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ASTRONOMICAL PHENOMENA IN THE CULTURAL PRACTICES OF THE KUMBA-QUIMBAYA INDIGENOUS COMMUNITY OF COLOMBIA

FENÓMENOS ASTRONÓMICOS INMERSOS EN LAS PRÁCTICAS CULTURALES DE LA COMUNIDAD INDÍGENA KUMBA-QUIMBAYA DE COLOMBIA

Daniela Sánchez-Giraldo
Maestría en Enseñanza de la Física, Universidad Tecnológica de Pereira, Colombia.
E-mail: danielasanchez@utp.edu.co

and

Edwin A. Quintero-Salazar
Grupo de Investigación en Astronomía Alfa Orión, Observatorio Astronómico, Universidad Tecnológica de Pereira, Colombia.
E-mail: equintero@utp.edu.co

Abstract: The Quimbaya were a South American native people who inhabited the central region of Colombia, extinct due to the Spanish colonization. However, it was recently discovered that the Kumba-Quimbaya indigenous community, currently living in the village of La Iberia in the municipality of Riosucio, Caldas, is descendant of the ancient Quimbaya culture. This paper describes the implicit astronomical phenomena found in the cultural practices of the ancestral Kumba-Quimbaya people and characterizes the relationship between these practices and the daily activities of this community. This qualitative study relies on three ethnographic techniques to gather information: participant observation, field diaries, and interviews, which were conducted during visits to the community's rural settlement. The information was systematized in a textual corpus and processed through content analysis. We identified 10 astronomical phenomena embedded within the cultural practices of this community. The phases of the Moon are used to schedule ceremonies and festivities, agricultural activities and within their traditional cuisine. We also identified the ritual use of geography through the observation of the location of the Sun and the Moon with respect to sacred mountains. Likewise, we evidenced the influence of a lunar calendar of their own in current social activities. This work allowed us to describe the relationship between astronomical phenomena and the daily activities of the community, such as rituals to improve their harvests, perform plantings, or anticipate climatic or seasonal changes. These findings contribute to the knowledge of the customs and traditions of the Quimbaya people, as well as broaden our understanding of the use of astronomy by pre-Columbian peoples.

Resumen: Los Quimbaya fueron un pueblo nativo sudamericano que habitó la región central de Colombia, extinto a causa de la colonización española. Sin embargo, recientemente se descubrió que la comunidad indígena Kumba-Quimbaya, que actualmente habita en la vereda La Iberia del municipio de Riosucio, Caldas, es descendiente de la antigua cultura Quimbaya. Este artículo describe los fenómenos astronómicos implícitos en las prácticas culturales del pueblo ancestral Kumba-Quimbaya y caracteriza la relación entre estas prácticas y las actividades cotidianas de esta comunidad. Este estudio cualitativo se basa en tres técnicas etnográficas para recopilar información: observación participante, diarios de campo y entrevistas, las cuales se realizaron durante visitas al asentamiento rural de la comunidad. La información se sistematizó en un corpus textual y se procesó mediante análisis de contenido. Identificamos 10 fenómenos astronómicos inmersos dentro de las prácticas culturales de esta comunidad. Las fases de la Luna son utilizadas para la programación de ceremonias y festividades, actividades agrícolas y dentro de su culinaria tradicional. También identificamos el uso ritual de la geografía, a través de la observación de la ubicación del Sol y la Luna con respecto a montañas de carácter sagrado. Igualmente, evidenciamos la influencia de un calendario lunar propio en las actividades sociales actuales. Este trabajo nos permitió describir la relación existente entre los fenómenos astronómicos y las actividades cotidianas de la comunidad, tales como rituales para mejorar sus cosechas, realizar siembras, o anticiparse a cambios climáticos o estacionales. Estos hallazgos aportan al conocimiento de las costumbres y tradiciones del pueblo Quimbaya, así como también amplían nuestra comprensión acerca del uso de la astronomía por parte de los pueblos precolombinos.

Keywords: Cultural astronomy, ethnography, astronomical phenomena, Kumba-Quimbaya community, cultural practices

Palabras clave: Astronomía cultural, etnografía, fenómenos astronómicos, Comunidad Kumba-Quimbaya, prácticas culturales

1 INTRODUCTION

Astronomy has revolutionized human thought and brought scientific, technological and cultural knowledge. It is one of the oldest sciences and has played a fundamental role in ancient peoples' conceptualization of life and the environment. At the end of the nineteenth century, the relationship between knowledge about celestial phenomena and the ancient societies that developed that knowledge began to be studied (López and Benítez, 2010), giving rise to an interdisciplinary branch of astronomy called cultural astronomy; it is defined as the study of the ways in which humans perceive the sky and its relationship with the organization of different aspects of social life (Iwaniszewski, 1994).

Since 1985, in Colombia, discussions have taken place at international congresses about the perception of time in the Andes and the calendar systems of ancient civilizations such as the Incas. These discussions have exposed the astronomical phenomena involved in archaeological monuments (Aveni, 1992). Additionally, in northern America, Young (1986) has studied the interaction between petroglyphs and the phenomena of light and dark at significant times of the year.

In Mexico, there have been numerous investigations in this field because of the presence of ancient civilizations' monuments, temples and sacred structures. For example, in the Mayan ruins' complex of Chichen Itza in Yucatán, Šprajc and Nava (2013) conducted a systematic study of the architectural orientations of the main buildings, identifying the astronomical and calendrical criteria used by the Mayas in relation to their worldview, political ideology, and ceremonial planning, among other social aspects. Additionally, in Xochicalco, an archaeological site in the state of Morelos, Morante (2019) studied the astronomical knowledge recorded in texts carved in stone, identifying precise architectural orientations and advanced observation instruments with which it is possible to verify historical astronomical phenomena. Studying an area further east in Mexico, de la Vega and Pérez (2014) investigated the advances made in Tehuacalco, where they identified that most of the structures are aligned with the movements of the Sun and others with those of Venus. In addition, they found that these movements conform to the elements that constitute an observational calendar that is related to the agricultural cycle of that community.

Cultural astronomy has two main subdisciplines, archaeoastronomy and ethnoastronomy. The former entails studies on the astronomical knowledge of past cultures through archaeological and historical material, and the latter entails studies on the astronomical phenomena that are used by current sociocultural groups in their ritual and daily practices (Iwaniszewski, et al., 2021; Lopez and Hamacher, 2016). Research in cultural astronomy not only allows us to know the diversity of ways of thinking about the sky but also the relationship between the societies that produce these approaches (ibid.). That is, studying the way in which people perceive the sky allows us to understand how human beings produce knowledge about who we are.

Therefore, in South America, there has been much interest in the astronomical knowledge of contemporary indigenous communities and cultures. For instance, the cosmovisions and cosmologies of the Mocovíes in the Chaco, Argentina, have been studied to understand that community's celestial plane, corroborate the importance of some asterisms in its cultural practices and even reconstruct some aspects of the life of the Mocovíes before the arrival of the Spaniards (Benítez, et al., 2006).

Astronomical and atmospheric phenomena have been a fundamental tool for the execution of agricultural practices among indigenous peoples and peasants in relation to agricultural production cycles and changes in the climate and the sky (Agreda, 2010). The astronomical knowledge of these communities has been preserved over time through legends and oral traditions. In Mesoamerican communities, Venus, as an evening star, is considered an indicator of the beginning and end of the rainy seasons, which are related to the planting and harvesting of corn (Šprajc, 1993).

Studies in cultural astronomy have allowed the compilation of myths and legends involving stars, asterisms and astronomical phenomena. For example, Gómez (2017) anthropologically and historically documented how the Tobas in Argentina perceived the sky and the relationship between their cosmogony, mythology and social organization.

Both scientifically and culturally, studying the history of ancient peoples has provided insight into the processes of transformation and evolution of human cognitive actions. It is possible to understand our place in the cosmos through astronomical knowledge that has been preserved in ancestral cultures in tangible (temples, cave paintings, and ceremonial sites) and intangible (oral tradition and traditional practices) ways (López and Hamacher, 2016). These approaches allow us to understand the

relationship between the cosmovision or perception of the world and the practical phenomena taking place in cultural groups. This understanding allows the production of evidence about the intervention of social processes in the construction of knowledge about celestial phenomena.

Colombia, and especially Eje Cafetero, is a culturally rich region. Indigenous citizens make up 3.4% of the population, with more than 87 peoples and 64 living languages. Identifying the astronomical knowledge of indigenous peoples who inhabit the Colombian territory allows us to recognize the cultural diversity of the country and to use ancestral wisdom to identify the relationship that exists between the sky and the Earth and how these relationships are part of the cultural landscape. In Colombia, some of the regions where studies in archaeoastronomy have been conducted are Bogotá (Bonilla, et al., 2011), Huila (Betancur, 2007) and Pasto (Quijano, 2006), where important geographical locations used by ancient civilizations for the observation and interpretation of the sky were identified, allowing us to learn about the concepts and technologies of the ancient people who inhabited these territories. The city of Pasto has also been a center of ethnoastronomy studies. For example, Agreda (2010) unveiled the practical use of ethnoastronomical knowledge in the indigenous communities of Mapachico and Genoy, contributing to an understanding of the social and cultural structure of this contemporary community in southern Colombia. Similarly, ethnoastronomical studies have been conducted in Embera communities by Pardo (1986), who documented the astronomical knowledge that this ethnic group has preserved until today through oral tradition in their myths and legends. This reflects the cultural richness of Colombia, and of the Eje Cafetero in particular.

One of the indigenous communities of the Eje Cafetero is heir to the ancient Quimbaya culture, the Kumba-Quimbaya, located in the municipality of Riosucio, Caldas. Despite studies on the conservation of that community's territorial settlement and cultural traits, no studies have focused on the preservation of its astronomical conception over time. Studying stories and cultural practices through which our ancestors explained their relationship with the Universe allows us to understand the wisdom by which people lived in ancient times and how they were able to connect astronomical phenomena to changes on Earth pertaining to agriculture and society. Thus, it is important to recover and make visible the ancestral knowledge of the communities that have inhabited this territory. Therefore, in this paper, through ethnoastronomical techniques and participant observation, we present the astronomical phenomena identified in the cultural practices of the Kumba-Quimbaya community of Riosucio, Caldas, Colombia.

2 METHOD

This research was framed according to a qualitative paradigm because it resulted in descriptive data that were analyzed based on the Kumba-Quimbaya people's social processes. This population is an indigenous and peasant community that has preserved its cultural traits through traditions, daily practices, orality and ritual ceremonies. To identify the astronomical phenomena that are implicit in its culture, it was necessary to analyze qualitative information collected in the spaces regularly used by the community.

Data were collected within the context of the community through interviews, observation and participation; these sources of evidence were then analyzed.

This research was carried out in 4 phases: 1) collection of information using interviews, focus groups and participant observation during visits to the community, 2) systematization of the information in text sets or textual corpora, 3) analysis of the information using a content approach, and 4) development of conclusions based on the results.

2.1 Population

The Kumba-Quimbaya live in the village of La Iberia, approximately 7 km from the town of Riosucio, in the department of Caldas, Colombia (Figure 1). They have a ceremonial center and have preserved an important part of their territorial settlement and cultural traits. The study involved members of the Council of Sages (wise men) among the Kumba-Quimbaya community, the Kurikamayo and the Burimkuricamayo, the main community leaders, as well as some interested people who participated during the meetings and face-to-face activities.

The Council of Sages is composed of 12 individuals over 60 years of age (Figure 2), who, due to their experience in different areas of work, are considered the spiritual authority in the village and are in charge of making decisions internally. The Kurikamayo is the main leader, also called the governor, who is in charge of decisions and representations at the societal and governmental levels. The Burimkurikamayo is the alternate governor who accompanies and on specific occasions replaces the Kurikamayo.

Figure 1: Municipality of Riosucio in the department of Caldas, Colombia (author: Milenioscuro. License: CC BY-SA 3.0; retrieved from: https://commons.wikimedia.org/w/index.php?curid=17831464).

Figure 2: Members of the 'Council of Wise Men' of the Kumba-Quimbaya community (photograph courtesy: Rodrigo Grajales).

Figure 3 (above): The astronomical mirror of the Kumba-Quimbaya community. Left: The approximately 4-meter stone, located on Tabuyá Hill in La Iberia, Riosucio, Caldas. Right: The water mirror located at the top of the stone (photographs: Daniela Sánchez).

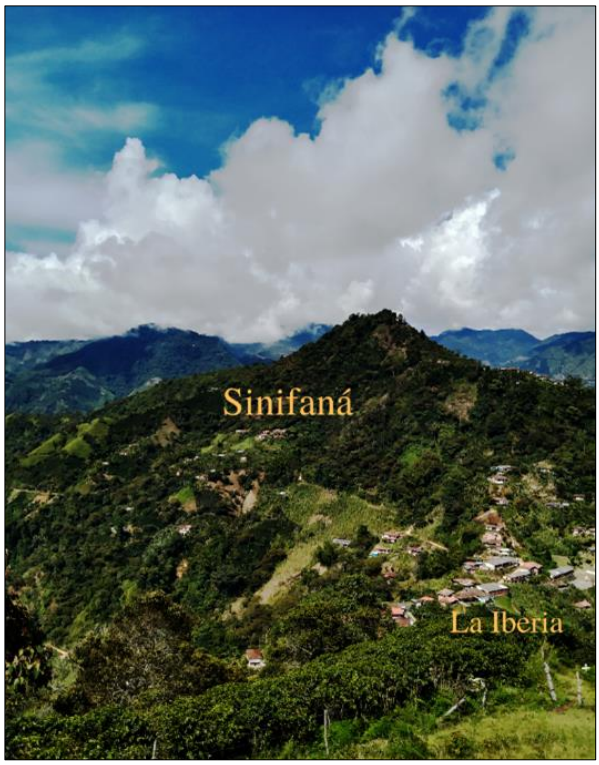


Figure 4 (right): A photograph from Tabuyá Hill showing the Kumba-Quimbaya community's village and *Sinifaná* Hill (photograph courtesy: Miguel Ángel Parra).

2.2 Data Collection Techniques and Instruments

During this research, fieldwork was carried out over 1 year, during which 5 visits to the community took place, each lasting approximately 5 days; in addition, and due to the SARS-CoV-2 health emergency, constant virtual communication was maintained.

Fieldwork is a fundamental element of ethnoastronomical research, as it allows the researcher to describe aspects of a culture, community or people based on direct or face-to-face interaction with the given community. This study recognizes the implicit knowledge that exists within the culture of an indigenous and peasant community and used three ethnographic techniques to collect information: participant observation, field diaries and interviews.

2.2.1 Participant Observation

Participant observation is a particularly descriptive information gathering technique, typical of qualitative research, and it is carried out by participating in the daily life of the group, person, or organization under study (Musante and DeWalt, 2010). During this research, the community was visited during one week in the months of April, June, July, August and September 2021. The accommodation and overnight stays were located in the communal hut, and food was provided by one of the families, allowing communication with members of the community at different times of the day.

One of the activities carried out in each of the field trips was a tour of the sacred hills, where ceremonial sites were recognized—for example, the astronomical mirror (Figure 3). No conclusive information was obtained about the astronomical mirror that would allow to identify the use of this instrument by members of the community. However, the members of the council of sages assured that their ancestors used the mirror's reflection to observe the stars. Additionally, a panoramic observation of the territory was conducted (Figure 4) during which it was possible to hold casual conversations with some members of the council of wise men.

To capture the information observed, technological tools were used, such as a voice recorder, which made it possible to record stories and sporadic conversations during walks in the mountains and in recreational spaces. Accurate, complete and detailed notes were also taken in a field diary, which made it possible to record behaviors and events that occurred during the field trips.

2.2.2 Field Diary

Field diaries make it possible to record events that occur during participant observation and to

Figure 5: Field diary format completed during the field trip to Tabuyá Hill on 02 April 2021.

integrate all the factors that may influence the experience, including objective and subjective observations and observations made by other people at different times (Martínez, 2007). A schematic model was used to record the information observed in field diaries; this information was organized in a precise and orderly manner in consideration of the following characteristics: date, place, activity or event, estimated number of people involved, people's estimated ages, and population distribution (boys, girls, men, women), and additional important notes were included (Figure 5).

After participating in specific daily activities with members of the community, it was necessary to use a moment in the middle of the day and at night to capture what had been observed in each space, such as the stories heard and information obtained about the territory in the car while touring, while preparing food, or during casual encounters with members of the community and tours in the mountains.

2.2.3 Interview

The interview possibly constitutes the information gathering instrument most used by researchers in the human sciences. For Marradi et al. (2010), the interview refers to a special form of encounter—a conversation that is used to collect certain types of information within the framework of research. In this study, two types of interviews were designed: semistructured interviews (Figure 6) and a focus group (Figure 7). The semistructured interviews were conducted individually with community leaders, while the focus group was organized openly in a telescope observation activity proposed by the authors. The council of wise men and some members of the community participated in this latter activity.

Telescope observing (Figure 8) allowed the general population, from children to older adults who were interested in the instrument and decided to participate, to partake not only in the observation of planets, the Moon and other celestial objects but also in the conversations about the stars. The topics were proposed in the focus group interview design and allowed the collection of information significant for the development of this research.

The information collected during these meetings was recorded in the field diary; it was also recorded and saved in audio format using a voice recorder. Subsequently, all recorded material was transcribed into a textual corpus to be analyzed.

2.3 Information Analysis

Through the analysis of the information collected during this research, concepts implicit in the community's expressions were identified. This identification considered not only the literal messages or the discourses of those who participated but also the context in which the messages arose and developed and everything that may have influenced or conditioned these messages. After a bibliographic review of the analysis of qualitative information was conducted, several types of analysis were found: discourse-based, textual, and content-based, among others. This research relied on content analysis because this type of analysis allows for a complete contextual study of a community's expressions.

During the content analysis, various procedural versions of analysis were found, some of which were similar to each other and others different. In this study, we use the methodology proposed by Navarro (1995), as it contains a more illustrative and concise procedure. These authors defined content analysis as a methodological perspective whose purpose is the investigation of verbal expressions (which was applicable in this case).

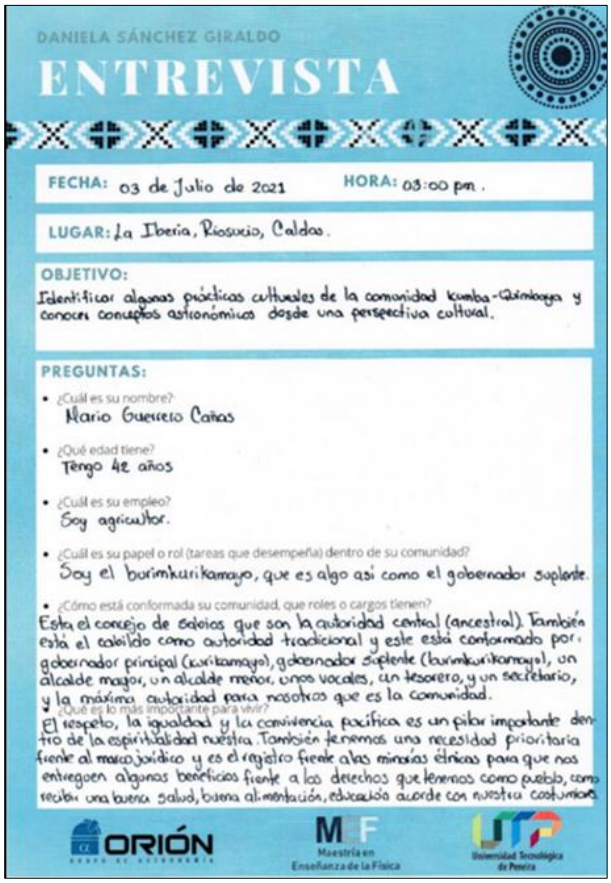
Verbal utterances can take two forms: oral or written utterances. Oral utterances were recorded during this research; for convenience, they analyzed from the written transcripts. To analyze the information collected, the following procedural approach was used, based on seven steps proposed by Navarro (1995).

According to Figure 9, the first step was the production of a textual corpus, which was developed out of the information collected in field diaries, interviews, focus groups and recordings during the field trips.

The second step was the extraction of the basic units of relevance or register units, which are defined as textual segments covering a certain aspect of the corpus considered relevant to the research. In this research, we used register units of the word-terms form, which was easier to detect via a software by using lists of frequent keywords appearing in the text. For the register units to be relevant and to acquire extratextual information, it was necessary to find the specific instances in which the units were found in the text. These instances are called context units.

The third step entailed coding. This was the moment in which each of the register units was assigned its respective context unit. Once the contexts of the register units were known, it was possible to link them and group them according to their lexical, semantic and pragmatic characteristics. The lexical field refers to the form of a word; the semantic field refers to the meaning of a word; and the pragmatic field refers to the interpretation of the context or extratextual information.

The fourth step was categorization, which is the result of the classification of the recording units according to their similarities or differences in a homogeneous manner and based on the previous step. The categories were exhaustive and included all the register units or subcategories, allowing for a reduction in the complexity of the analytical data, especially when there were large textual corpora. Table 1 shows the seven categories that emerged as a



DANIELA SÁNCHEZ GIRALDO

ENTREVISTA

FECHA: 03 de Julio de 2021 HORA: 03:00 pm.

LUGAR: La Iberia, Riosucio, Caldas.

OBJETIVO:

Identificar algunas prácticas culturales de la comunidad kumba-Quimbaya y conocer conceptos astronómicos desde una perspectiva cultural.

PREGUNTAS:

- ¿Cuál es su nombre?
  Mario Guerrero Cañas
- ¿Qué edad tiene?
  Tengo 42 años
- ¿Cuál es su empleo?
  Soy agricultor.
- ¿Cuál es su papel o rol (tareas que desempeña) dentro de su comunidad?
  Soy el burimkurikamayo, que es algo así como el gobernador suplente.
- ¿Cómo está conformada su comunidad, que roles o cargos tienen?
  Esta el consejo de ancianos que son la autoridad central (ancestral). También está el cabildo como autoridad tradicional y este está conformado por: gobernador principal (kurikamayo), gobernador suplente (burimkurikamayo), un alcalde mayor, un alcalde menor, unos vocales, un tesorero, y un secretario, y la máxima autoridad para nosotros que es la comunidad.
- ¿Qué es lo más importante para vivir?
  El respeto, la igualdad y la convivencia pacífica es un pilar importante dentro de la espiritualidad nuestra. También tenemos una necesidad prioritaria frente al marco jurídico y es el registro frente a las minorías étnicas para que nos entreguen algunos beneficios frente a los derechos que tenemos como pueblo, como recibir una buena salud, buena alimentación, educación acorde con nuestras costumbres.

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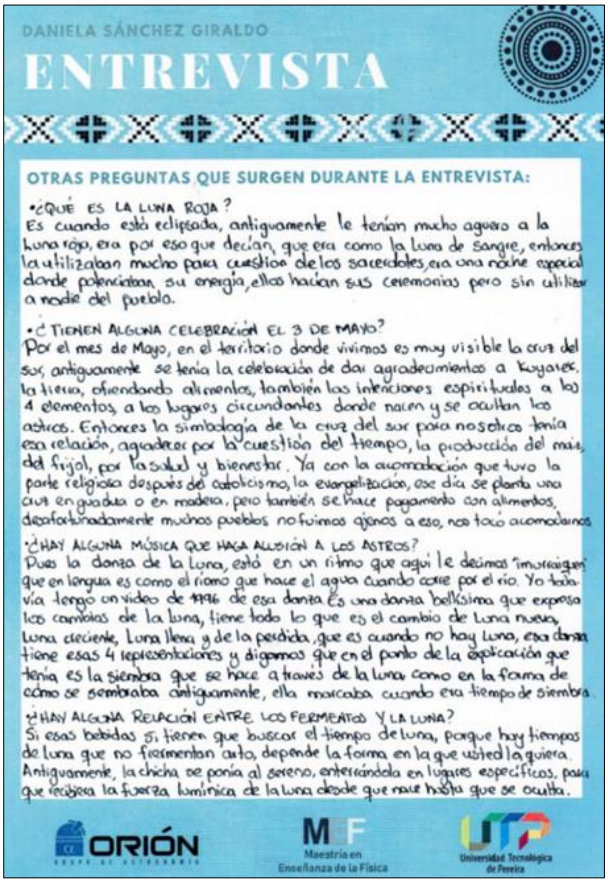

DANIELA SÁNCHEZ GIRALDO

ENTREVISTA

OTRAS PREGUNTAS QUE SURGEN DURANTE LA ENTREVISTA:

- ¿QUÉ ES LA LUNA ROJA?
  Es cuando está eclipsada, antiguamente le tenían mucho agüero a la luna roja, era por eso que decían, que era como la luna de sangre, entonces la utilizaban mucho para cuestión de los sacerdotes, era una noche especial donde potenciaban su energía, ellos hacían sus ceremonias pero sin utilizar a nadie del pueblo.
- ¿TIENEN ALGUNA CELEBRACIÓN EL 3 DE MAYO?
  Por el mes de Mayo, en el territorio donde vivimos es muy visible la cruz del sur, antiguamente se tenía la celebración de dar agradecimientos a Kuyares, la tierra, ofrendando alimentos, también las intenciones espirituales a los 4 elementos, a los lugares circundantes donde nacen y se ocultan los astros. Entonces la simbología de la cruz del sur para nosotros tenía esa relación, agradecer por la cuestión del tiempo, la producción del maíz, del fríjol, por la salud y bienestar. Ya con la acomodación que tuvo la parte religiosa después del catolicismo, la evangelización, ese día se planta una cruz en guadua o en madera, pero también se hace pagamento con alimentos, desafortunadamente muchos pueblos no fuimos ajenos a eso, nos tocó acomodarnos.
- ¿HAY ALGUNA MÚSICA QUE HAGA ALUSIÓN A LOS ASTROS?
  Pues la danza de la luna, está en un ritmo que aquí le decimos "imurreiguen" que en lengua es como el ritmo que hace el agua cuando corre por el río. Yo tengo un video de 1996 de esa danza. Es una danza bellísima que expresa los cambios de la luna, tiene todo lo que es el cambio de luna nueva, luna creciente, luna llena y de la perdida, que es cuando no hay luna, esa danza tiene esas 4 representaciones y digamos que en el punto de la explicación que tenía es la siembra que se hace a través de la luna como en la forma de cómo se sembraba antiguamente, ella marcaba cuando era tiempo de siembra.
- ¿HAY ALGUNA RELACIÓN ENTRE LOS FERMENTOS Y LA LUNA?
  Si esas bebidas sí, tienen que buscar el tiempo de luna, porque hay tiempos de luna que no fermentan acto, depende la forma en la que usted la quiera. Antiguamente, la chicha se ponía al sereno, enterrándola en lugares específicos, para que recibiera la fuerza lumínica de la luna desde que nace hasta que se oculta.

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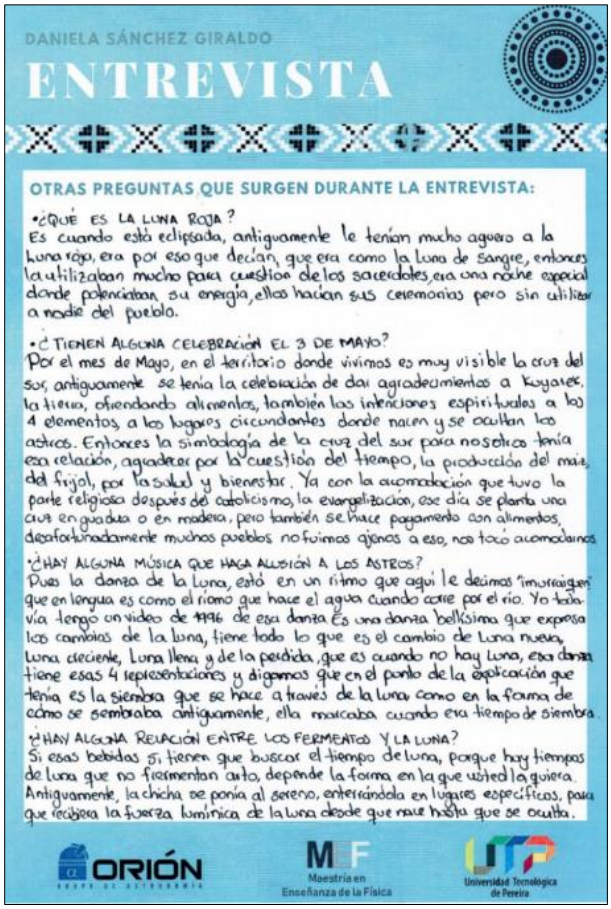

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Figure 6: A semistructured interview format.

result of this analysis, with the frequency (count) in which they were found in the corpus after the relevant groupings.

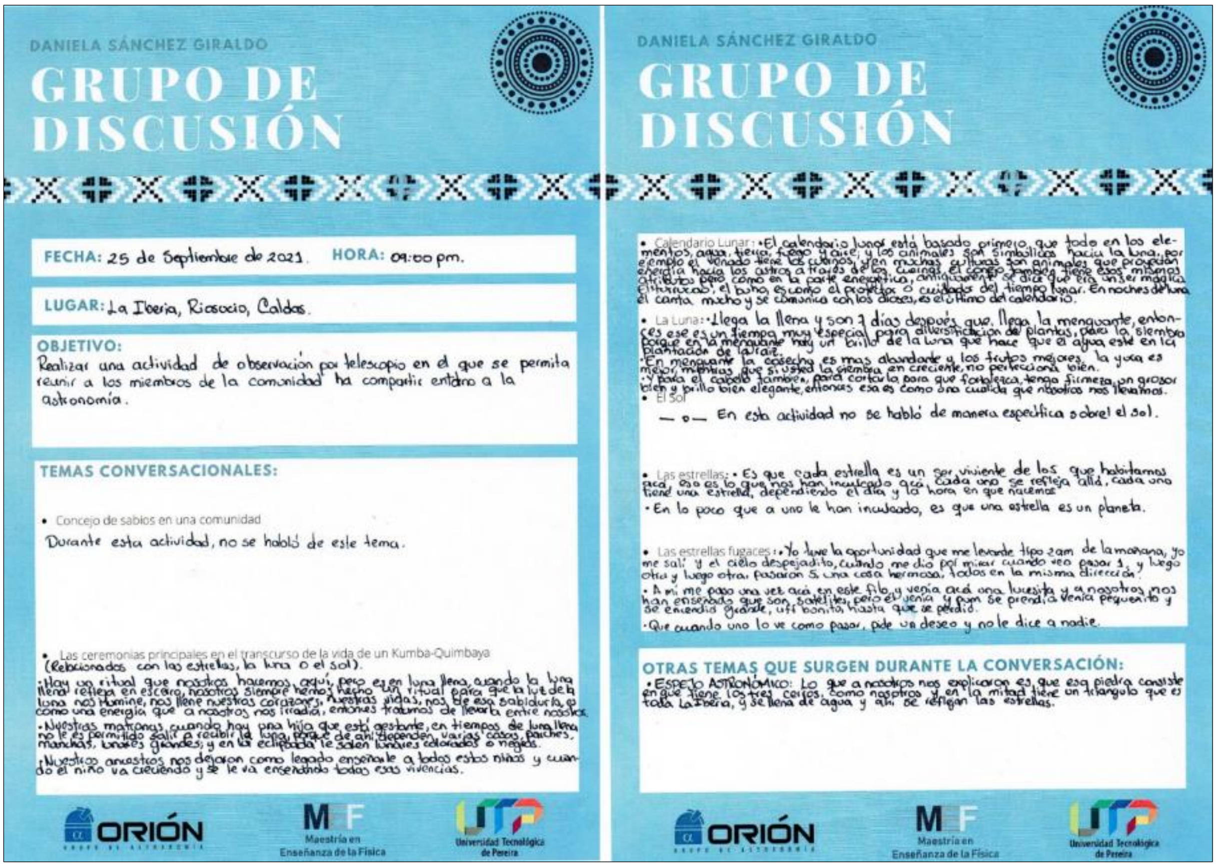
In the fifth step, interpretation and inferences were made. According to Navarro (1995: 195), this is the proper theoretical moment, in which, based on the data obtained at that stage:

> … it is necessary to make the leap to a different domain: that of the underlying realities that have determined the production of these data …

During this step, the context units of each of the categories were analyzed in detail, and the celestial bodies and astronomical phenomena arising from each of them were identified.

In the sixth step, an in-depth analysis of the context units in each of the categories was also carried out, and cultural practices were identified in each.

The last step proposed by Navarro (1995) is that of categorical schemes, where the different categories, subcategories and recording units are visualized through structures. In this study, specific and unpublished categorical schemes were created, which helped with data interpretation and theoretical inferences, creating a precise relationship between categories—astronomical phenomena—and cultural practices.



DANIELA SÁNCHEZ GIRALDO

GRUPO DE DISCUSIÓN

FECHA: 25 de Septiembre de 2021. HORA: 09:00 pm.

LUGAR: La Iberia, Riosucio, Caldas.

OBJETIVO:
Realizar una actividad de observación por telescopio en el que se permita reunir a los miembros de la comunidad ha compartir entorno a la astronomía.

TEMAS CONVERSACIONALES:

- Concejo de sabios en una comunidad
Durante esta actividad, no se habló de este tema.

- Las ceremonias principales en el transcurso de la vida de un Kumba-Quimbaya (Relacionados con las estrellas, la luna o el sol).
·Hay un ritual que nosotros hacemos aquí, pero es en luna llena, cuando la luna llena refleja en escaro, nosotros siempre hemos hecho un ritual para que la luz de la luna nos ilumine, nos llene nuestros corazones, nuestras vidas, nos de esa sabiduría, es como una energía que a nosotros nos irradia, entonces tratamos de llevarla entre nosotros.
·Nuestras matronas cuando hay una hija que está gestante, en tiempos de luna llena no le es permitido salir a recibir la luna, porque de ahí dependen varias cosas, parches, manchas, lunares grandes; y en la eclipsada le salen lunares colorados o negros.
·Nuestros ancestros nos dejaron como legado enseñarle a todos estos niños y cuando el niño va creciendo y se le va enseñando todas esas vivencias.

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GRUPO DE DISCUSIÓN

- Calendario Lunar: ·El calendario lunar está basado primero que todo en los elementos, agua, tierra, fuego y aire; y los animales son simbólicos hacia la luna, por ejemplo el venado tiene los cuernos, y en muchas culturas son animales que proyectan energía hacia los astros a través de los cuernos, el conejo también tiene esos mismos atributos pero como en la parte energética, antiguamente se dice que era un ser mágico. El turrucao, el buho, es como el protector o cuidador del tiempo lunar. En noches de luna él canta mucho y se comunica con los dioses, es el último del calendario.
- La Luna: ·Llega la llena y son 7 días después que llega la menguante, entonces ese es un tiempo muy especial para diversificación de plantas, para la siembra porque en la menguante hay un brillo de la luna que hace que el agua esté en la plantación de la raíz.
·En menguante la cosecha es mas abundante y los frutos mejores, la yuca es mejor, mientras que si usted la siembra en creciente, no perfecciona bien.
·Y para el cabello también, para cortarlo para que fortalezca, tenga firmeza, un grosor bien y brillo bien elegante, entonces esa es como una cualidad que nosotros nos llevamos.
- El Sol
—o— En esta actividad no se habló de manera especifica sobre el sol.

- Las estrellas: · Es que cada estrella es un ser viviente de los que habitamos acá, eso es lo que nos han inculcado acá, cada uno se refleja allá, cada uno tiene una estrella, dependiendo el día y la hora en que nacemos
·En lo poco que a uno le han inculcado, es que una estrella es un planeta.

- Las estrellas fugaces: ·Yo tuve la oportunidad que me levante tipo 2am de la mañana, yo me salí y el cielo despejadito, cuando me dio por mirar cuando veo pasar 1, y luego otra y luego otra, pasaron 5, una cosa hermosa, todos en la misma dirección.
· A mi me paso una vez acá en este filo y venía acá una lucesita y a nosotros nos han enseñado que son satélites, pero el venía y pum se prendió, venía pequeñito y se encendió grande, uff bonito, hasta que se perdió.
·Que cuando uno lo ve como pasar, pide un deseo y no le dice a nadie.

OTRAS TEMAS QUE SURGEN DURANTE LA CONVERSACIÓN:
·ESPEJO ASTRONÓMICO: Lo que a nosotros nos explicaron es que esa piedra consiste en que tiene los tres cerros, como nosotros y en la mitad tiene un triangulo que es toda La Iberia, y se llena de agua y ahí se reflejan las estrellas.

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Figure 7: Discussion group format. The discussion group met during a telescope observation activity on 25 September 2021, and members of the council of wise men and the community at large participated.

Figure 8: Observing with telescopes in the Kumba-Quimbaya community (photograph: Miguel Ángel Parra).

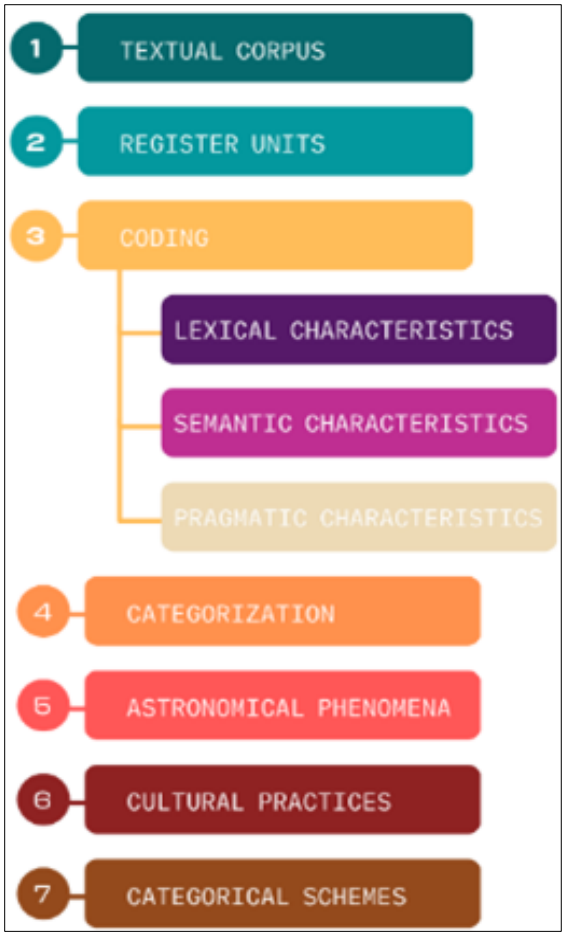

Figure 9: Diagram showing the content analysis procedure (diagram: Daniela Sánchez).

Table 1: Categorization of Registration Units.

Categorization		Counting
1	Moon	202
2	Culture	318
3	Territory	104
4	Stars	50
5	Meetings	97
6	Sacred	46
7	Sun	84

Table 2: A List of Astronomical Phenomena Identified in all Categories.

No.	Astronomical Phenomenon
1	Moonset
2	Phases of the Moon
3	Lunar Eclipses
4	Moon cycle
5	Heliotropism
6	Movement of the Sun Along the Horizon
7	Visibility of the 'Southern Cross'
8	Movement of the Earth (day and night)
9	Sunset
10	Sunrise
11	Geographical References (Mountains)
12	Evening of the Stars
13	Solar Eclipses
14	Shooting Stars (Meteors)

The relationship between each of the astronomical phenomena and the identified cultural practices of the Kumba-Quimbaya community of Riosucio, Caldas, Colombia, is specifically presented below.

3 RESULTS AND DISCUSSION

This research allowed us to identify 14 astronomical phenomena (Table 2) and 18 cultural practices (Table 3) of the Kumba-Quimbaya community. However, 10 astronomical phenomena were implicitly found in 14 of the 18 cultural practices identified. Figure 10 indicates the 10 astronomical events identified (blue circles) and their relationship with the 14 cultural practices (gray circles) of the Kumba-Quimbaya community. The following is a detailed description of each of the astronomical phenomena

Table 3: A List of Cultural Practices Identified in all Categories.

No.	Cultural Practices
1	Physical and spiritual healing
2	Light welcoming ceremony
3	Placenta and umbilical cord burial
4	El *Kañari*
5	Culinary origins
6	Planting, cultivation and harvesting
7	Funeral ceremonies
8	Celebration of the Holy Cross
9	Seasons and weather changes
10	Traditional dance
11	Sound medicine
12	Spiritual belief
13	Ancestral vision of the stars
14	Practices during lunar eclipses
15	Practices during solar eclipses
16	Observation of meteor showers
17	Reproduction and nesting of farm animals
18	Gestation and the full Moon

from the perspective of the ways in which the Kumba-Quimbaya community uses them in its cultural practices and the ways in which these phenomena have been viewed in other cultures at the national and international levels.

3.1 Phases of the Moon

Some of the most important astronomical phenomena throughout the history of humankind have been the phases of the Moon, which allow people to observe changes in the main night star with the naked eye. Most of the indigenous and peasant communities living in tropical territories such as Colombia have related the phases of the Moon with agriculture and their daily life. This topic is not scientifically rooted in biology, agronomy, or physics (Mayoral, et al., 2020), but it is a source of important social and cultural knowledge that allows the wisdom that

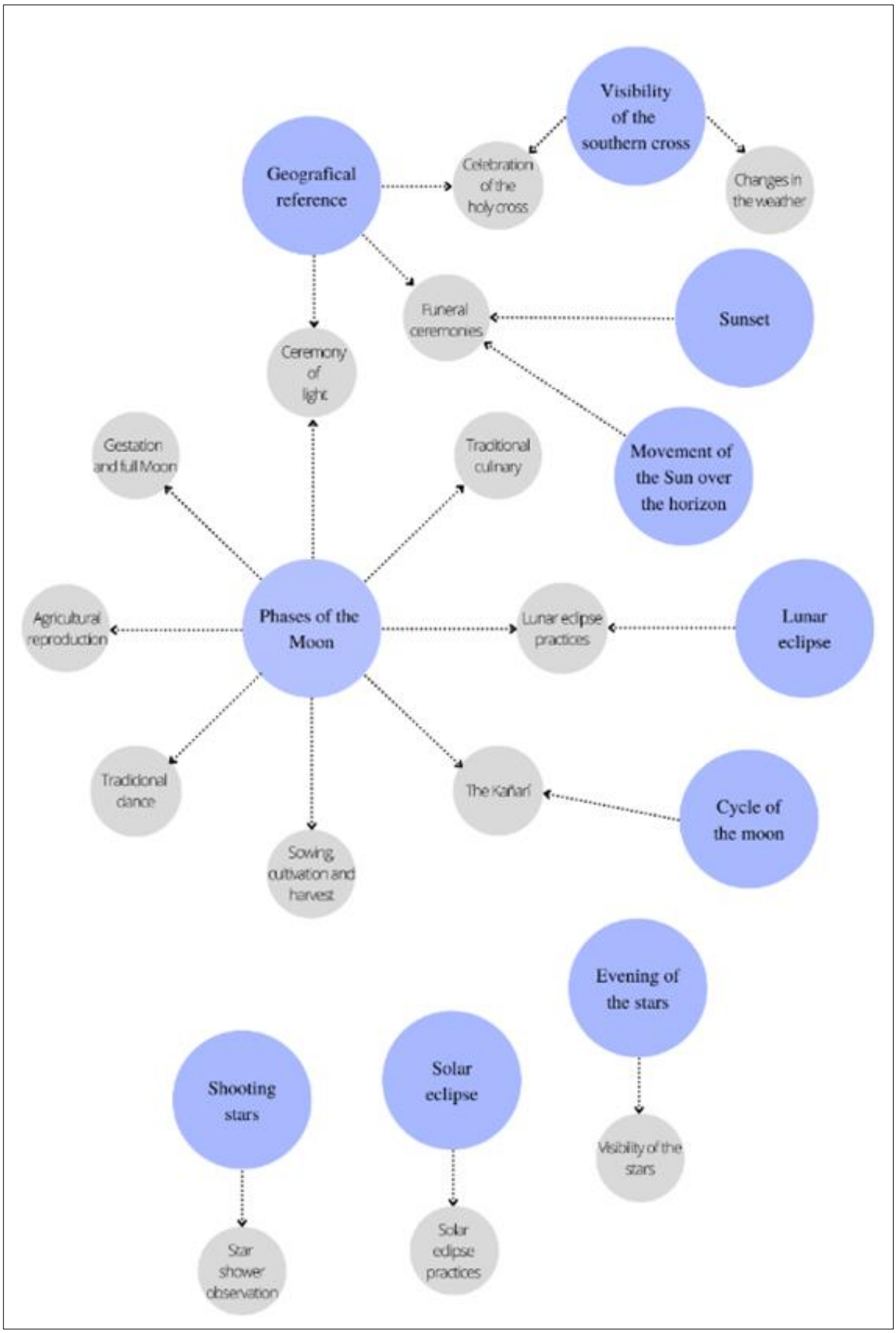

Figure 10: Relationship between astronomical phenomena and cultural practices (diagram: Daniela Sánchez).

people acquire through experience to be recognized.

This phenomenon is the most used in the practices of the Kumba-Quimbaya community members. In their daily lives, the phases of the Moon are used at the time of planting and harvesting food, such as *pancoger* and *guadua*. Kumba-Quimbaya's traditional cuisine includes fermented drinks such as *guarapo*, which is buried or left in the moonlight; the drink's flavor and fermentation depends on the phase of the Moon.

In ancient times, the Quimbaya reproduced at specific times of the year during festivities intended for that purpose and considered the phase of the Moon to predict the sex of their offspring. Currently, the Quimbaya use this astronomical phenomenon to predict the sex of chicks during nesting. The community considers the Full Moon as a special time when there is a different atmosphere. This phase is used for ceremonial practices; mothers and midwives also forbid pregnant women to go out at night during a Full Moon and during lunar eclipses to avoid large spots or moles appearing on the skin of the mother or baby.

One of the main practices that has been preserved over time is the *Kañari*—the main celebration in the Kumba-Quimbaya community. It is a feast in which to give thanks to an agricultural god. The date of the celebration is determined by Full Moon and the lunar calendar. The community has also preserved a traditional dance in which, through movement, they teach the phases of the Moon and the relationship between the Moon and sowing.

In other ancestral territories within Colombia, the phases of the Moon have been used mainly in agricultural activities within local production systems, for example among the indigenous Arhuacos, Wiwas and Koguis of the Sierra Nevada de Santa Marta (López-Ríos, et al., 2021), the Nasa in Cauca (Guetio, 2022), and the Ingas, Quillacinga and Kamentsa in Putumayo (Rodríguez-Echeverry, 2010).

3.2 Lunar Eclipse

Lunar eclipses are easily observed astronomical phenomena that have allowed humankind to marvel at the reddish appearance of the Moon, often referring to its blood color. Many ancestral cultures, which have preserved their ancient knowledge, associate eclipses with omens for their peoples and territories (Hamacher and Norris, 2011; Zeilik, 1986). In times of eclipses, the Kumba-Quimbaya community foretells great changes at the personal and social levels and predicts upcoming transformations in the group or special events.

In the context of other cultures, Mazzoldi (2004) studied the Wayuu culture and described that community's myth about eclipses, in which the Sun and the Moon fall in love and have sexual relations; however, these relations cannot morally happen because the two entities belong to the same family. The Wayuu, especially children, are forbidden from observing eclipses and instead perform drumming rituals to bring the stars out of this *trance*.

3.3 Moon Cycle

The Kumba-Quimbaya have used the Moon throughout history as their main marker of time. A Quimbaya lunar month is equivalent to a 28-day lunation, and the Quimbaya lunar cycle spans 9 lunations, i.e., 9 consecutive Full Moons. This complete cycle is called *Kin*. This time marker was used by the Kumba-Quimbaya for the realization of their lunar calendar and to establish the exact times of their cultural celebrations, such as the *Kañari*, which takes place every 4 lunar cycles, that is, at the end of a 36 lunations cycle (Rendón and Gelemur, 2016).

Regarding this astronomical phenomenon, in southern Africa, Snedegar (1998) conducted an ethnoastronomical study on the cultural practices of the Nguni community, finding that it uses a lunar calendar, complemented by the observation of flowers, birds and stars, to designate its rites and ceremonies. However, these calendars have not been important for ancient civilizations only. For example, Kavanagh et al. (2005) conducted research on the teaching of astronomy using the lunar calendar in today's high schools; this teaching makes a historical journey from the origin of these calendars to the construction of a lunar calendar that addresses disciplinary concepts such as Kepler's laws.

3.4 Movement of the Sun over the Horizon

In tropical countries such as Colombia, it is possible to observe the sunrise and sunset from different places on the horizon; the Sun appears at the southern end during the December solstice, moves throughout the year, rises at the midpoint during the equinoxes and finally rises and sets at the northern end during the June solstice.

In rural communities such as the Kumba-Quimbaya, the appreciation of this phenomenon is common due to the need for sunlight for plots, orchards and crops; hence, greater attention is drawn to the variations in the shadows cast by sunlight in these territories at each time of the year. However, the observation of this astronomical phenomenon is not exclusive to

Figure 11: The Tabuyá and Sinifaná Hills (photograph: Daniela Sánchez)

Kumba-Quimbaya. Observing this movement on the horizon allowed Bonilla et al. (2011) to approach the solar observatory practices of the Muisca people. He presented in his research the angles or azimuths of alignments of the Sun during the ortho over the mountains of Guadalupe and Monserrate in Bogota, Colombia, during the solstices of December and June.

3.5 Sunset

The Kumba-Quimbaya relate the setting of the Sun to darkness and cold, using the time at which the Sun sets to identify mainly the exact points on their mountains where the light hides. Although Colombia does not have defined climatic seasons, it is possible to identify the changes in the Earth's position due to the position of the Sun when it sets over the horizon. All territories, especially those inhabited by in-digenous peoples and peasant communities who experience and observe their environment, have defined their meteorological times and organized their agricultural and cultural activi-ties according to the timing of rain or droughts. For example, a study conducted by Quijano (2006) identified a pictogram used by the pre-Hispanic Quillacinga ethnic group, which, through the shadow cast on one of the cave paintings during the June solstice, determined the arrival of the summer season in the region.

3.6 Geographical Reference (Mountain)

In the territory of La Iberia, in Riosucio, Caldas, the Kumba-Quimbaya community uses the mountains as a geographical reference for cardinal points. Tabuyá Hill (Figure 11) is considered the hill where the light is born. It is located to the east and is one of the sacred places used for the ceremonies of harmonization and healing and for the *Reception of the light*. Sinifaná Hill, located to the west, is considered a cold and dark mountain on which the community performs funeral ceremonies and walks the *Via Crucis*, carrying the bodies of the deceased to Riosucio. Mythologically, this hill is inhabited by a giant bird that helps to transcend the spirit of the deceased.

Several indigenous traditions of the American continent include the cardinal points within their ritual practices. For example, when studying the contemporary Muisca community, Comba (2018) explained the importance of spatial management and the relationship between forms such as the cross and the circle, which symbolize the cardinal points and the architecture of the temples, respectively, and are used during the beginning and closing of sacred ceremonies.

3.7 Evening of the Stars

Within the cosmogony of the Kumba-Quimbaya community, it is considered that the stars symbolize each of the living beings that inhabits the planet, which are reflected in the sky. At sunset, the mountains through which the stars are thought to hide or disappear become sacred.

Different cultures have shown great interest in the movement of stars observed from Earth and have identified meteorological changes

through the appearance and disappearance of asterisms in the sky (Gómez, 2017). Hence, the observations made by indigenous people are important. The Koguis in the Sierra Nevada de Santa Marta, Colombia, identify constellations such as the Pleiades and Orion's Belt (Preuss and Llanos, 2013); moreover, they visualize a jaguar in the Big Dipper (Reichel-Dolmatoff, 1975), while the Embera culture recognizes the Pleiades as a corn cob (Pardo, 1986).

3.8 Visibility of the 'Southern Cross' Constellation

One of the ancient Christian celebrations is the festivity of the cross on 3 May, which has been superimposed on many ancient celebrations in different countries, including the Andean nations after Spanish conquest. Crosses proliferated on different sacred hills or mountain tops in areas in which the Andean religion was worshipped, and a possible religious symbolism was created (Huaringa, 2016).

The Kumba-Quimbaya community was no stranger to evangelization, and it celebrated the day of the Holy Cross by climbing its sacred hills and elaborating a wooden cross according to one of its leaders; moreover, the community preserved its ancient traditions of offering food, observing the constellation of the Southern Cross, petitioning to the four elements and the four directions, and celebrating with music of a new time of abundance.

In a study of ethnoliterature and geographical correlates of lagoons in the Andean territories between Colombia, Ecuador and Peru, a representation of the Andean image of the cosmos, found in the main altar of the Sanctuary of the Sun in Cuzco, Peru, has been explained. The image shows different forms of crosses, with dots symbolizing stars. In Andean cultures, these dots are called *Chacana* (Torres, 2000). According to Villena (2018), these star shapes correspond to the constellation of the Southern Cross, which has its equinoctial point on the night of 3 May, when the *Chacana Raymi* is celebrated and the Andean annual cycles begin.

3.9 Solar Eclipses

The Kumba-Quimbaya community has preserved much of its cultural knowledge through traditions. Since ancient times, it has considered the moment when sunlight is overshadowed by a solar eclipse as a reminder of the beginning of life through darkness; it also reminds people in that community of their place in the territory they inhabit.

In the same sense, the Kogui community of the Sierra Nevada de Santa Marta considers the Sun as a giant that dominates all dimensions; myths describe a solar eclipse as being caused by a woman, who, in the form of a star, seduces the Sun and makes it hide itself, which generates variations in the climate and can put the life of the community at risk. Therefore, wise women in the community perform rituals by which they invoke the Sun to pay attention to its faults and return to its course (Reichel-Dolmatoff, 1975).

3.10 Meteors (Shooting Stars)

Members of the Kumba-Quimbaya people consider shooting stars as a good omen for the community, harvests, seeds and abundance in general.

In the Latin American context, during a study of pre-Hispanic astronomy in Mexico, shooting stars and meteor showers were recorded in codices, which were called *Citlalin tlamina*, i.e., arrow stars; these were considered dangerous because they could hurt animals and humans (Trejo, 2009).

4 CONCLUDING REMARKS

The Kumba-Quimbaya form a community that has observed the cosmos and preserved its astronomical knowledge from a cultural perspective. This knowledge is reflected in the use of astronomical phenomena (the phases of the Moon, the sunrise and sunset, eclipses, meteors, etc.) in the elaboration of ritual and daily practices, which have contributed to the preservation of Kumba-Quimbaya traditions and the building of the culture.

In this study, 10 implicit astronomical phenomena were identified among 14 of the cultural practices performed by the Kumba-Quimbaya community. It was possible to describe each of these astronomical phenomena and validate their importance from an astronomical, cultural and social point of view, since it is evident that the Kumba community has been an observer of the sky and has also been able to identify and integrate astronomical phenomena into its daily life to improve harvests, carry out sowing or anticipate climatic or seasonal changes.

At the same time, procedural aesthetics in the methodology included the collection, treatment and analysis of the information using qualitative methods, which allowed the identification of implicit astronomical concepts in the expressions of a contemporary indigenous community. This methodology serves as a basis for future projects seeking to identify the influence

of astronomy on other cultures at the national and international levels; indeed, this methodology constitutes an illustrative and general way to conduct ethnoastronomical studies through various steps.

At the regional level, this research allowed us to identify the astronomical and cultural knowledge preserved by the indigenous and peasant communities that inhabit the territory of the Eje Cafetero of Colombia, allowing the academic community and citizens in general to understand the roots of the social structures and customs of the territory they inhabit, reconsidering the colonial perceptions of the stories of the sky.

The importance of this work lies in the fact that it contributes to research in cultural astronomy and recognizes the capacity of human beings to create knowledge from their culture and place of origin in relation to astronomical concepts. This research can be used in ethnoastronomy as a complement to various studies on the description of the pre-Columbian cultural diversity that the Colombian territory has preserved until today.

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Daniela Sánchez-Giraldo, a Physics Engineer and Master's graduate in Physics Teaching from the Technological University of Pereira, Colombia, currently works as a Physics teacher in the High School at the Liceo Inglés Foundation in Pereira.

Her academic research encompasses photometric analysis of star clusters and ethnoastronomy in indigenous communities. Moreover, she has spearheaded astronomy outreach projects like “Astronomía en tu Escuela” (Astronomy in Your School) and currently oversees an astronomy club in Santa Rosa de Cabal, Risaralda.

Professor Edwin A. Quintero-Salazar has a PhD in Astrophysics from the University of Guanajuato, Mexico, and is currently a full Professor and Director of the Alfa Orion Astronomy Research Group at the Astronomical Observatory of the Universidad Tecnológica de Pereira, Colombia.

His research interests include Solar System minor bodies and massive binary stellar systems. Over the last 10 years, Edwin has led more than 50 astronomy outreach activities with the objective of contributing to the social appropriation of space science among the public in the Eje Cafetero region of Colombia.