Astronomy in Brazilian Ethnohistory

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Abstract

Ethnohistorical data in the form of chronicles, records, and reports written by early European colonists, missionaries, naturalists and travelers dating back to the sixteenth century provide a valuable source of information concerning indigenous knowledge systems in Brazil, despite being filtered through the eyes of the ethnologist. This chapter considers some early accounts relating to constellations and timekeeping.

Introduction

In 1875, Augusto Emílio Zaluar wrote the first Brazilian scientific novel, entitled *O Doutor Benignus* (Doctor Benignus). The book describes a hypothetical scientific expedition to the Brazilian hinterlands, in the style of the European and Brazilian naturalists who visited Brazil in the nineteenth century. It is not by chance that he wrote:

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> (. . .) the old chief explained to his visitors many other curious things, including some unique astronomical traditions, which raised keen interest in the doctor and M. de Fronville, and therefore they could understand why the savages scream and become terrified when they witness solar eclipses. (Zaluar 1994; author's translation)

Travel reports by Saint-Hilaire, Langsdorff, and Couto de Magalhães inspired the novel, as did experiences of the author's own travels. These books belong to a substantial set of chronicles, historical records, and reports of travelers, colonists, missionaries, and naturalists who had been in contact with native peoples in Brazil since the arrival of the Portuguese in 1500 CE. These reports frequently contain information about indigenous knowledge systems, including descriptions of constellations, cosmogony, stellar myths, calendar systems, and elements of empirical astronomical knowledge.

The importance of skywatching for Brazilian indigenous groups was noted by many chroniclers and ethnologists, and the records of this information are important for a better understanding of these peoples' knowledge of relations between the heavens and earth. Though each of these reports is shaped by the worldview of its author, which sometimes limits or distorts the understanding of information that interests the ethnoastronomer, these chronicles, which date back to the sixteenth century, have been an invaluable source of indigenous knowledge systems, especially those of groups who no longer survive, such as the Tupinambá (Lima 2004, 2006).

The *ethnohistorical map* by Curt Nimuendajú (2002 [1944]) locates all known Brazilian tribes (more than 1,400 indigenous groups), including those now extinct, based on 972 bibliographical references together with his own fieldwork. The map is divided into 40 linguistic families, each having a characteristic color (IBGE 2002). The young German autodidact Curt Unkel, who later adopted the Guarani name Nimuendajú, lived for more than 40 years (1903–1945) in the Brazilian hinterland among Indian tribes, including the Guarani, Ge, Canela, Apinajé, and Xerente. He wrote over 30 ethnological and linguistic works, including three tribal monographs.

Constellations and Timekeeping

Most of the authors who wrote during the first centuries of colonization had been in contact with the Tupinambá. These Tupi tribal groups had cultural and linguistic unity and have lived since the beginning of colonization in the areas where contact with Europeans was more intense and regular, mainly the Brazilian littoral zone. The Tupinambá no longer survive, owing to warfare (with the Europeans and other indigenous groups), epidemics caused by contact with the Portuguese, slavery, and starvation.

The French theologian and Calvinist Jean de Léry was in Brazil in 1557 among the Tupinambá of Rio de Janeiro and wrote about the way they used the lunar phases for timekeeping:

> Ignorant of the creation of the world, they do not distinguish the days by specific names, nor do they count the weeks, months and years, only calculating or marking time through lunations. (Léry 1980, pp. 205–206; author's translation)

Léry also recorded the way they reckoned their age by counting the number of lunations since their birth:

> In spite of many of them living for up to 120 years (they know how to count their age by lunations), few are the ones who in old age have white or grey hair. . . (Léry 1980, p. 111; author's translation)

The Italian navigator Amerigo Vespucci, in his letter to Lorenzo dei Medici in 1502, also noted counting by lunar months:

> They are individuals who live for many years, because, according to their calculations, we know many men who have four generations of descendents. They do not know how to count the days, nor the months or the years, except by dividing time into lunar months. When they want to indicate something and its time, they place a stone for each moon [lunation]. I met one of the oldest men who showed me by means of signs with stones that he has lived for 1,700 lunar months, which seems to me like 132 years, counting 13 lunar months per year. (Vespúcio 2003, pp. 186–187; author's translation)

The book *Histoire de la mission des pères capucins en l'isle de Marignan et terres circonvoisines où est traicté des singularitez admirables & des moeurs merveilleuses des indiens habitans de ce pais*, first published in 1614 by the French Capuchin Claude d'Abbeville (d'Abbeville 1995), is one of the most notable sources and describes Tupinambá ethnoastronomy in great detail in its chapter *LI* (Lima 2004; Lima and Borges 2005; Lima and Moreira 2005; Lima et al. 2006). D'Abbeville describes calendar systems, elements of empirical astronomical knowledge, and about 30 names of constellations, stars, planets, etc. Concerning the stargazing practiced by the Tupinambá, d'Abbeville says:

> There are only a few of them that don't know the majority of the celestial bodies and stars of their hemisphere and that don't call them by the proper names that were invented and imposed upon each of them by their ancestors. (D'Abbeville 1995, pp. 310–311; author's translation)

About the moon, d'Abbeville wrote:

> It is certain that they do not know the Epact, nor the Moon's Ages; however, by virtue of long practice, they know its waning and waxing, the full Moon and the new Moon and many other things about its course. (D'Abbeville 1995, p. 320; author's translation)

D'Abbeville was a monk, and for that reason he was familiar with the epact and the moon's age, astronomical definitions used to calculate the Catholic calendar. The Tupinambá had an empirical knowledge of the difference in days between the "solar year" and the "lunar year", probably because they also managed a solar calendar:

> They also observe the course of the Sun, the route that it follows between the two tropics, and the boundaries and frontiers it never surpasses; and they know that when the Sun comes from the Arctic pole it brings them winds and breezes and that, on the contrary, it brings rains when coming from the other side as it ascends towards us.

> They count perfectly the years with twelve months as we do, by the course of the Sun coming and going from one tropic to the other. They recognize them also by the season of rains and by the season of breezes and winds. They also recognize them, still, by the harvest of the cashew (. . .) just as we would know them here by the vintage. (D'Abbeville 1995, p. 320; author's translation)

The Tupinambá also used the stars to determine the length of the year:

> Besides, the star Seychou becomes visible some days before the rains and disappears at the end of them; it reappears above the horizon at the beginning of the rains in the next year, from which the people of Maranhão perfectly recognize the interval and the length of a whole year. (D'Abbeville 1995, p. 320; author's translation)

Seychou is the "Poussinière" (the Pleiades):

> We have among us the 'Poussinière' that they know very well and they call 'Seychou'. It starts to be seen, in their hemisphere, by the middle of January, and as soon as they see it, they affirm that the rains are about to come, as they do indeed a little later. (D'Abbeville 1995, p. 310; author's translation)

The northern region of the state of Maranhão has two seasons: a dry one (from June to November) and a rainy one (from December to May). D'Abbeville says that Seychou becomes visible in January, but the heliacal rise of the Pleiades occurs in June and its acronychal rise (rising at sunset) (see ▶ Chap. 30, "Basic Concepts of Positional Astronomy") occurs in November. D'Abbeville says that Seychou announces the rain, and for that reason, the acronychal rise seems more likely. He also says that Seychou disappears at the end of the rains, which could indicate its heliacal set. In fact, the end of the rainy season is in May.

The moon and its relation to the tides were also described:

> They attribute to the Moon the ebb and flow of the sea and distinguish very well the two high tides that happen at full Moon and New Moon or a few days later. (D'Abbeville 1995, p. 320; author's translation)

This quotation is important because, at the time d'Abbeville wrote his book, the causes of tides were not known. Galilei wrote the *Discorso del flusso e reflusso del mare* in 1616, and an expansion of the *Discorso* in the *Dialogo sopra i due massimi sistemi del mondo Tolemaico e Copernicano* appeared in 1632. In the *Dialogo*, Galilei tries to show that the tidal motions we observe can only arise from a combination of the earth's axial rotation with its orbital revolution – two motions which Copernicus had assigned to the earth (Burstyn 1962, p. 163). In the Discorso, Galilei says he does not need to use the motion of the moon to explain the tides (Galilei 1968, p. 389). But the cause of the tides is the gravitational attraction of the moon and sun, and "Newton was the first to show correctly how the tide-generating force arises" (Burstyn 1962, p. 163).

D'Abbeville is also the first author to describe a very important and widespread indigenous constellation in Brazil:

> They have a constellation which they call "Yandoutin", or the White Ostrich, formed by very large and bright stars; and because many of them are in the shape of a beak,

> the inhabitants of Maranhão say that it wants to eat two other stars which they denominate "Ouyra-Oupia", i.e., the two eggs. (D'Abbeville 1995, p. 319; author's translation)

D'Abbeville called the constellation "the White Ostrich", but the ostrich (*Struthio camelus*) is not a Brazilian bird. In fact, he was talking about the bird popularly named Ema in Brazil, also called Greater Rhea or Emu in English, whose scientific name is *Rhea americana*.

The Brazilian polymath José Vieira Couto de Magalhães, in his "Tupi Language Course", locates the Emu constellation:

> Living in the ardent climates of Brazil, the ones who are navigators prefer the night for the trip. I traveled tens or perhaps hundreds of nights at Araguaya accompanied by the wild Carajás - and they always know the time of night by the stars, with enough precision to perfectly adjust the pace. I am not ashamed to say that at this time, they knew a larger number of constellations than I knew. One night they showed me that one of the dark clouds in the sky (which is close to the Southern Cross) formed the ostrich head, and as the night progressed the continuation of the dark patch appeared along the Milky Way as the neck and then the bird's body. Among the Tupi the planet Venus, which is called iaci-tatá-uaçu, and the Pleiades constellation (Ceiuci) are frequently used for timekeeping during the night. In the collection of legends I publish below, there is a curious explanation of time. (Magalhães 1935, pp. 78–79; author's translation)

The Emu is a type of constellation that is formed by dark clouds in the Milky Way. In the ethnohistorical literature and during fieldwork among the Guarani Indians of Rio de Janeiro, we discovered that there are several types of constellations: star-to-star, dark, and white. There are also possibly some mixed constellations, formed by stars and dark clouds in the Milky Way (Lima et al. 2006).

Salesian missionaries have lived among the Bororo Indians of Mato Grosso since 1896 and have produced extensive ethnographic work on the Bororo, including in particular the three monumental volumes of the *Enciclopédia Bororo* (see Fabian 1982). They also report the Emu constellation:

> Pári (celestial dark cloud): It is a set of dark patches, occupying much of the celestial dome, resembling a running emu, whose head is near the Southern Cross. (Enciclopédia Bororo v.1 1962, p. 614; author's translation)

In 1983, the American ethnoastronomer Stephen M. Fabian spent 10 months among the Bororo. This fieldwork resulted in important publications (Fabian 1992, 2001). His Bororo informant reported a constellation named Light Emu (Pari kigadurewu) in the lighter areas of the Milky Way.

Future Directions

Research into the ethnohistorical literature as a source of indigenous knowledge may present difficulties, because it can be very difficult to determine whether the information mentioned did come originally from informants: it may represent the personal interpretations of ethnologists influenced by the interpretive trends of their

time. However, ethnologist mediation always occurs to a greater or lesser extent. Notwithstanding these difficulties, this literature can help in the construction of a general framework of ethnoastronomy among Brazilian indigenous groups and contribute to a better understanding of some widespread constellations – such as the Emu – that appear among groups as culturally and linguistically diverse as the Guarani and Apinajé and may even inhabit the heavens of the Mocovi of Argentina.

Conversely, it is common to find in books written by naturalists and ethnologists who traveled through Brazil in the nineteenth and twentieth centuries references they received from Brazilians, such as Domingos Soares Ferreira Penna and Silva Coutinho, whose contributions to the history of science in Brazil may not yet have been fully recognized and whose works need to be analyzed with respect to ethnoastronomy.

Cross-References

► Astronomy and Cosmology of the Guarani of Southern Brazil
► "Chiriguano" Astronomy - Venus and a Guarani New Year

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