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ILLUMINATION EFFECTS AT THE CATHEDRAL OF SAINT JAMES (GALICIA): FIRST RESULTS

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ABSTRACT

The Cathedral of Santiago (Spain) is one of the three most sacred sites in Christendom together with Saint Peter in Vatican and Jerusalem, and it is the focal point of a pilgrimage route since the Middle Ages. The present Cathedral of Santiago de Compostela is the result of a long-lasting effort of building and reconstruction with two main break-points, the erection of the Romanesque building in the 12th and 13th centuries and its reform during Baroque times (s. 'XVII'). Built at the site of a previous Roman and later Germanic cemetery, its orientation is fully compatible with the canonical rule for the Middle Ages in Spain and indicates an attempt to follow a given date in the Julian calendar, March 25th. This is one of the three calendar dates that are related to the Apostle according to the Codex Callistinus, a writing describing the pilgrimage to Santiago from the XIIth century, the other two being July 25th and December 30th. In the present essay we investigate how the different dates related to this Saint have been incorporated in the original design of the Cathedral and its transformation through time, either through the orientation or by illumination effects, particularly in the Romanesque and the later Baroque reform.

KEYWORDS: Christian churches, Santiago de Compostela, Orientation of churches, illumination effects.

1. INTRODUCTION

The Cathedral of Saint James in Santiago de Compostela is one of the holiest places of Christendom, along with Saint Peter's Basilica in the Vatican and Jerusalem (because it gives plenary jubilee). Furthermore it has been a focal centre of pilgrimage routes since the Middle Ages.

The construction of the cathedral in Santiago is directly related to the history of the appearance of the remains of the Apostle James. The "*Historia Compostelana*", a chronicle of the year 1100, tells us that in the year 815, under the leadership of King Alfonso II and Teodomiro bishop of Iria-Flavia, a hermit named Pelayo observed some bright lights in the sky. Teodomiro went to the place marked by the lights and found the grave that confined the remains of the Apostle James. Soon after, King Alfonso II ordered for a small church to be erected there. Around this church was born Santiago de Compostela, whose name is popularly related to the lights or stars that indicated to Pelayo the burial place of the Apostle James (María Unceta 2004).

The erection of the church led to the birth of the Christian legend that would mobilise hundreds of thousands of people throughout time. However, it should not be ignored that this legend arose in a complicated socio-political context. This is because, the Spanish church found itself plunged in divisions and theological controversies (especially adoptionism), enclosed, too, by the pressure exercised by the caliphate of Córdoba (González García et al. 2016). In this context, Beato (c. 701-798) was the first author to mention the Apostle James in his writings as a possible patron saint of Spain. At that time, the tomb of the Apostle James had not yet been discovered, but the sepulchre ended up being discovered barely 20 years after his death. The discovery created and boosted a new Christian centre of attraction against the bishopric of Toledo, which was at that time in Muslims hands. As a result of the discovery appears a new idea that breaks the isolation of the Spanish church. The pilgrimage route, characterised by the idea of a unified Christendom centred on the cult of the relics, will be a way to introduce new ideas in Northwest Spain (María Unceta 2004). A few years after the discovery, the Battle of Clavijo took place on the 23rd of May of 844, between the troops of the caliphate and the Asturian Kingdom. According to the legend, the battle was won by the Asturian troops thanks to the miraculous apparition of the Apostle James riding a horse. After that battle, King Ramiro I voted to take a pilgrimage to Compostela, giving rise to the pilgrimage routes.

In the *Codex Calixtinus*, a book from the XII century that describes the pilgrimage to Compostela, the dates when the feasts of the Apostle James are celebrated are indicated in Book III Chapter III: "Thus, suffered martyrdom the 25th of March, the 25th of July was carried from Iria to Compostela and was given burial the 30th of December, because preparing the material and the work of his burial lasted from August to January." (*Códice Calixtino*, translation from Xosé López Díaz, p 449).

In the 11th century, with the change from the Hispanic liturgy to the Roman liturgy, two feasts were institutionalised in Compostela: on the 25th of July (Roman liturgy) and the 30th of December (Hispanic liturgy), with the 25th of March being forgotten. This was because this date presented several problems: it was the date of the feast of the Annunciation and it could coincide with Easter and finally there was some confusion about attributing this date to James the Lesser too (Rey-Olleros, 2009).

2. CONSTRUCTIVE DESIGN AND ILLUMINATION EFFECTS AT THE ROMANESQUE CATHEDRAL.

The present cathedral began to be built in 1075 and it was consecrated in 1211, being a Romanesque building. According to Sicart-Gómez (1993) the outside of the building displayed an unusual balance, with the windows highlighted: this is perfectly described in the *Codex Calixtinus* and demonstrates a special interest in the search for light to illuminate the interior of the temple.

The building shows an orientation towards the sunrise on the 25th of March, at the date of its construction (Siglo XI-XII; González-García & Belmonte 2015). Plus, this orientation is slightly different from that of previous buildings, although the orientation remains constant towards the sunrise of the 25th of March due to the effect of the Julian calendar (González-García 2015).

The Romanesque building incorporated new styles through time. These styles never destroyed the Romanesque core; rather, they transformed it, hampering the verification of possible illumination effects in the interior of the original temple, as it will be explained later. Nevertheless, different sources indicate that, from the beginning of the construction of the Romanesque cathedral in the high Middle Ages, light and shadow effects and allegoric images were considered at the façades of the temple that were not the result of improvisation.

In this way, Rosende Valdés (2004 pp 237-238) specified that the different iconographic programmes at the façades worked as religious lessons. Thus, at the North door (known at that time as Paradise Door), the topics of the "fall of man" and the

promise of redemption were presented. Meanwhile at Platerias (the Door of the Midday as it is identified in the *Codex Calixtinus*) which was oriented to the south, the iconographic programme was focused at the fulfilment of that promise. According to that, the south door was dedicated to the New Testament, the work of the Son, the redemption, in the same way that the north door was dedicated to the Old Testament, the work of the father, the creation and fall of man. This is not accidental; the work of the Son evoked as *lux mundi* occupied a place bathed in light, whereas the work of the father was assigned a door plunged in shadow, materialising the scholastic idea that the doctrine of Christ came to unveil what the Law of Moses had veiled.

According to Rosende Valdés (2004 p 323), the contrast of the luminosity of the South door against the North one would not have remained unnoticed to the people of the Middle Ages, who were so prone to symbolism that it has been said that they symbolised as easily as they breathed.

This division of topics at the different doors no longer exists today due to the reform and reconstruction of the north façade after the fire of 1758 and the transfer of the different romanesque elements to the south façade (Platerías).

However, the interplay of light and shadow still exists, although it seems that this might be a coincidence (or the subsequent perception of the contexts). In this way, the south façade is presently identified as Platerías, which owes its name to the settlements of silver traders (plata = silver), while the north façade is identified as Azabachería, named after jet (a black stone) became trendy among the pilgrims, who turned it into another symbol. In this sense, the silver a shiny element is situated at the South, while the black jet is placed at the North. Although this could be a coincidence, it is very suggestive

3. THE BARROQUE REFORM AND THE NEW ILLUMINATION EFFECTS.

The biggest architectonic transformations at the Cathedral occurred during the Baroque period in the 16th and 17th centuries. In this epoch, in addition to considering the religious building as a most sacred architectonic symbol, the people from the Baroque period understood that this type of building should be full of visual emotions. They believed that the temple should be configured as a space that invited emotion and a place where everything allied to quench the religious passions of the great public. The people of the Baroque period pretended through all these emotions to express all their Catholic and Christian fervour. The promoters of Baroque temples sought dramatic and emotional qualities; that is to say, for all who enter to experience emotions

through the eyes and the ears, and furthermore in an immediate and imperious way (Vigo-Trasancos, 1996: 452).

The different Baroque reforms that took place at the Cathedral (in this article we will focus on some particular ones, but we don't discuss all of them) are of such magnitude that one could almost say that the cathedral is an essentially Baroque building that wrapped very well the Romanesque building (Rosende Valdés, 1996). Thus, at the Cathedral of Santiago de Compostela the two very different stylistic conceptions work together assuming discrepancies without prejudice to make the structure more rich and varied, more monumental and emphatic, and more spectacular (Rosende Valdés, 1996: 486).

The reason for the near transformation of the cathedral during the Baroque period was the revitalisation of the cult of Saint James for ideological and political reasons. The aim was to ensure the supremacy of the Apostle James as the only true patron saint of Spain against the rivals that arose during the 17th and 18th centuries (Rosende Valdés, 1996). This fact also explains the prominence given to the figure of the Apostle James as "Matamoros" (muslim slayer) at the battle of Clavijo during the Baroque reform, because such highlighted the image of the celestial warrior created during the Middle Ages, against other celestial warriors such as the Archangel Michael. However, the Apostle James became the only one recognised as a patron saint of Spain and protective of the monarchy and Spanish army (Rosende Valdés, 1996 p 525). In fact, the official and solemn recognition by the church of the date of 23rd of May (battle of Clavijo) occurred in 1750 by Pope Benedict XIV (although this date was already celebrated in Santiago de Compostela beforehand; Cantera-Orive, 1949). As a result, the 23rd of May, the traditional 25th of July and the 30th of December were officially established at feasts of the Apostle James.

Since the beginning of the Baroque reform, a concern for maintaining the illumination of the cathedral has existed, responding to the recommendations of Carlo Borromeo's guide: *Instructiones Fabricae et Supellectilis Ecclesiasticae* (1577) where in Cap VIII talks about the illumination of the main altar and the windows. As we mentioned earlier, the old Romanesque cathedral was a well-illuminated building, where the light accomplished a fundamental mission. However, the different reforms and constructions through time had altered its illumination. Several windows were walled, while many other beams of light were set back. What qualified as direct illumination, was converted in twilight (Rosende Valdés, 1996, p 530).

In such a way, the reforms at the major chapel of the cathedral and in the construction of the main

façade (called 'Obradoiro') were carefully considered to augment the interior illumination of the cathedral.



Figure 1. Major chapel of the cathedral illuminated on the 23rd of September, an equivalent date of the 21st of March. The baldachin can be observed with the image of the Saint.

In the case of the major chapel, the primitive interior space had been ostensibly altered through time (Rosende Valdés, 1996: 530). Between 1654 and 1677 took place the redesign of the major chapel by architect Vega y Verdugo. He designed the current baldachin, the pergola of the salomonic columns and the wood coating of the walls (Taín-Guzmán, 2006). During this redesign the direct light from the upper overflows of the stem of the vault and the indirect light coming from the windows of the tribune were properly redirected (Rosende Valdés 1996: 530-531).

In the case of the present Obradoiro façade, its construction began in 1738 with architect Fernando Casas Novoa in charge, and was finished in 1750. The idea behind constructing this façade was to demonstrate the economic power of the Cathedral at that time, but also to emphasise its importance as a sacred venue (in fact, there are several scenes of the Apostle James as muslim slayer at the façade, Vigo Trasancos, 1996: 41). The new façade illuminates the Romanesque interior with abundant natural light. This new façade was intended to illuminate the new main altar because the four large windows of the previous medieval façade were closed darkening the

central nave during an undetermined epoch (Vigo Trasancos, 1996, pp 42-44).



Figure 2: View of the main façade of the cathedral as seen from the main altar and the podium of the saint. The Romanesque façade can be seen in the first term, with the modifications of the rosette from the Baroque epoch. Behind it, the Obradoiro façade can be observed. The main windows of the baroque façade do not match the Romanesque rosette. However, the Obradoiro façade frames the romanese openings in such a way that the sunset only appears through these spaces on the 21st of March (lower space) and the 25th of March (upper space).

As stated above, the retrieval of natural light played a fundamental role during the Baroque reform at the cathedral (the last great reform of the cathedral; ever since then, no more major changes were done to modify its aspects) as different authors who have researched the cathedral have pointed out. However, a number of items indicate the possibility that the retrieval of the natural light was to exalt the figure of the Apostle James and cause a visual emotion at particular dates, as was previously explained.

4. ORAL ACCOUNTS AND PREVIOUS RESULTS

We fortunately have two different written sources that call our attention to the '*tradición Compostelana*' in relation to the illumination effects over the images of the Apostle James:

In his "*Guía de Galicia*" (1926) Ramón Otero Pedrayo reports the following: "Three great days evoke the history of the Apostle James: 23rd of March, the Battle of Clavijo; 25th of July, the martyrdom, 30th of December, the translation. In those 3 days, if the sun shines in the sky, it will illuminate the stone image of the Apostle James (he is referring to the one situated at the main altar) and only on those days." (1926, p 592)

Celestino Sánchez Rivera in "*Notas Compostelanas*" (1946) reports almost the same, but offers more information about the hour when this effect would take place: "It is known – told us a sexagenarian prebendary half a century ago– that when the sun starts to decline, the sun beams enter through the windows from Obradoiro illuminating all the nave

until the beautiful baldachin can be seen in all detail. The image of the Apostle James is illuminated as well, but his face is only illuminated by the sun three days per year. And the curious thing is –the prebendary told us– that these three days are the three days of its feast: 23rd of May, the Battle of Clavijo, 25th of July, the Feast of the Apostle James, and 30 of December, the feast of the travel of his body to the west.

Go –continued the prebendary– to the cathedral at four o'clock or a little later, and in those days you will confirm what I am telling you, which was told to me by another prebendary when he studied at the seminary, and to whom it was told by another prebendary up to 1820 when the faculty of theology was studied at the university because the seminars were not founded yet". (1946, p 55-56).

After analysing these two different sources that document this singular phenomenon, a mistake can be observed in the text of Otero Pedrayo (1926) when he identifies the Battle of Clavijo as being on the 23rd of March instead of 23rd of May. Although there is confusion among these dates, it is not less true –as we will analyse– that this day also produces an illumination effect over the image of the Apostle James. In fact, it is important to not forget that the cathedral is oriented towards sunrise 25th of March, Feast of the Annunciation, as was previously commented. This means, that it might not be a transcription mistake, since the tradition picked by Ramón Otero Pedrayo reflects a phenomenon on those dates about which the people from Compostela were also conscious. Furthermore, this date is important in the history of the cathedral.

Nonetheless, two works have analysed the luminous phenomena at the cathedral, although paying only attention to the text of Otero Pedrayo. Tarragó published the first in 1978 in which he concluded that none of these effects existed. However this appear to be due to a mistake in the mathematical calculations to check the dates with respect to the windows (Tarragó, 1978, p 57).

The next work was published by López Rosende in 1982, in which he reassesses Tarragó previous calculations, and points out that the stone image of the Apostle James placed at the main altar would be illuminated on the 23rd of March, whilst on the 25th of July it would be illuminated the stone figure from the Portico of Glory, additionally the 30th of December would be discarded because, according to him there is no possibility of direct illumination (López Rosende, 1982, pp 114). Unfortunately, these two publications had very few echoes in studies of the cathedral, and are practically unknown.

5. RESULTS AND DISCUSSION

We have endeavoured a number of measurements and observations to verify whether the tradition is more certain that was previously pointed out. Our results are yet preliminary, but show definitive and clear conclusions.

The stone image placed at the main altar has been confirmed to be illuminated through the holes of the windows of the Obradoiro façade (see Figs. 1 and 2). These windows happen to be designed such that they can be observed through the romanesque rosette placed over the Portico of Glory. Sun beams completely illuminate the face of the Apostle James on 21st (lower space) and 25th of March (upper space) between 6 and 7 in the afternoon (Figs 1 and 2). The 21st of March, is not by itself an apostle's feast or important religious festivity linked to the cathedral; rather, it is the day of the spring equinox and is therefore fundamental to the determination of Easter. For its part, the 25th of March is the Feast of the Annunciation, and an old apostolic feast and a day that is strongly linked to the cathedral's history as was previously stated. However, because the sun is a large sphere, it also illuminates the saint on the 23rd of March, as already pointed out by José L. López Rosende (1982), in a misguided belief that this day was when the Battle of Clavijo happened due to the information of Ramón Otero Pedrayo (1926).

Regarding the 30th of December, indeed the sun does not illuminate the image through the windows of the Obradoiro façade. However, the sun does enter the nave through a small window (from the perspective of the side-chapel) situated towards the area of Platerías at the south transept of the cathedral (fig 3) a few minutes after 4 o'clock in the afternoon. Sun sunbeam does illuminate the saint, as Celestino Sánchez Rivera (1946) mentions.

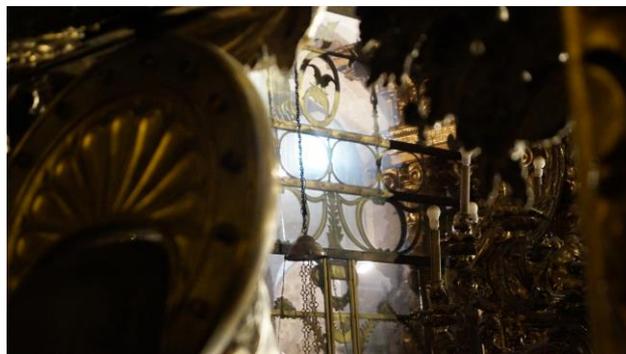


Figure 3: View from the side-chapel of the saint to the window of the transept that illuminates the saint (in the foreground) the 30th of December

Table I. Orientation of the elements indicated in the text inside Saint James Cathedral (latitude 42° 30'). The columns show the structure measured, the azimuth (A) and horizon altitude (h) measured with a precision compass (error estimated to be 1/2°), and the calculated astronomical declination (δ). The last column gives the date for the illumination event.

Structure	A	h	δ	Date
Rosette Inner part down	262	7½	-0¾	18 th Mar/25 th Sep
Rosette Inner part up	262	9	0¼	21 st Mar/22 nd Sep
Rosette Upper part down	262	10	1	23 rd Mar/21 st Sep
Rosette Upper part up	262	11½	2	25 th Mar/18 th Sep
Window at the dome	262	39	20¼	23 rd May/25 th Jul
Window at the transept	220	13	-23¼	15 th Dec/30 th Dec

Of course, both phenomena are repeated on symmetric dates, during the autumn equinox and around mid-December, when the sun presents the same declination as in the previous cases, because excluding the solstices the sun always pass for the same place twice each year. Interestingly, the tradition does not call attention to the symmetric dates, probably because these other dates do not have any relation to or significance with the Apostle James. It is also important to highlight that in the days immediately before and after the dates, the sun also illuminates the apostle's face but not as directly.

However, with respect to the 23rd of May and the 25th of July which are almost symmetric dates, the tradition calls attention to both. Regrettably, due to the works currently being completed at the cathedral, we could not check the illumination effect or study the illumination effects on the stone the Apostle James situated at the Portico of Glory, although we believe that this saint would be illuminated on

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more days that those pointed out by José L. López Rosende (note that he does not mention the 23rd of May due to the previously explained mistake). This is so because the window that illuminates this images is large and is situated very close to the actual stone image of the Apostle in the Portico of Glory.

In the same way, our calculations indicates that the stone image situated at the main altar is also illuminated on the 23rd of May and 25th of July through the windows situated at the dome of the cathedral (fig 4) which we hope to confirm soon. Furthermore, if this is confirmed we would have the old tradition corroborated.

6. CONCLUSION

Throughout the work, we have shown how the sun was an important element from the beginning of the cathedral's construction, through the orientation of the cathedral and the play of light and shade at the north and south façades.

Furthermore, we have highlighted the importance of the baroque mentality of amazement through one's emotions, mainly visually. In this way, the importance given to the illumination during the Baroque reform to highlight the main altar covered by gold has been noted. After taking those elements into account, we believe that the stone image of the Apostle James in the side-chapel was situated at the exact place where the architects knew that this light phenomenon could happen, as highlighted by the construction of the Obradoiro façade.

Plus, the people of Compostela knew about this phenomenon, and fortunately, Ramón Otero Pedrayo (1926) and Celestino Sánchez River (1946) collected such tradition. Unfortunately, this is currently a forgotten tradition as a result of the artificial light that eliminates this effect in a clear example of indoor lightpollution.

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