Mediterranean Archaeology and Archaeometry, Vol. 18, No 4, (2018), pp. 11-18

DOI: 10.5281/zenodo.1472251

THE ALMOGAREN OF RISCO CAÍDO: A SINGULAR ASTRONOMICAL SANCTUARY OF THE ANCIENT CANARIANS

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Received: 28/02/2018
Accepted: 01/05/2018
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ABSTRACT

The almogaren (rock-cut sanctuary) of Risco Caído was discovered in 1996 in the Canary island of Gran Canaria. It is a paradigmatic example of a complex where light and shadow effects of an astronomical character have been found within the recent archaeological discoveries of a religious and ritual character in the Canaries. The main artificially excavated camera of the cultural complex Cave 6 takes the form of a cylinder, topped with a dome in the form of paraboloid. In this dome, a 2m long tunnel is excavated by which the light of the Sun penetrates at dawn, from spring to autumn equinoxes. The entering light projects enigmatic images on the western wall of the sanctuary, where numerous pubic triangles (vulvae − the universal symbol of fertility −) are recorded in low relief. Two dots of light of the sun first illuminate the decorated wall in March 19th (and september 25th) in the proleptic Gregorian Calendar, colliding and forming a single image for the time of the equinox, thus allowing the determination of a rough midpoint in time between the solstices. The rising and ascending sun then penetrates the cave during the spring and summer months, reaching its extreme at the moment of the summer solstice when the light takes a form roughly resembling a phallus illuminating the vulvae. This paper will desscribe the site and these series of illuminating effects and will discuss how this could have been interpreted by the ancient inhabitants of the island within the context of a lunar-solar calendar related to the cycle of fertility and permanent regeneration of life.

KEYWORDS: UNESCO, Archaeoastronomy, Archaeology, ancient Canarians, Gran Canaria, Risco Caído

1. INTRODUCTION

In 1996, the first author discovered the almogaren − or ceremonial centre −at Risco Caído in an archaeological prospect campaign in the mountains of Gran Canaria (Cuenca Sanabria, 2008 and 2012). This sanctuary is a unique, outstanding, religious archaeological site of the ancient Canarians, where astronomical relationship could have played a most relevant role. This was actually the rediscovery of a place of exceptional symbolic significance for the indigenous people.

The archaeological complex is situated on the edge of the Caldera de Tejeda, in the highlands of the north-western slopes of the island of Gran Canaria, 960 metres above sea level (see Figure 1). It is located in a remote and secluded part of Barranco Hondo ravine. Archaeological research indicates that the almogaren at Risco Caído was located at a strategic point on one of the main 'sacred routes' used by the indigenous people of the northern lowlands (area of Galdar, capital of the island in ancient times) to reach their main mountain sanctuaries situated in the Caldera de Tejeda and the surrounding mountains, such as Roque Bentayga (Esteban et al. 1996-7).

In these lands, where legends and actual facts mix and occupied by the early inhabitants of the island, archaeological studies have recovered a series of sites that have been identified as places of worship and ritual. They are found either on the top of prominent rock tors, where structures were carved out of the surface bedrock or, more frequently, in hollowed-out caves located in the most inaccessible or secluded parts of certain mountains, as is the case here (see e.g. Belmonte et al. 2018, this volume).

Figure 1. Panoramic view of the archaeological site of Risco Caído © Julio Cuenca

The two main and most remarkable neighbouring caves of the Risco Caído complex (caves C6 and C7, see Figure 2) comprise what the ancient Canarians called an 'almogaren', that is, a temple, a place where rituals are performed, where people congregated at certain times of the year or when the rains were scarce and rituals were needed to pray for them so as to ensure the cereal harvests. As ethnohistorical sources relate: *The houses of religious women were sacred for delinquents, they called them Tamogante en Acorán, which means the house of God. They had another house on a high cliff called Almogarén, which is a sacred house; there they invoked the deities and made sacrifices, sprinkling milk every day, which their God above looked down upon and they kept livestock for this purpose. They also went to two very high crags: Tirmah in the district of Gáldar, and another in Tirahana called Humiaia at White Cliffs. They swore by these two crags with utmost solemnity, they came to them in procession with branches and palm fronds, and the Maguas or virgins with their*

pitchers of milk to sprinkle; they called out and raised their hand and faces to the heavens and circled the rocky tor and descended, from there, they went to the sea to thrash it with their branches (Gómez Escudero, 1682).

Archaeological evidence reaffirms the sacred nature of the site as one of the most important almogarenes of the aboriginal Canarians (see, de León and Marín, 2018 for a comparative). The first striking fact is that these troglodyte constructions are located on top of a mountain that had previously been covered by a laurel forest. Thus, this was a hidden, isolated place with abundant water, far from human settlement. Consequently, this is a very significant natural landscape, containing the mountain, rain forest, the caves, water sources and even plant fossils. Another archaeological indicator is the architecture itself. In this case, we have two unique hollowed-out caves that have been built differently from the caves used as dwellings or for economic use.

However, two other features unequivocally confirm the sanctuary-like character of this site. One is the presence of symbols or bas-relief rock engravings on the inside walls, in the form of inverted triangles. These are clear representations of pubic triangles, a universal sign of fertility (López Peña et al., 2002; see Figure 3). The other is that there are numerous circular cup-marks and small niches chiseled into the inside walls and floors of both chambers. The presence of these cultural expressions is considered a definite indicator of a place of worship and ritual (Cuenca Sanabria, 1992).

Cave 6, the most relevant of the Risco Caído complex, has an original and completely unique layout. The floor is practically circular. The cave has curved walls and a hollowed-out vault rising almost five metres from floor level, forming an almost perfect parabolic dome (see Figure 4). This aspect is extremely important: since no other example of an artificial cave with a domed roof of this complexity and shape is known in the aboriginal world of the Canary Islands. On the eastern side of the dome, almost coinciding with the highest point is a conduit or oculus facing east, allowing light to flow in through it (Fig. 4).

The most appealing feature of this remarkable site is the lighting effect representation produced by the sacred sun and moon inside Cave C6, in the form of images projected by the light passing across a light tunnel or oculus. This image changes shape as the days and months pass and as they move along the wall with its altar-like representations of triangular engravings and cup-marks. These may eventually have functioned as reference points in a lunar-solar calendar. This visual calendar would have started at a date very close to the spring equinox when the projected solar images first appear (equinoctial phenomenology is frequent in sacred sites of Gran Canaria, see Esteban et al. 1996-7), continuing until the autumn equinox. From then until the next spring equinox, either by chance or by deliberated desire of the designers, the light of the full moon between the months of October and February would have illuminated the engravings inside the sanctuary.

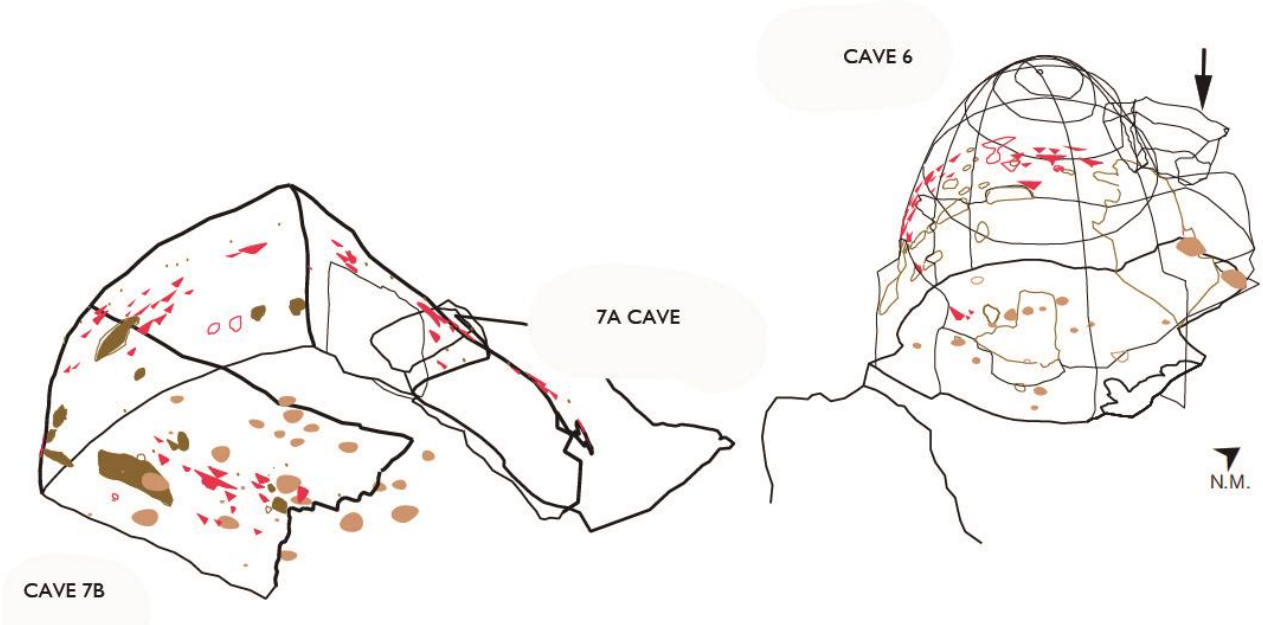

Figure 2. Three-dimensional survey of Risco Caído neighbouring artificial Caves 7A and 6. These certainly represent the sanctuary of the site with an elaborated decoration formed by pubic triangles (in red) and cup-marks (in brown). Notice the dome aperture or oculus in the upper right extreme of Cave 6. © Carlos Gil Sarmiento, PROPAC.

Amazingly, it is still possible to watch this visual tale unfold; one that has been projected inside this temple for countless centuries. It is thought to relate to fertility rituals, the fertility of Mother Earth being represented here by the carved ideogram for the female pubic triangle. Hence, this cave site is an ingenious creation that functions both as a sacred place and perhaps as an astronomical marker, where certain events such as the equinoxes and the summer solstice (when the moving image will stop and turn back) would be visually highlighted to coincide with the aboriginal Canarians' rituals, while eventually allowing them to keep a calendar, which they may have used to regulate farming and productive activities.

Archaeological research is still ongoing at Risco Caído. Two C14 radiocarbon dates have been obtained so far, one in 2013 from a sample of wood from a Canary Guelder Rose shrub (Viburnum rigidum; 1415-1450 A.D.), and the other in 2014 from an older organic sediment (1295 ± 25 A.D.), both collected from the inside walls of Cave C6. A thermally altered floor was discovered inside this cave during 2015: a sample taken from this still awaits paleomagnetic dating (de León and Marín, 2018).

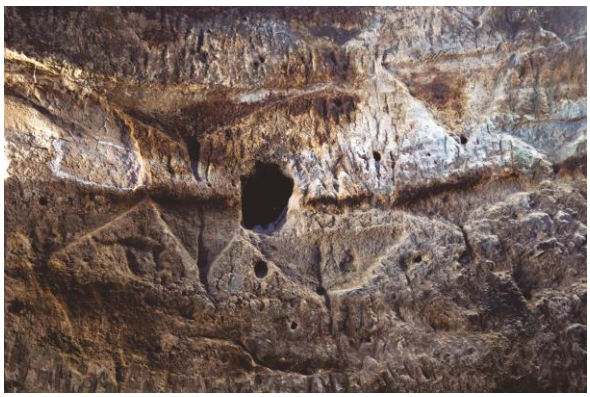

Figure 3. Close-up of the series of the engravings of pubic triangles, a symbol of fertility, and the cup-marks scattered over the west wall of Cave 6. © Julio Cuenca.

The incoming light hits the mural of rock engravings on the back wall, opposite the light tunnel or oculus. For six months of the year, sunlight illuminates this wall creating different shapes depending on the time of day and the season of the year (see Figure 5). The floor of the cave has also been worked and levelled, and a whole set of unconnected circular cup-marks have been chiseled into it. The largest concentration of these cup-marks lies at the base of the rock-engraving mural. Halfway up the south wall is what may have been a silo. The entrance is rectangular and it has opposing orifices on the floor and lintel for fitting the closing system.

Perhaps most strikingly, halfway up the west wall is a composition of thirty or so engravings of inverted equilateral triangle-shaped motifs, forming a decorative frieze of two parallel rows (Figs. 2 and 3). Associated with these triangular motifs and forming part of the same panel, are numerous cup-marks and generally circular orifices. There are also two large niches within the same wall panel, the larger of which is rectangular in shape (see Figure 6).

With its unique architecture and the interesting design of the oculus, together with its remarkable rock engravings, Risco Caído Cave 6 is a religious-ritualistic structure that is unparalleled in pre-Hispanic Canary Island archaeology. As we shall soon show in greater detail, its design may also incorporate probable astronomical and calendar-related relationships. The only cave sanctuary anywhere in Gran Canaria, that bears any similarity is the Tara sanctuary, in Telde, which is currently under study, although Risco Caído indeed is a more evolved and sophisticated version.

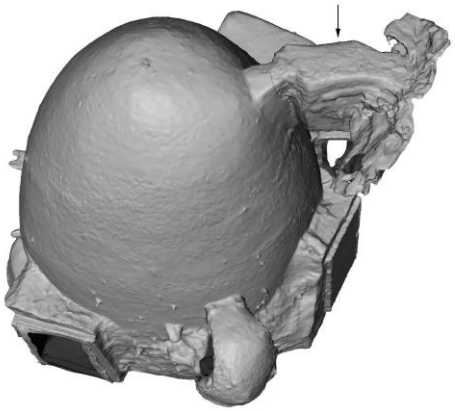

Figure 4. Digital model of Cave 6 using photogrammetry techniques and three-dimensional laser scanner. The paraboloid shape of the dome and the oculus (signalled by an arrow) are emphasized. © Carlos Gil Sarmiento.

2. RISCO CAÍDO, ARCHAEOSTRONOMY IN ACTION

It might be the case that Risco Caído Cave 6 acted as an ingenious astronomical marker. The light of the rising sun illuminating the interior of the sanctuary possibly signaled the arrival of the equinoxes and the summer solstice (Fig. 6), while the light of the full moon perhaps marked the passing of the 'winter' half' months after the autumn equinox until the next spring equinox, if this would not happen just by chance, which is unlikely since the ancient Canarians measured time through the year by 'moons' (Belmonte and Hoskin, 2002). These together would provide a calendar based on a lunar-solar year. This fact would indeed have allowed these aboriginal people to govern the vital yearly farming cycle.

The cave's significance as a possible astronomical marker was suggestive from the moment of its discovery. However, the fact that the light of the sun's rays enters two days before the spring equinox (a key moment of the ancient Canarian calendar; Esteban et al., 1996-7; Belmonte and Hoskin, 2002) and that the phenomenon continues until the autumn equinox was confirmed and documented in 2012, as part of the research work carried out during the first phase of the 'Archaeological Conservation, Protection and Research of the Cultural Complex' project. Every day at sunrise during the 'summer' half of the year, the cave is illuminated by a beam of light. This is projected onto the west wall and changes shape and direction as the sun rises and climbs into the sky. Each day, the descending beam of light illuminates the pubic triangles and niches located in the middle part of the mural, changing shape until it fades out in its path across the panel (see Figure 7). After six months of illuminating the cave every day, these effects disappear altogether at nearly the autumn equinox.

Hence, what is highly suggestive, and directly supported by empirical observations and subsequent astronomical calculations, is that the light enters through an aperture in the dome that could be described as an oculus, striking the dome for the first team each year almost at a time close to the spring equinox, dividing the year into two halves and allowing the determination of an approximate midpoint in time between the solstices. The recurring effect of the sunlight on the engravings would have progressed from two days before the spring equinox until the summer solstice, when the sunrise reaches its most northerly point on the local horizon of Risco Caído and its most southerly position on the panel of engravings (Fig. 7), before turning back along the same track until two days after the autumn equinox, when the phenomenon of the sunlight entering the cave comes to an end.

The chronicles of the Conquest reiterate the importance of the equinoxes (and particularly the spring equinox, as shown by the chronicles of Sedeño) and of the solstices, which are implicitly mentioned with the sun entering the sign of Cancer. Both are considered key moments in the annual cycle, as shown in the chronicle of Marín de Cubas (Esteban et al. 1996-7; Belmonte and Hoskin, 2002; Belmonte, 2015).

Figure 5. The diagram − a superposition of several photographs − shows the image projected by sunlight onto the panel of engravings at different moments of the year once the typical image of each epoch is clearly visualized. The sun's rays enter every day within the seasonal cycle between nearly the spring and autumn equinoxes. The sun's rays penetrate the chamber for the first time two days ahead the spring equinox and for the last time two days after the autumn equinox. The two separate dots on the extreme right mark these dates, close to the two equinoxes, moments when the two dots fused into a single image. In the intervening months of spring and summer, the image takes different forms that illustrate a rich visual language ranging from a 'primeval seed' to a 'fertilising phallus' (at the time of the solstice, time of harvest). In the middle, the light forms an image that resembles the Palaeolithic Venuses which, in turn, are reminiscent of certain female idols found in Gran Canaria. This, together with the presence of pubic triangles, cup-marks and niches along the light's path −as illustrated in Fig. 7 − suggests that we are dealing with a suggestive astronomical and symbolic phenomenology related to fertility cycles and perhaps timekeeping. © Julio Cuenca and José Carlos Gil.

Figure 6. The west wall of Cave C6, with the shapes of the extant pubic triangles superimposed for emphasis, viewed on the morning of the spring equinox. The patch of projected sunlight can be observed as it starts to descend the wall, moving down and right. The arrows indicate the most singular triangle of the panel (right) and the triangle touched by the path of sunlight at the summer solstice. Most of the central engravings on the panel (c. 65%.of the pubic triangles, including several of those to the left and right of the arrows as shown by our calculations; de León and Marín, 2018) are covered by sunlight or moonlight at different epochs of the year when a node regression lunar cycle is eventually considered. © Julio Cuenca

Figure 7. Photographic overlay showing consecutive images of the path of sunlight at the summer solstice (declination +23½°). The image, starting in the form of a phallus or shield, falls upon or fills several pubic triangles during its sweep down the wall, eventually becoming a dot that disappears into a niche, the lowest one illuminated by the rays of the sun or moon. This cycle of images is little different from the one that occurred in aboriginal times and serves as an example of what could be seen inside the sanctuary. This nice phenomenology is perhaps related to the fecundity rituals performed at the sanctuaries of Gran Canaria, at the great feasts celebrated in the lunation after the summer solstice. © Julio Cuenca and José Carlos Gil.

Further research work and the evidence collected over almost a decade have enabled us to gain a more accurate understanding of the probable astronomical function of the site. As already discussed, it is not only sunlight that penetrates Cave 6. The light of the full moon as it rises and climbs during the winter months from October to March (the time of the highest rainfall when the moon 'signals' the seasons in traditional Canarian agriculture; Belmonte and Sanz de Lara, 2001) also illuminates the main panel of engravings. The full moon also has the power and capability to illuminate the interior of the cave. This phenomenology happens from around the time of the autumn equinox and at each subsequent full moon until around the time of the vernal equinox. Although this effect could be for granted due to the architectural design and orientation of the sanctuary, we believe that it was certainly observed in ancient times.

The moon's movement is regulated by the 18.6-year lunar node cycle. This, together with the fact that full moons fall on different dates in different calendar years, mean that moonlight will not always fall on the same engravings from one year to another. During every 18th or 19th year, the moon's follows its most northerly path through the sky (the 'northern major lunar standstill limit'), which is beyond where the sun ever reaches. Interestingly, at these times, full moonlight can illuminate triangles beyond those illuminated by sunlight even at the summer solstice, lighting up some of the triangles situated to the left of the sweeps during the seasonal cycle between the spring and the autumn equinox (see Fig. 6).

3. FINAL REMARKS AND CONCLUSIONS

The structural profile of the ceiling of Cave 6 at Risco Caído is a parabola (Fig. 4), unlike all the other known caves on the island. Some have flat and some have domed ceilings, but their perimeters are generally rectangular and they usually have intentionally rounded corners, so as to reduce the maximum concentration of tangential forces where the ceiling meets the vertical faces of the walls. These, in turn, are vertical or lean in slightly towards the inside of the cave (e.g. Cave 7A, Fig. 2). From the point of view of its size, Cave 6 could perfectly well have been built like all the others, in a perceptibly prismatic shape. However, this is not the case!

Creatively and intentionally, the excavation and final ascending shape of the cave is a vaulted dome with a variable parabolic profile, with the main focus at the height of the window or oculus, facing east, through which natural light penetrates. In this way, the cave harnesses the geometrical qualities of a parabola not only to create a space that protects and embraces but also to obtain a uniform and concentrated distribution of the light that it captures, as well as the best diffusion of sound. These conditions enhance its quality as a space of sensations and beliefs.

Natural sunlight and moonlight − directed and, in turn, modified by the conduit that channels it like a spotlight into the cave − generates a series of images projected on to the opposite (west) wall that functions as a stone altar and potential astral marker. In addition to this, the beam of light that crosses the focus of the parabola creates indirect general lighting because its reflection is intensified by the alternating white rings of salts adhering to the surface of the upper laminar strata of the cave. These irradiate most of the complementary diffuse light that is concentrated downwards towards the base or inhabitable surface of this architectural masterpiece. Furthermore, thanks to its shape, the cave is evenly lit, without any extensive shadows or dazzling, apart from on the aforementioned stone altar where the solar and lunar phenomenology unfolds.

The construction process, assembly or system is one that, at the very least, materializes significant functional, structural, indeed artistic and symbolic and possible astronomical knowledge. It is a creation that has never been seen before in the islands; a work of great value for an isolated, unfamiliar with metal, culture like the one that produced this design of overall, integral conception. The architectural expression of the sacred site of Risco Caído, and the way it astronomical phenomenology might function, is outstanding for that historical period on the Island of Gran Canaria, because the inhabitants eventually applied what they learned from constantly observing the skies, because of the lack of auxiliary resources and, above all, because it is an eminently social creation conceived in abstraction.

The synchrony that apparently connects the Risco Caído sanctuary to the cosmos itself requires a level of perfection in form, proportion and execution that speaks of the singular technical achievements of the island society that designed and built it, that might be comparable with other ancient cultures around the world (Belmonte et al., 2016). The layout of the different architectural elements is based upon structural and compositional laws that transcend time, which are still present and which speak of the eternal and the unchanging. It would indeed be a perfect example of cultural astronomy in action.

Risco Caído is the most outstanding and enigmatic manifestation in the proposed Cultural Landscape of 'Risco Caído and the sacred mountains of Gran Canaria' (de León and Marín, 2018; Belmonte et al, 2018, this volume). It is in in certain aspects representative of the astronomical culture and knowledge

of the ancient Canarians. This space would eventually have an interesting coherency as a sacred site closely related to celestial events − the skyscape − for measuring time, for marking commemorative dates, and for holding rituals. In this context, Risco Caído and the rest of the sacred sites in the neighborhood, such as the almogaren at Roque Bentayga (Esteban et al. 1996-7; Belmonte, 2015), are outstanding attributes because of their potential astronomical significance in a culture that evolved in isolation from the ancient know-how imported from the pre-Islamic Maghreb, and which developed as a genuine expression in this new island environment. Cave 6 at Risco Caído is a complex artificial indoor sanctuary with plausible astronomical connotations, where patterns of sunlight and moonlight interact with a series of engravings, possibly marking the passage of days and lunar months between the solstices and the equinoxes. It is an excellent example of a sacred site where an interesting astronomical phenomenology would be manifested. Indeed, its enigmatic anthropological perspective is still a clue to be disentangled and understood.

ACKNOWLEDGEMENTS

This work is supported by the Cabildo de Gran Canaria. The authors would especially like to thank all the people who have been involved in the different phases of study of the archaeological site for their support and cooperation and the two anonymous referees for their smart suggestions to improve the paper. JAB acknowledges the projects P/310793 'Arqueoastronomía' of the IAC, and AYA2015-66787 'Orientatio ad Sidera IV' of the Spanish MINECO.

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