astronomy in Latin America

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José Nicolás Balbi

Director, Museum of the Observatory of Cosmic Physics of San Miguel (Argentina)

President, Cultural Astronomy Community, European Association of
Archaeologists (SEAC-EAA)

Colchester Archaeological Group (UK)

As I indicated in the message in which I was invited to do this review, I was delighted to read this book. Just by reading the title, I imagined and almost guessed the authors who would work on the book, whom I know almost all personally and in some cases I have worked with several of them, as happens mainly in chapter 9, where I shared a large number of expeditions with the authors, who cite my work on several occasions. I should clarify that in this case, I was involved in the archaeological work and conducted excavations at the Shincal site, the results of which I have published extensively.

The book is important: it explains a large number of concepts in archaeoastronomy and cultural astronomy, as well as the social and cultural relationships between different human groups, including those originating in social mobility.

The book is organized both geographically and culturally and explores the most important observations of cultural astronomy in each case, with important citations from specialized authors who, for those interested in the subject, are a constant source of reference. It consists of 15 chapters, each of which explores a specific area and conducts a study of the cultural astronomy of each zone. While it is

important to note that in many cases, cultures whose periods of existence are separated by centuries are considered, it allows us to gain an idea of the most important data and how that information can be found in different cultural manifestations to this day.

I would like to make a personal observation. The reader can see that the cover is beautifully illustrated with a watercolor landscape inspired by Chankillo, which Jessica Gullberg, Steven's wife, created especially for the cover. I remember reviewing several of her excellent drawings, which Steven showed me in Italy over coffee during one of the few free moments at the SEAC Conference in 2024, and I personally believe this detail is indicative of the way the book was written and compiled; it shows dedication and the idea of putting not only the mind but the heart into it.

In this review, I will briefly examine each chapter, commenting not only on its content but also on what the reader can find. I hope my comments will lead readers to delve deeper into the topics I mention and to read the full text for a better understanding of the complex relationships explained.

In Chapter 1, "Pacha: An Andean Space-Time Construct, Energized by the Swaps of the Dual Concepts of Urin and Janan," its author Eusebio Manga-Quispe introduces us to the three dimensions enclosed in the term "Pacha" with ethnohistorical information and the different meanings of many terms in the Quechua language, with quotes from authors from the time of the Spanish conquest of America in the 16th century and the explanation and interrelations of different Andean concepts, which gives us ideas about the space-time divisions and relationships in the Inka culture. Terms such as Ñawpa, Ñaupen, Urin and Janan are explored and the mentions of these terms by different authors are examined. Also, the term in the Quechua language appear as variations of different meanings and explains abundant information, challenging us to search for coincidences and interpretive deficiencies, with an open ending to new contributions. The text is based on an abundant bibliography, much of it for permanent reference for those who study the Inka world.

In Chapter 2, "Astronomies of the European Immigrants and Their Descendants in the Southern Argentinean Chaco Region," Armando Mudrik looks back to the 19th and early 20th centuries, analyzing the influence of European immigration in Argentina and the way these immigrants and other local social groups, who each had their own interpretations of the sky and celestial phenomena, shaped their interpretations of the sky and celestial phenomena. The chapter explores the perspective of what the author calls ethnoastronomy, focusing primarily on rural regions located between Chaco and Santa Fe. The ideas conveyed by immigrants from almost all of Europe are interesting, in this case during the social mobility phenomena at the end of the 19th century toward the aforementioned areas. The work offers both a sociological and astronomical-cultural perspective, since it takes into account many aspects related to rural life and the models used in lunar cycles, with different and interesting interpretations. Also striking is the effort made to relate meteorological phenomena to astronomical ones, for example, by predicting rain. One can also find interpretations of various observable phenomena, such as the Milky Way, or the ways in which different Guaycurú groups, of which the Moqoit and Qom are mentioned, identified different celestial representations, which can be differentiated from the symbolic conceptions of European immigrants. The chapter contains abundant references to texts that further explain these concepts.

In Chapter 3, "Maya Skyscape Iconology," author Christopher Layser reviews the development of Maya iconography from its beginnings and surprises us from the beginning with his quotes that explain various terms that we currently use interchangeably to define archaeoastronomy, cultural astronomy, or skyscape archaeology, to indicate the direction we will see in his work. In the following pages, the author primarily analyzes the abundant Mayan iconography, illustrated by the author as an example for useful transliteration that will allow us to better understand these iconographic and hieroglyphic marks. The text also leads us to an analysis of the spatial environment, with mentions of references to celestial objects and some comparisons with symbols from the Aztec culture. It also focuses on the study of anthropomorphic figures and their possible meanings, with many interesting conclusions. All of this is explained extensively, and there is a large

amount of reference literature on the subject, which will be very useful for the reader who wishes to further expand on the concepts developed in the work.

In Chapter 4, "Toward an Understanding: Exploring the American Southwest Star Connection to Mesoamerica," author Mark Raney guides us toward a comparison between the cultural interpretations of the Hopi and the Aztecs in several aspects that take us back to the American Southwest and Mesoamerica. I liked the choice of comparing the Sotunangu and Tezcatlipoca flute players, a wise choice that allows us to delve into calendric and landscape issues, with rich references to stellar constellations, explained and associated with the perceptions of local cultures. I was particularly interested in the third section, dedicated to the analysis of Quetzacoatl from the perspective of both cultures, although at this point in the work, rather than under a sense of comparison, the reader will be tempted to identify the coincidences in both interpretations. The author expressly mentions that "Although I have pointed out numerous similarities between the Hopi and the Aztec, there is no intention to suggest that the cultures are similar," a point clarified in the conclusions of the work, which leaves us eager to continue studying this fascinating analogy, both culturally and astronomically.

In Chapter 5, "Heaven on Earth: Inter-Ethnic Dialogues with Sky Entities," its author Alejandro Martín López returns us to the area of the Southern Great Chaco that we explored in Chapter 2, "Astronomies of the European Immigrants and their Descendants in the Southern Argentinean Chaco Region," where we are offered a chronological introduction from the 17th century through the Spanish expeditions, the arrival of the Catholic Jesuits and the social mobility that occurred at the end of the 19th century, until ending in the mid and late 20th century with the arrival of the different branches of Christianity, already organized and the final disposition of these peoples, including some rural communes. The study enters into different sociological perceptions such as spaces of power and political relations between sky and earth related to mythical narratives. The study and meanings of meteorites occupy an important place, with particular mention of the so-called "Campo del Cielo," meteorite fall which occurred approximately 4000 years ago. The mention of

the "Moqoit" perspective and its narrative is interesting, with some stories and the cultural perception of these stories. The work continues with a perspective from the local "Criollos," closing the circle of different cultural interpretations with a final bibliographic selection for those who wish to further expand their knowledge on this topic.

In Chapter 6, "Caral, the Moon, and the River in the Preceramic Andes," prolific authors César González-García and Juan A. Belmonte conduct a cultural astronomical study of the Supe Valley, introducing a methodological innovation in the study of a culture that developed in relation to a river, establishing a profound relationship between the landscape and the sky. The article is excellent. It begins with the relationship between the development of this culture and various sites thoroughly studied in Europe, Asia, and Africa. The article begins with a description of Caral, an archaeological site currently declared a World Heritage Site, located in the Supe Valley, Peru, less than 200 kilometers from Lima. Caral society can be initially dated to 3000 BCE and is recognized as one of the first urban developments in the Americas. The work mentions the architectural features of the site, highlighting the characteristics of the different buildings built along the Supe Valley, which puts the studied site into context. The possibilities for astronomical and cultural orientations are enormous and are studied with graphs that show phenomena based on cardinal directions, orientations, declinations, etc. It is striking, as the title of the work indicates, the lunar relationships with each archaeological site, which are revealed in the text. Studies were conducted of the directions taken by the river from the sea, and a lunar cult is revealed in relation to the orientation of its buildings. All the information is in the article, which determines that the Supe Valley case constitutes an incredible network where location, temporality, and orientation can be seen in relation. This peculiar orientation was achieved when locating urban areas, taking into account the river's course, the visibility of astronomical events, and the location of the mountains, turning the site into a fascinating place for study. In the final section of the work, and as mentioned at the beginning, there is a brief study of the orientations of the Nile River, which had already been mentioned for comparison. For all lovers of the study of cultural

astronomy, the work is a perfect example of the current methodology for determining the aforementioned relationships. Finally, a specialized bibliography is provided for those who wish to delve deeper into the subject. Readers interested in these issues will be tempted, if they haven't already, to visit and explore this place, with the text in their backpack, to recreate the work presented in this chapter.

In Chapter 7, "Historical Sources and Astronomical Constellations in the Northwest Amazon," author Walmir Thomazi Cardoso takes us on a journey through the incredible Amazonian landscape. Those who have visited the different Amazonian cultures will agree with the author on the different interpretations of the sky along the river's geography. As the author states in one of his publications, "every bend in the river has a different sky." I invite you to look at the chapter bibliography, which includes references essential for understanding Amazonian cultures and whose principles are expressed in this article. In a recent conversation with the author, we examined the scope of cultural astronomy studies in the Americas and concluded that we would produce works that, in addition to being a reference for specialists, are accessible to all interested parties. This chapter is an example of this, and primarily analyzes the importance of historical sources of science and their relationship with cultural manifestations and the study of how these same cultures interpreted phenomena related to the sky in relation to the landscape. Furthermore, the work demonstrates the application of multiple disciplines around a common theme. In this case, we move to the Rio Negro in the Amazon, where the author shows us the different aspects of knowledge and learning that involve a diverse and inherent set of constellations. Those interested in legends will find an interesting mention of the "legend of Jurupari," related to the different constellations of the sky. On a recent visit to the Amazon, I was struck by the rapidity with which different communities transfer drawings of their mythological characters to constellations like Scorpio, known precisely for its ability to house a diverse number of symbols. This diversity leads us to one of the terms used by the author: "cosmoperception" instead of "cosmovation," to refer precisely to the way locals understand celestial phenomena. I invite you to read this chapter to

understand the richness of cultural astronomical studies in South America and to perceive how it has developed its own identity.

In Chapter 8, "Group E of Uaxact'un, Pet'en, Guatemala: Archaeoastronomical Hypotheses and Archaeological Reality," author Ivan Sprajc returns us to the Mayan world. Toward the south of their zone of influence, in Guatemala, we can see archaeological work and an analysis of the orientations of their buildings, with alignments and descriptions of various complexes, interpreted using the foundations of cultural archaeology. The aforementioned studies began about a hundred years ago, focusing on a culture dating to approximately 1000 BCE, with uniquely oriented buildings described in the text. The author provides an astronomical interpretation and relates sunrises and sunsets to agricultural needs, indicating various calendar combinations with interesting graphs and photographs. As happens in many of these cases, the site was built over centuries, and the author studies the construction process over time, indicating the alignments he was able to calculate. This chapter is intended for those seeking a comprehensive study of a Mayan cultural site, including its buildings, astronomical orientations, and cultural significance, with extensive bibliographical references, which will satisfy any reader interested in this topic.

Chapter 9, "Inca Astronomy South of the Tawantinsuyu" by Gustavo Corrado and Sixto Giménez Benétez, is a work in which I have a lot to tell since it is an investigation that I worked on and experienced over the years, and that is why I will allow myself to be self-referential. From 2016 to 2022, I carried out, together with the authors, a number of expeditions to the El Shincal de Quimivil site, in the Argentine Province of Catamarca, where the archaeological remains of a ceremonial and political center are located. It turns out to be the southernmost Inca structure of the Tawantinsuyu, that is, of that portion of the so-called Inca Empire. I personally excavated most of the most important buildings in the discovered part of the site, although many of the main constructions are still hidden by vegetation. I would like to mention that we initially took measurements and carried out an excavation at Complex 19, nicknamed the Watchtower because it had been

assigned a military function. We discovered a series of ceremonial elements, including an oven and a system of water channels possibly dedicated to a divination ceremony. This ruled out the possibility that the complex was a watchtower and confirmed the existence of a temple. In any case, the entire Shincal complex has interesting alignments: the Ushnu, a fundamental structure in Inca constructions, installed in the middle of a quadrangular plaza, several residences and kallancas, qolcas, and all kinds of constructions typical of Inca culture. The connection with the landscape is undeniable, and the measurements taken reveal a large number of relationships and orientations with astronomical elements having undeniable significance in Inca culture. The article describes these main structures, some of their orientation measurements, and the similarities between some of them and those located in present-day Peru, such as Huánuco Pampa. The text also shows several of the alignments we took from the first expeditions and confirmed in subsequent expeditions, exhibiting photographs from different times of the year, which we intentionally chose in all cases. There are also some mentions of the measurements taken on the Western Terraced Hill and the Segmented Wall, located on one side of the plaza where the Ushnu is located, which I excavated together with the authors on my last expedition to Shincal, next to the summit of the Eastern Terraced Hill. The article is a summary of the major discoveries in cultural astronomy made at the site, accompanied by a number of references that will be familiar to anyone interested in the subject of Shincal. The site was explored by a large number of archaeologists, resulting in a large body of literature on both archaeology and cultural astronomy. It was a surprise to see the authors' gratitude and the reproduction of several of my photographs, along with others that, along with the graphics, were familiar to me and that we used in several presentations on the subject. This was a chapter that, personally, brought me a certain nostalgia and great joy.

In Chapter 10, "Honduras Between Archaeoastronomy and Ethnoastronomy: Copán, Rock Art, and Tolupán Cosmvision," author Javier Mejuto leads us again to Central America and specifically Honduras, to explore Copán – a site that turns out to be the most southern where we find such an important expression of the

Mayan culture. The significance of this chapter is demonstrated by the development of cultural astronomy at the Universidad Nacional Autonoma de Honduras in Tegucigalpa in recent years, under the guidance of the author, who directs an entire department dedicated exclusively to cultural astronomy, proposing what I understand is the first degree of this subject in the world, the degree in cultural astronomy. In 2023 we held a series of events at the University in support of this endeavour, which was completed with the designation in 2025 of Copán as the headquarters for the annual meeting of the Inter-American Society of Cultural Astronomy. There are many references in the beginning of the article, in which the reader can find a complete account of Mayan culture. Copán, which was declared a World Heritage site in 1980 is simply fantastic. The article begins with a trip through its cultural history that begins in 1400 BCE with the Early Pre Classic period and develops for almost twenty-five centuries. The chapter summarizes the cultural development of the site, identifies the ceramics found and provides details of ethnic groups that inhabited the area, including at the time of arrival of the Europeans in the eighteenth century as well as information about the astronomic and cultural relationships Copán structures. The chapter is well illustrated with plans of the most important parts of the site revealing the large number of astronomical alignments, as well as a study of steles and the impressive iconography at the site. I invite you to discover the secrets in the celestial bench, located in the area of the graves, which beckon the visitor to stay and contemplate the meanings carved in the stones by people who preceded us on the path of life. Part of the article is dedicated to the Honduras rock art, a topic that has not been completely investigated, completing the description with a study of the indigenous worldview in Tolupan, with an abundant review of astronomical concepts. The segment dedicated to eclipses and their cultural interpretation and of course the same treatment to local worldview through the stars will call attention to the reader. The article is excellent and a recommended guide for beginning an understanding of the Mayan culture from Copán, crowned with an extensive bibliography if the reader wishes to immerse himself in the impressive Mayan world.

In Chapter 11, "Asterisms and Time Cycles: Perspectives from Central West Chaco," by Cecilia P. Gómez we move again south into the area we call Chaco that corresponds to the northwest of the current province of Formosa in Argentina. The article makes a tour of local Toba cultures with a mention of their socio cultural characteristics, and relations with other neighboring cultures and linguistic groups. The work explores the perception that this culture has regarding heaven, the sun and the moon with an important sociological content. The article introduces us to the cosmic perception of Toba and Wichi, with varied references to celestial bodies, with different sociological and cultural relations.

In Chapter 12, "The Plate of the Andean Worldview and the Stars, Heavenly Bodies, and Natural Phenomena," author Eusebio Manga-Quispe takes us back to the Andean world and in particular, to the Inca capital, Cusco. The article begins with very complete listing of astronomic and cultural references, and in my case, I liked that the article included some verbatim quotes from several sources listed in the bibliography. I think this allows the reader to interpret some of the perceptions of the stars through a narrative of legends and divinities. The Salcamaygua Golden Plate is a fantastic element that captures the attention of visitors who come to appreciate it at the Coricancha Museum in Cusco, and it has given rise to numerous interpretations. The article includes images and informative graphics that help explain the narrative, mentioning the cultural and astronomical relationships that can be clearly observed and which are further discussed by the author. Reading the text makes us feel as if we are there, in Cusco, and despite the fact that the subject of analysis is the Golden Plate, the mention of various particularities of the Inca capital is inevitable. Readers who love history will enjoy the interpretations of the different figures found on the stela, which mention astronomical observations, deified beings to be praised, epic battles, and a myriad of issues captured in an object that, in addition to being culturally revealing, is truly beautiful.

In Chapter 13, "A Revision of Some Lunar Glyphs of the Lunar Series at Quirigua," author Stanislaw Iwanizewski takes us back to the Mayan world,

dedicated specifically to lunar representations. The article is extremely informative and contains a number of tables that allow the reader to understand the data extracted from the interpretation of the glyphs, beginning with the Lunar Series. In my opinion, the book is enriched by this article, a cultural astronomic study that, in addition to presenting the information, invites the reader to follow the notations found in the tables, which are extremely complete and lead us to reflect on the level of mathematical development of the Mayan culture, as well as the advancement of their astronomy. The article has a large number of references to the different orientations and is a constant invitation to consider the annotations of the tables and relate them culturally to the Mayan perception of the universe. It is a fascinating work, which was presented in 2019 as part of the "Lunar Theory in Maya Astronomy" project, supported by the National Institute of Anthropology and History by the author. It is worth mentioning the important bibliography included in the article, necessary for those who wish to expand their knowledge on this subject, although again, in this case, the article and particularly its tables will be a valuable reference for those who want to deeply understand the subject.

In Chapter 14, "The Cultural Legacy of the Incas: The Road toward a Genetic Epistemological Cognitive Archaeoastronomy," by Mónica Baptista Pereira Estrázulas and Milton Rojas Gamarra, we return to the Inka world with a comprehensive study of their worldview and its fundamental principles, with a strong epistemological focus. I found the account to be agile and easy to read, supported in its main references by citations to other studies that enrich and contribute to the reader's understanding. The work provides a basis for interpreting the most important issues of Inka culture's worldview, with accounts of daily life in the Andes that give the reader a sense of what it would be like to live in that landscape, with a constant addition of stories that serve as examples of the aforementioned theories. In addition, the paper mentions a series of social relationships and characteristics of community life. The article will be very satisfying for those who align their ideas with Piaget's interpretations, which is the dominant rule in most works that go so far as to venture into breaking down ideas regarding moral values. The work is very comprehensive, and I invite you to read it.

There are so many cultural and social aspects described that I risk omitting some: it would be best to read the chapter itself.

Chapter 15, which concludes the book, is entitled "Chankillo Archaeoastronomical Complex," by Steven Gullberg. It is a worthy end to this great adventure to which the authors have invited us into the world of cultural astronomy in Latin America. Chankillo is a recent UNESCO World Heritage Site (2021). This book started as a journey that began with the beautifully illustrated cover of Chankillo, traveled through different parts of Latin American culture prior to the European conquest that began in the 15th century, and finally brought us back again to the site illustrated on the cover. The dating of the Chankillo takes us back to the fourth century BCE, and includes what is possibly the oldest solar calendar in the Americas, which illustrates the extensive knowledge of its builders regarding solar cycles. The article includes mention of the Inca Solar Pillars, north of Cusco and tempts us to consult the author's 2020 work on the Astronomy of the Inca Empire. We continue with a description of the archaeoastronomical complex at Chankillo to include the Solar Observatory, Fortified Temple, Administrative Center, and Observatory building, before delving into the details of the thirteen towers, which Gullberg defines as the most outstanding feature of the site. Numerous illustrations provide useful understanding of archaeoastronomic findings. The photographs of the September equinox sunset and a moonset between the towers are striking. The article, in addition to a complete explanation of the site and its astronomical-cultural relationships, is an invitation to visit the site. Towards the end of the article, some sociological, astronomical-cultural, calendrical references, and aspects of solar worship are considered. After reading this, I feel the desire to be present at this site built by people who preceded us on life's journey, developing cultures that we now try to study and learn from, whose cultural, ceremonial, and social relationships led them to build sites like this one. After reading this chapter, those who have not been to the Chankillo (and Urubamba) will want to experience and explore these sites, so thoroughly described and beautifully illustrated.

This is how I conclude my analysis of the publication entitled *Cultural Astronomy in Latin America*, edited by Steven R. Gullberg and César Augusto Zen Vasconcellos. I feel like I have explored an important, reference-worthy text, with constant invitations to learn more about astronomy in Latin America and to explore its diverse identity. I hope all those who embark on this adventure enjoy reading it as much as I did and that they treasure this volume in their libraries.