



The Restoration of the Oratory of the Partal Palace and the  
House of Astasio de Bracamonte in the Alhambra of Granada

Granada, Spain

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## RESEARCH STATEMENT

### Description

The research focuses on the innovative outcomes from the most recent restoration of the Oratory of the Partal Palace, a unique fourteenth century private palatine mosque that forms part of the Alhambra heritage complex. The Alhambra is a UNESCO World Heritage Site, key to understanding the history of intercultural processes in western European architecture.

The restoration has revealed previously unknown fourteenth century inscriptions, decorative elements and technical solutions not known to have been employed in the Alhambra. It has significantly advanced the understanding of Nasrid carpentry construction techniques, enabled an entirely new interpretation of the Partal Palace building process and the Spanish restoration approaches of the last 180 years.

### Aims

- Acknowledging the heritage values of this site by enhancing the visibility of its successive historical periods and restorations, leading to a deeper understanding of the construction history of the Alhambra and its embedded values (pp.12, 14).
- Research into the historical conceptual approaches and technical solutions arising both from Christian and Muslim medieval constructive exchanges (pp. 29, 32) and the restorations throughout time (p.5).
- Acknowledging the distinction of Nasrid carpentry from the Christian-*mudéjar*, from which it had derived (p.29).
- Determining what new fourteenth century epigraphic inscriptions and decorative motives reveal about Hispano-Muslim architecture (p.32).
- Linking the discovery of an earlier original version of the timber framework with an identical pattern to

another conserved Nasrid framework elsewhere in the Partal Palace (p.33).

### Methods

- Archival research on the original condition and the historical restorations.
- Constructive analysis of the timber framework assembling process.
- Laser and chemical treatment for cleaning off the carpentry elements of the timber structure.
- Laser measurements for the geometric control of the added timber prostheses.
- Carbon-14 and dendrochronology dating tests.
- Painting pigments chemical analysis to determine original and restored decorative motives.

### Dissemination

- The restoration was awarded the Europa Nostra Grand Prix 2019, the most important European Heritage award, by the European Commission.
- Book publication of the restoration of the Oratory and the House of Astasio, published and funded by the World Monuments Fund (WMF).
- This restoration and its research findings have been extensively disseminated in media and social media networks from the Europa Nostra organisation and the World Monuments Fund (sponsors) highly visible media in Spain, France and the UK.
- A paper based on this research will be published in the International Journal of Architectural Heritage (IJAH) by Taylor & Francis publishers (in press).
- This research will be exhibited in December 2020 at the Hispania Nostra International Exhibition in Tongji University, Shanghai, China.



Fig. 1 North-east elevation of the Oratory and the House of Astasio de Bracamonte (Alhambra Council 2015)





# RESEARCH INTRODUCTION: THE CASE STUDY

## RESEARCH AIMS

### RESEARCH IN-PRACTICE DESCRIPTION AND METHODS

#### CONTRIBUTION

#### DISSEMINATION

Oratorio del Partal  
+ Casa Astasio de Bracamonte







Project Title	Location
The Restoration of the Oratory of the Partal Palace and the House of Astasio de Bracamonte in the Alhambra of Granada	The Alhambra, Granada, Spain
Architect	Project Duration
Dr. Federico Wulff Barreiro	2013-2017
	Awards
	Europa Nostra 2019
	Grand Prix Europa Nostra 2019

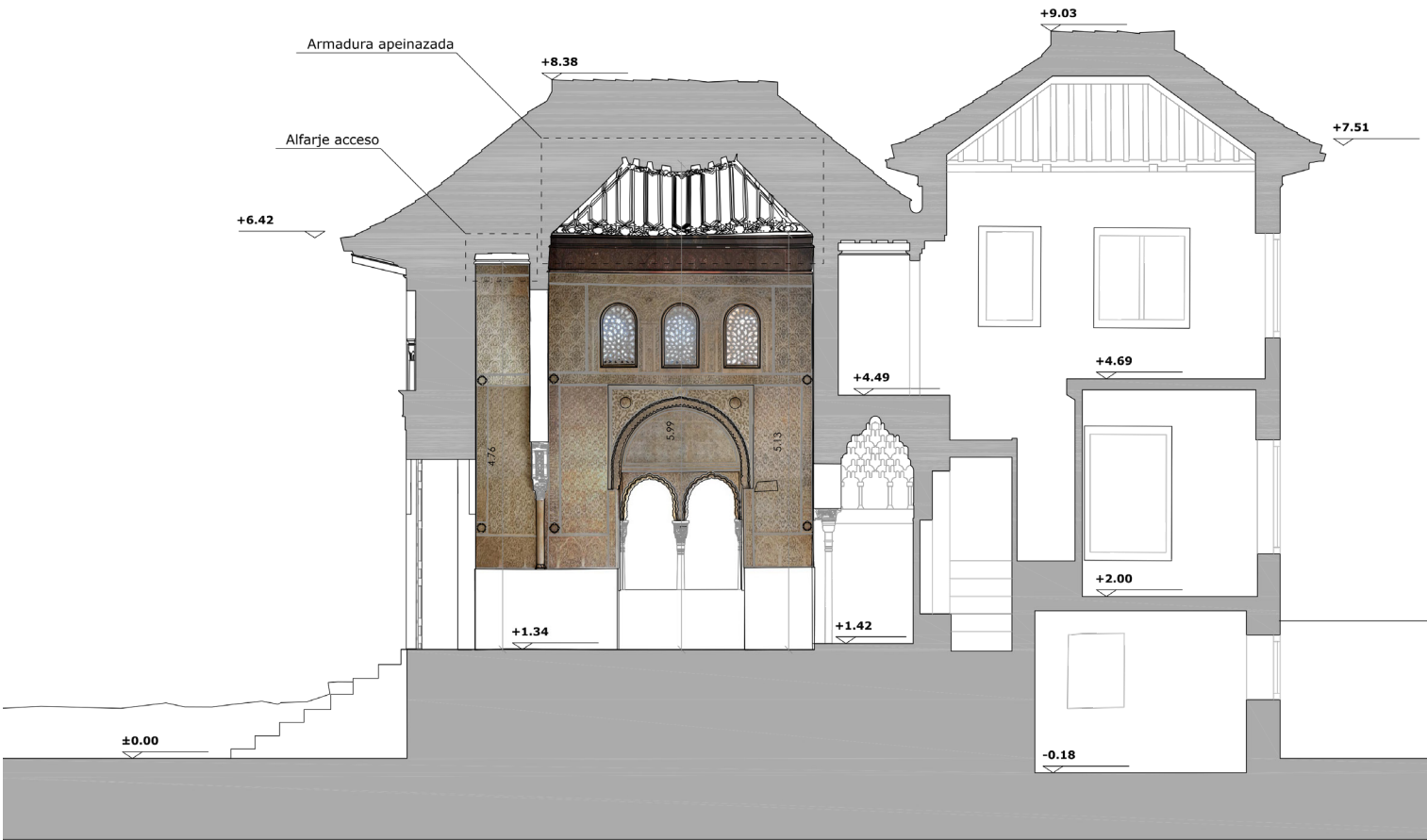


Fig.2 Longitudinal section of the Oratory and the House of Astasio de Bracamonte, condition before the 2013-2017 restoration. From left to right: access staircase, entrance, previous narrow space, main prayer space covered by the Nasrid timber framework, *mihrab*, House of Astasio with the upper space over the *mihrab*, internal staircase and the three storeys of the House of Astasio (Wulff 2012).

## RESEARCH INTRODUCTION: THE CASE STUDY

### The Alhambra

The Alhambra palatine complex was initiated in the mid-thirteenth century under the first emir of the Hispano-Muslim Nasrid dynasty Muhammad ibn al-Ahmar (1195 –1273), and mainly completed a century later under the sultans Yusuf I (1333-1354) and his son Muhammad V (1354 –1391) (Fernández-Puertas 1997a).

Despite of the Christian conquest in 1492, the Alhambra has managed to retain most of its medieval Hispano-Muslim character. The Alhambra is

a UNESCO World Heritage Site since 1984<sup>1</sup>, as one of the best conserved Muslim medieval palatine complexes worldwide and the most important surviving heritage site of the Islamic period in the Iberian Peninsula (711–1492). It can be interpreted as a palimpsest of the multiple intercultural interactions during medieval Muslim and modern Christian rules, intimately connected to the exceptional values of its natural landscape.

1 <https://whc.unesco.org/en/list/314/>. Accessed April 12, 2019.

### The Oratory

The Partal Palace, attributed to the Nasrid emir Muhammad III (1302-1309) with interventions from the sultan Isma'il I (1314-1325) (Torres Balbás 1959, 402), is the earliest surviving structure amongst the Nasrid royal palaces of the Alhambra. As the private mosque of the Nasrid sultan Yusuf I (1333-1354), the Oratory might be considered as the most important building of the Partal Palace from the perspective of its religious use, symbolism and decorative programme.

The Oratory has a rectangular plan of 4.20m x 3m surmounting an earlier tower of 15m high that forms part of the north defensive walls of the Alhambra complex (Fig. 3 & 5) (Orihuela Uzal 1996). Its entrance door opens to a narrow space which leads onto the prayer space covered by an original and richly-decorated timber framework. The *mihrab* of the mosque decorated with a *muqqarnas* vault that retains part of its original polychromy, is located on the other end of this space facing the entrance (Fig.7).





Fig. 3 The Alhambra north elevation facing the Albaycin medieval neighbourhood. Granada (Spain). The Partial Palace is on the left end.

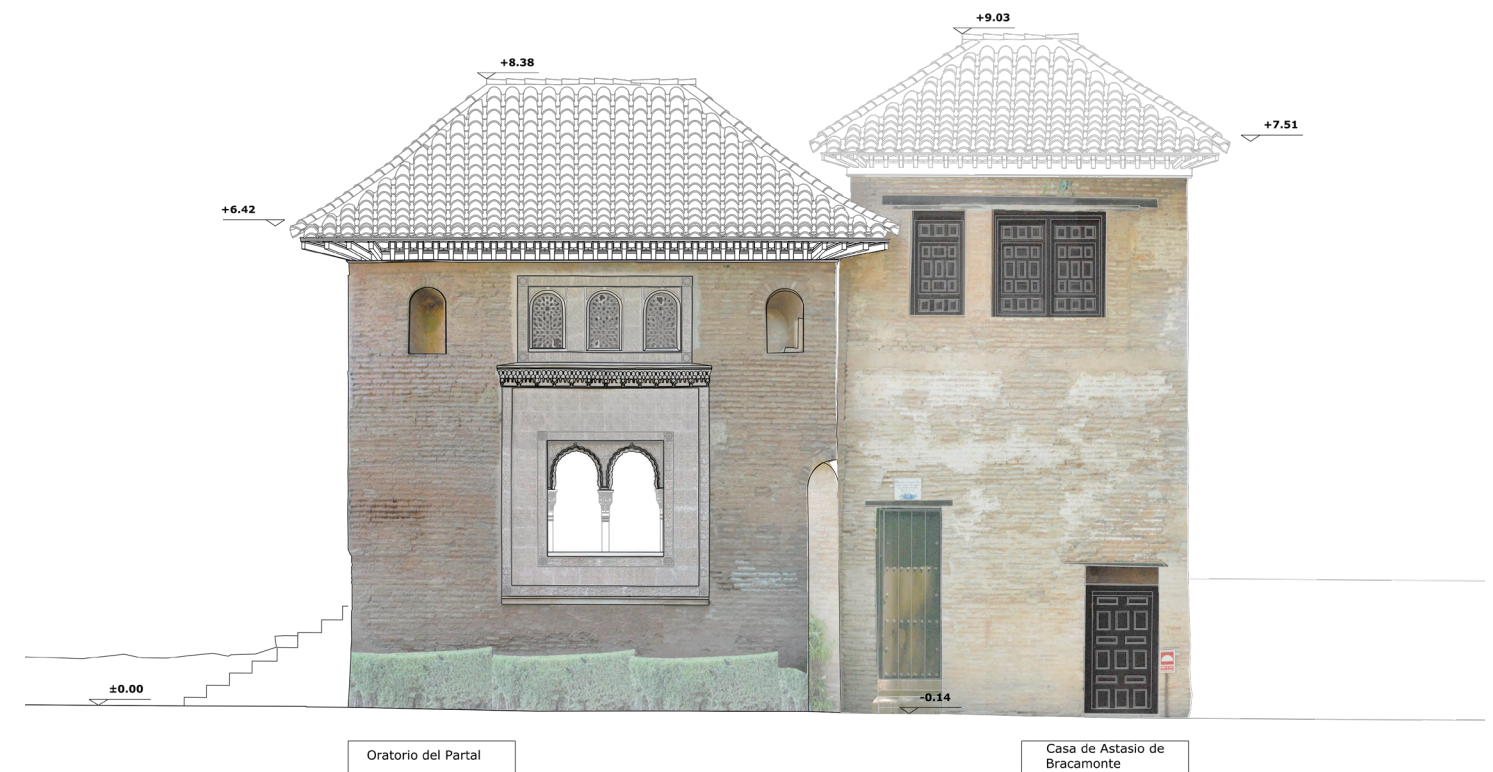


Fig.4 Photogrammetric analysis of the south-west elevation of the Oratory (*left*) and the House of Astasio de Bracamonte (*right*).

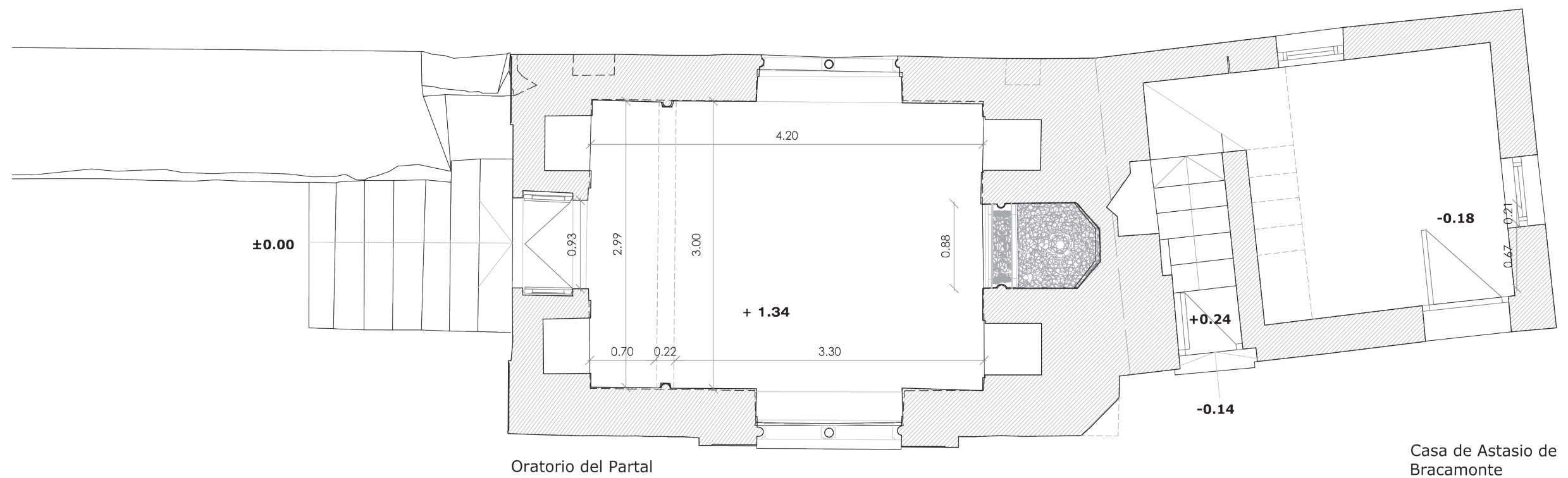


Fig.5 Plan layout of the Oratory (*left*) and the House of Astasio de Bracamonte (*right*) (Wulff 2012).





Fig.6 The Oratory's entrance on the north-west façade. The Oratory was built over the earlier defensive north-east walls of the Alhambra, see bottom left. (Alhambra Council 2015)



Fig.7 The *muqqarnas'* vault that covers the Oratory's *mihrab* facing the entrance (Alhambra Council 2015)



The decorated timber framework<sup>1</sup> covering the central prayer space of the Oratory is one of the best conserved decorated timber structures of the Nasrid Dynasty, in close connection to the Christian *mudéjar*<sup>2</sup> carpentry traditions. It has a truncated pyramid shape with four slopes formed by rafters and assembled noggins, forming interlacing patterns of eight-point stars. This structural typology is present in other areas of the Alhambra and built within a very narrow time span between the end of the thirteenth century and the middle of the fourteenth century.

The different kinds of timber utilised in the construction of this structure were those most commonly

used in the Nasrid context over the fourteenth century: the upper horizontal plane formed by the collar beams (*almizate*) and the common rafters made of silver poplar (*Populus Alba L.*), while the central couple of rafters from the north-east and south-west slopes were made of Aleppo pine (*Pinus halepensis, Mill.*) (Rodríguez Trobajo 2014, 1).

<sup>1</sup> This structural typology was built both in the Christian and the Muslim kingdoms of the Iberian Peninsula from the end of the twelfth century to the eighteenth century, expanding their influence to Morocco and to Latin America during the Spanish Empire period.

<sup>2</sup> *Mudéjar*: A syncretic medieval architectural style that combines Christian and Muslim constructive, architectural and decorative traditions. It was initiated with the construction of medieval Christian buildings by craftsmen of Hispano-Muslim background.

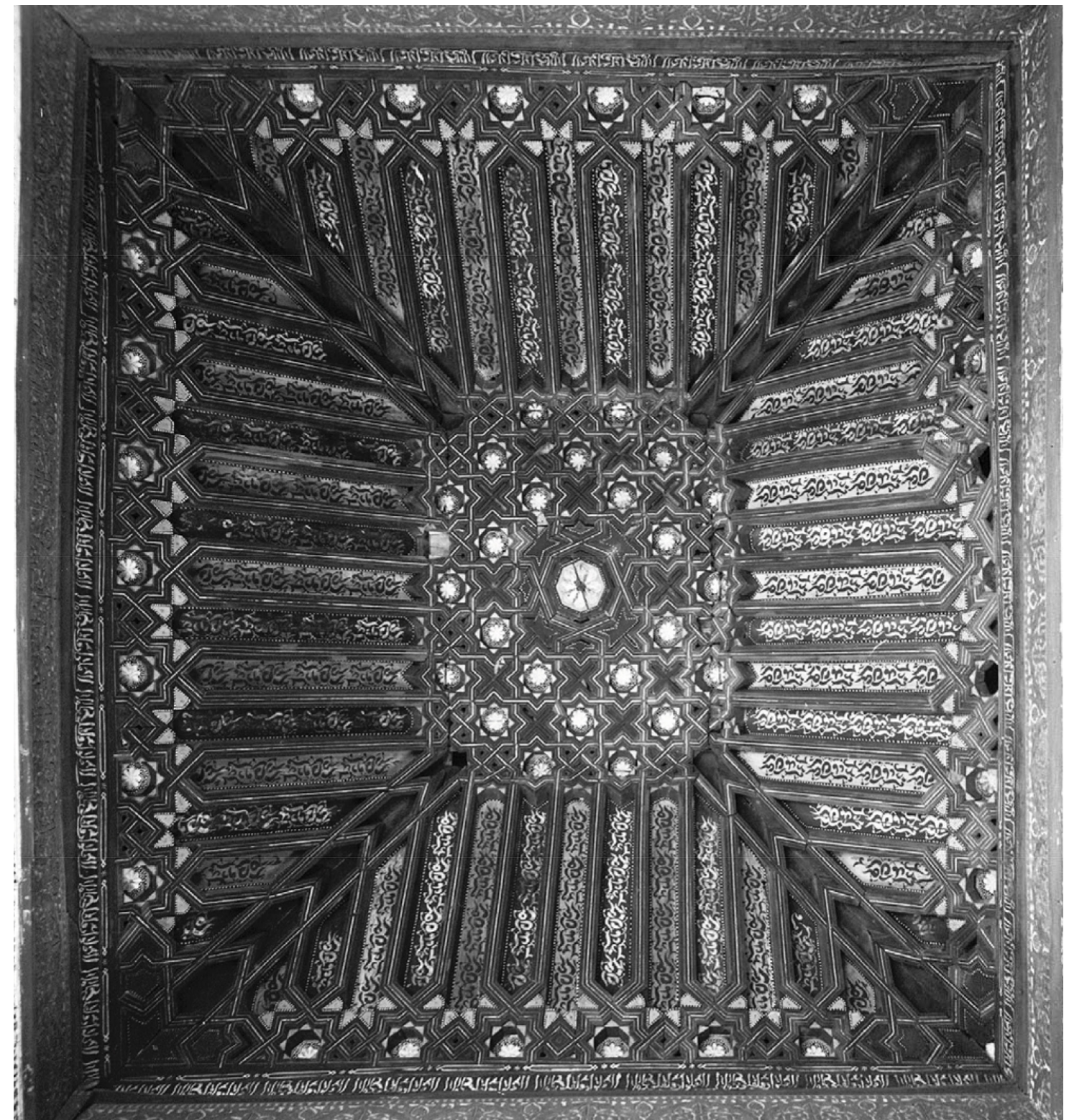


Fig.8. The condition of the Nasrid timber structure of the Oratory in 1924, with repainted decorative motives from the 1846 restoration (© 2014 Institut Amatller d'Art Hispànic. Foto Mas, ref.n. C-42674 (1924), detail; Artyco 2015, I, 18)



## HISTORIC RESTORATIONS

### 1846 Orientalist and 1930 Rationalist-Eclectic approaches

In 1846, Rafael Contreras restored the Oratory aligned to the European Orientalist eclectic trends of his time, closely connected to Viollet-Le-Duc's approach (Torres Balbás 1945, 114). He interpreted the missing parts on the basis of his extensive knowledge of the Nasrid ornamental grammar of the Alhambra, deeply influenced by Owen Jones' studies (Owen Jones 1842, 1845; Contreras 1878).

Before the latest 2013-2017 restoration, the condition of this heritage site resulted from the previous 1930 restoration of the architect Leopoldo Torres Balbás, the director of the Alhambra during the II Spanish Republic (1931-1936) (Torres Balbás 1945, 1969). He is considered the initiator and the most important reference of the modern scientific architectural restoration in Spain. From a radical rationalist standpoint, Torres Balbás' initial approach in the Oratory and the House of Astasio was a selective removal of all the added elements during the previous historical restorations of the aforementioned 1846 orientalist restorer Rafael Contreras. The aim was to enable an exclusive legibility of the 'authentic' medieval Nasrid remains. However, for the first time ever in Torres Balbás' restoration works, he acknowledged Rafael Contreras' profound understanding of the Nasrid language and his rigorous interpretation -for his time- of the missing areas. Therefore, Torres Balbás decided to retain the most valuable parts of the previous Orientalist intervention as important contributions to the heritage values of these buildings. By doing so, his resto-

ration approach evolved from the radical rationalist context of the 20's-30's decades of the twentieth century to a more advanced eclectic criteria, as he defined his restoration (Torres Balbás 1945).

Beyond their physical interventions and regarding their consequences, the importance of both the 1846 and 1930 historical restorations reside in being profoundly rooted in their respective European historical cultural contexts. The former was an interesting example of the romantic, orientalist and eclectic trends of the mid-nineteenth century, while also being systematic and rigorous in its profound knowledge of the Nasrid architecture and decorative programme. The latter evidences a very advanced approach within the context of the European rationalist trends of his time. Here, the search for Nasrid authenticity was overcome by an advanced and complex approach based on the appreciation of the qualities of the former nineteenth century intervention, retained in some areas for being judged as high-quality re-interpretations of the missing original parts. Therefore, these nineteenth century interventions were not only respected by Torres Balbás in his 1930 intervention, but also conceptually incorporated within the multi-layered heritage values of the Oratory. In this respect, the complex and had-hoc positions of this 1930 intervention could be considered as being very close to the current diversity of European approaches on heritage restoration.



Fig. 9&10. The *mihrab* of the Oratory. Elevation from 1846 Rafael Contreras' restoration (Alhambra Council Archive-APAG, left) and the actual condition after the 1930 and 2013-2017 restorations (Alhambra Council 2015, right).



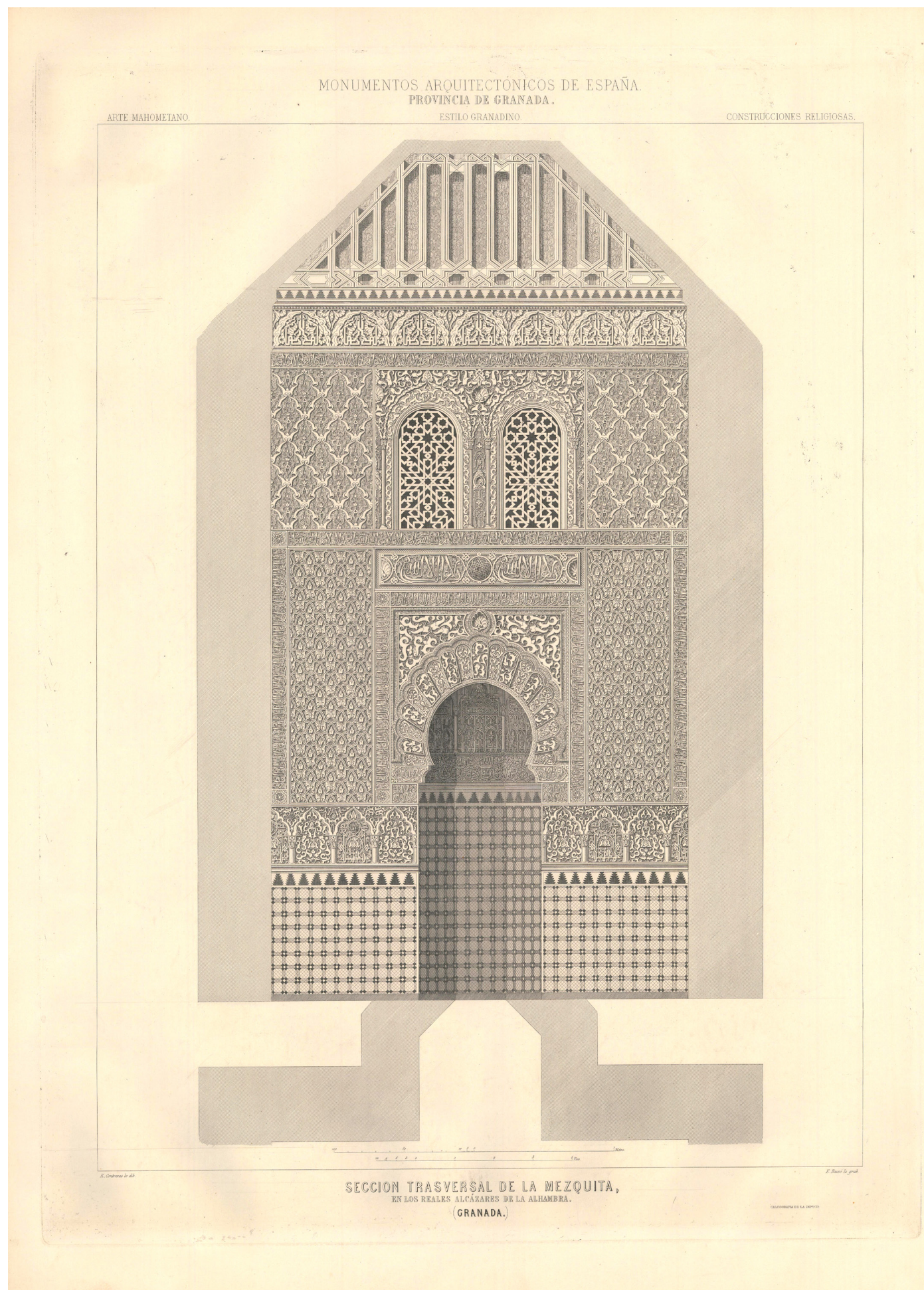


Fig. 11 Internal elevation of the Oratory facing the *mihrab*. 1846 restoration of Rafael Contreras (Alhambra Council Archive-APAG)

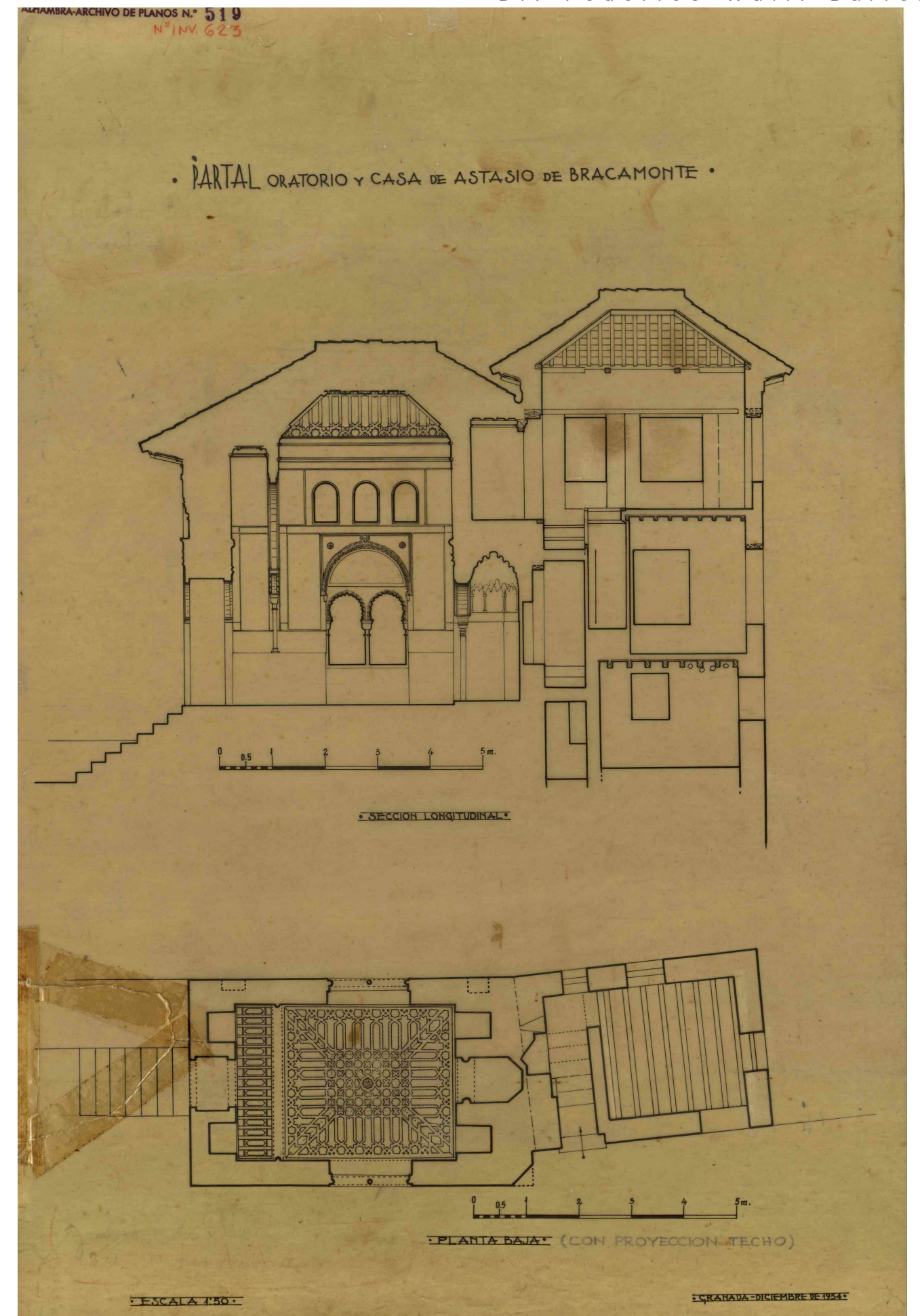


Fig.12. Plan and section of 1930 Leopoldo Torres Balbás restoration (Alhambra Council Archive-APAG)



## PRELIMINARY ARCHIVAL AND CONSTRUCTIVE RESEARCH

As the grounds for the 2013-2017 restoration, the Council of the Alhambra and Generalife commissioned two preliminary research reports which respectively focused on the analysis of the nineteenth and twentieth century historical restorations of this palatine mosque and the House of Astasio of Bracamonte (Wulff Barreiro 2005) and on their constructive condition (Wulff Barreiro 2007). The methods utilised for the first report was archival research in Granada (APAG<sup>1</sup>) and Madrid (AGA<sup>2</sup>), the study of the available graphic and written documents of these historical interventions and a survey of their impact in the condition of the buildings. For the second report, the work was developed through an in-depth constructive analysis of the buildings using photogrammetric techniques and laser measurements. The outcome of these studies was two-fold: on the one hand, the acknowledgement of the successive heritage values added to the building by these historical interventions and the necessity of their conservation; and on the other, the awareness by the Council of the Alhambra of the urgent need for a restoration intervention of the original timber framework that will focus on the research on the distinctive techniques of the Nasrid carpentry compared to the Christian *mudéjar* and on its constructive history, grounded on consistent dating tests.

1 <http://alhambra-patronato.es/ria/handle/10514/11>. Accessed April 11, 2019

2 <https://www.culturaydeporte.gob.es/cultura/areas/archivos/mc/archivos/aga/portada.html>. Accessed April 13, 2019

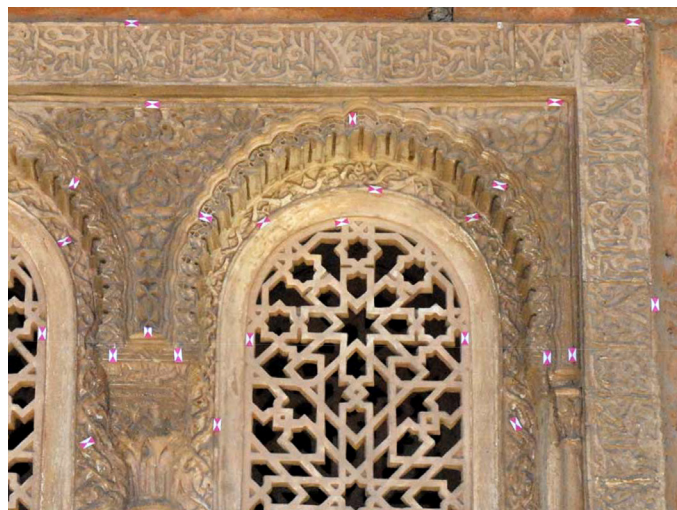


Fig.13. (above)Detail of the twin windows of the north-west elevation, covered by lattices added in 1846 restoration.



Fig.14. (below)Crack in the epigraph motives of the upper part of the north-west inner wall plasterwork.

## RESEARCH CONTEXT: CONDITION BEFORE RESTORATION

As advanced in the 2007 preliminary research report on the pre-existing pathologies, the main issues arisen before the 2013-2017 intervention were divided into two categories: structural issues on both the roof of the Oratory and on its inner decorated timber framework, and local constructive pathologies caused by damp and organic remains. In addition to these, the outcomes of the preliminary 2005 and 2007 research reports highlighted that the condition and values of these two heritage buildings were the result of the multiple interactions between the successive historical layering of the Nasrid original building, the 1846 orientalist restoration and the previous 1930 rationalist –but also eclectic– restoration by the architect Leopoldo Torres Balbás.

With the aim of enhancing the external legibility of both buildings, the 1930 restoration conceived an inadequate design for their roofs, with the Oratory's hipped roof, slightly higher than the wall of the House of Astasio, pouring the rainwater off its south-east side against the north-west side of the latter. A similar hipped roof covering the House pours the rainfall to the same valley gutter. Since then, it has generated damp issues in the north-west wall of the House and rainwater penetration into the inner spaces, resulting in the decay of both the wooden ceiling and the structure that covers the overlapping space between both buildings. Similar damp issues have affected the inner decorated timber framework, causing the decay of the north-east timber plate, the failure of its rafters' support and their disintegration with the collar ties from the upper horizontal plane of the timber framework.





Fig. 15 Restored plaster panels from the 1846 intervention, including epigraphs and vegetal decorations that frame the windows of the south-west elevation, kept by Torres Balbás in his 1930 intervention (Wulff 2012)



Fig. 16 Profound warping on the horizontal plane on the decorated timber frame (*almizate*), due to the inadequate overload of the roof (Wulff 2012)



Fig. 17 The Oratory and the House of Astasio's hipped roofs encounter, pouring the rainwater off the north-west wall of the House of Astasio. (Alhambra Council 2015)



Fig. 18 North-east slope of the inner timber frame that covers the mosque's praying space. The eight-point stars at the lower end of the central rafters evidence a profound deformation due to their support's failure at the level of the wall plate. (Wulff 2012)



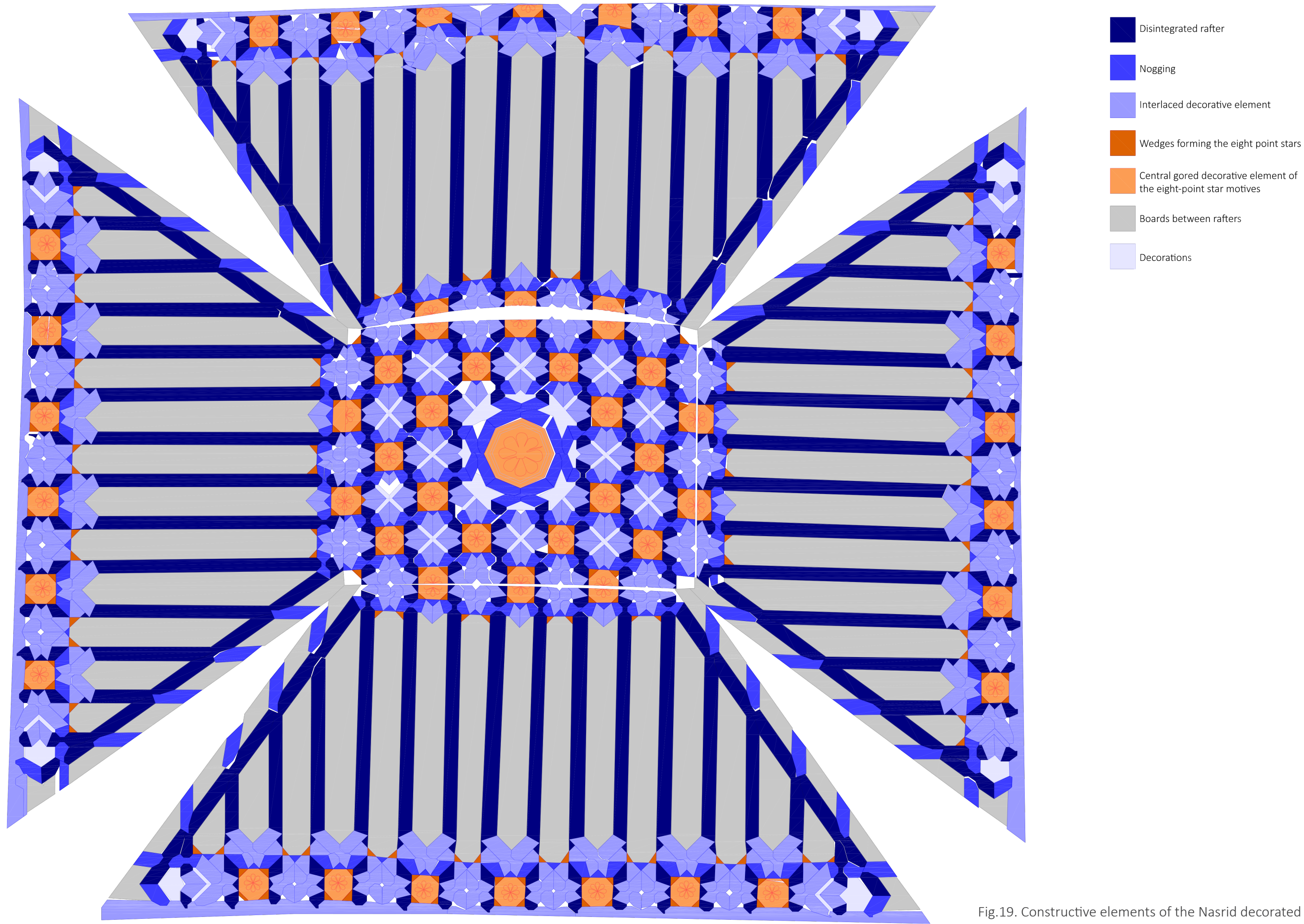


Fig.19. Constructive elements of the Nasrid decorated timber framework covering the prayer space



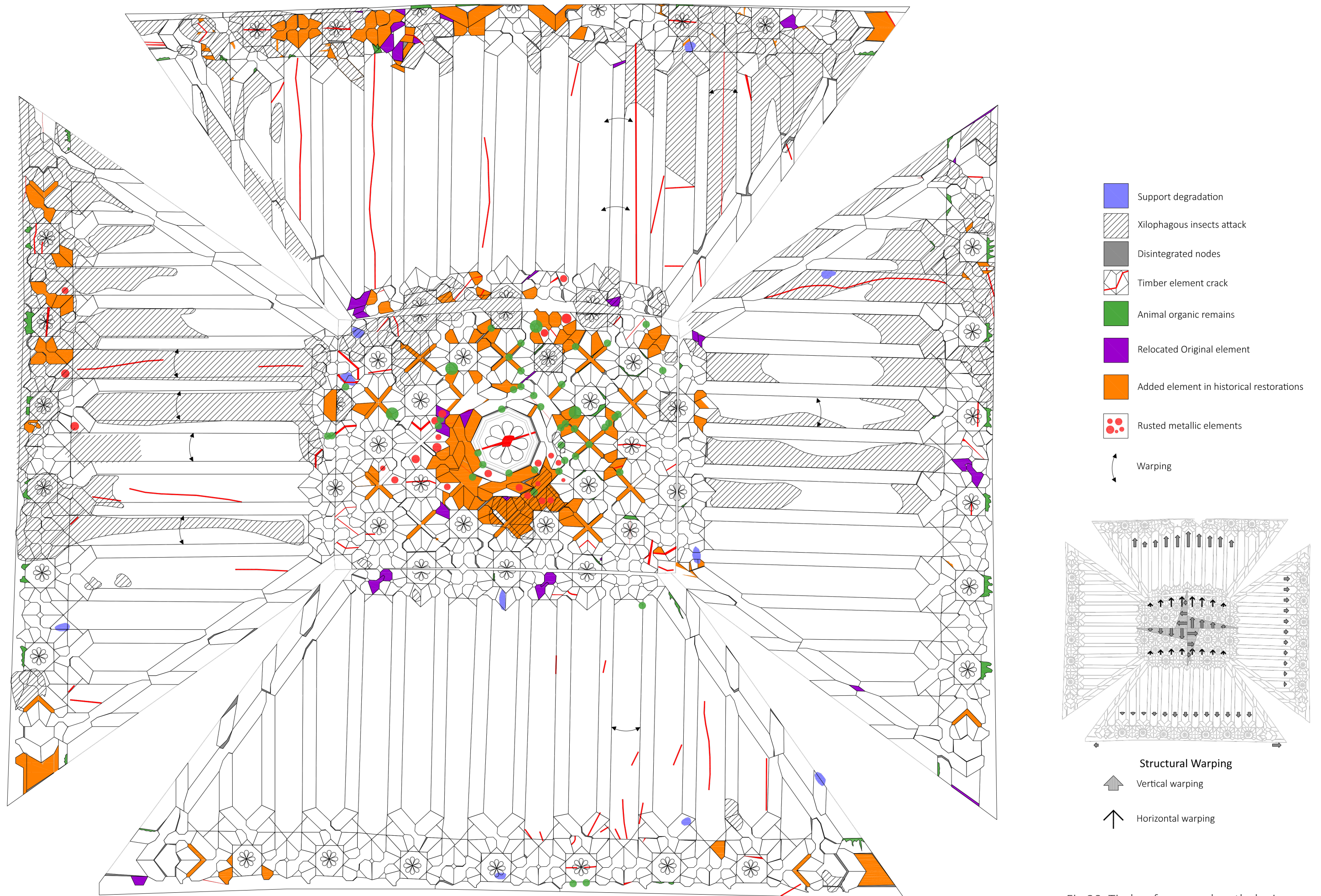


Fig.20. Timber framework pathologies mapping







## RESEARCH AIMS

The latest 2013-2017 intervention has enhanced the legibility of the successive historical layers, their interaction and the heritage values that have shaped these two buildings over time. The restoration was structured around four main areas that have contributed to the research aims as follows:

1. Disassembling and reassembling of the roof structures rebuilt during the 1930 intervention, including some reused historical rafters. Discovery of original Nasrid remains of the upper roof structure: two rafters, a double false collar tie and a wall plate. This Nasrid structural typology has appeared as distinctive from their Christian *mudéjar* counterparts.
2. Structural and constructive carpentry restoration of the Nasrid decorated timber framework which covers the main prayer space. Constructive analysis of its geometric design and assembling process, focusing on its specificities compared to the contemporary Christian-*mudéjar* techniques. Discovery of a first Nasrid constructive version of this timber framework of an identical pattern to another timber framework located elsewhere in the Partal Palace.
3. Chemical and laser cleaning and consolidation of the carpentry elements, the restoration of the original Nasrid painted decorative motives and their historical restorations. Discovery of new fourteenth century epigraphic inscriptions and decorative motives, interpreted as key contributions to current research literature on Hispano-Muslim architecture.
4. Identification and different restoration treatments of Nasrid and nineteenth century restored plasterwork, supported by the chemical analysis of the plaster and the pigments of the painted decorations. Both the original decorative elements and the nineteenth century historical restorations were recovered and enhanced as key heritage values of the building.

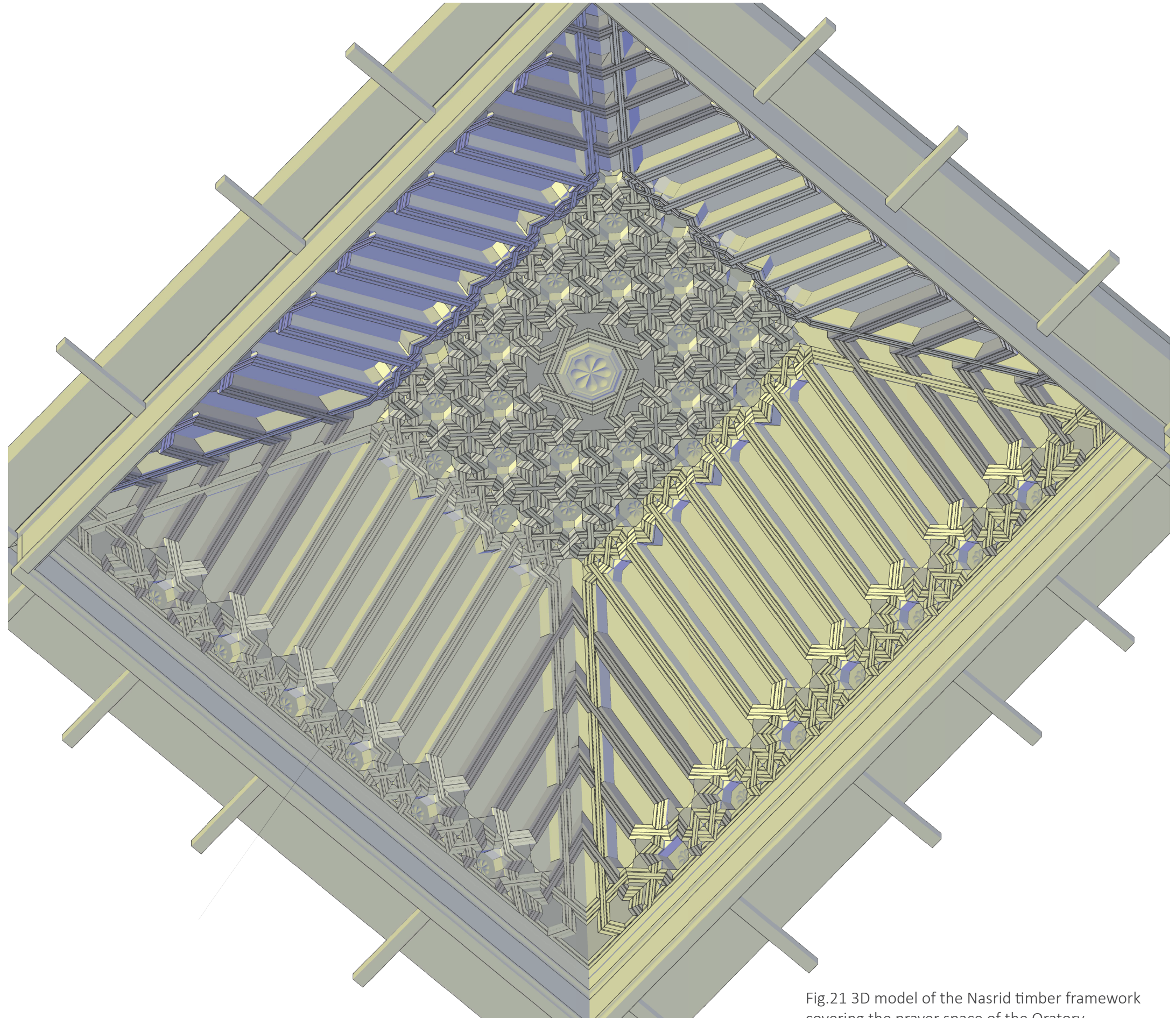


Fig.21 3D model of the Nasrid timber framework covering the prayer space of the Oratory







## RESTORATION APPROACH

**Together with its unique Nasrid heritage values, symbolic and functional role within the Alhambra complex, the significance of the Oratory of the Partal palace also lies on its interpretation as a compendium of the most important Spanish restoration approaches of the last 180 years. From the orientalist approach of Rafael Contreras' restoration (1846), closely connected to the positions of his contemporary Viollet-Le Duc, the rationalist-scientific-but also eclectic at times as he named himself (Torres Balbás 1945)- restoration of Leopoldo Torres Balbás (1930), to the last contemporary restoration (2013-2017) based on legibility and conservation criteria of the multiple heritage values of this successive historical layering.**

## RESTORATION PHASES

### Phase 1 (2013-2015)

Dismantling of the pre-existing roof of the Oratory for the access to the external side of the Nasrid timber framework. This upper roof structure proceeded from 1930 Torres Balbás' restoration and included some reused elements from other historic structures. Discovery of the timber elements forming part of the original Nasrid roof structure, that were located in the confined space between the modern roof and the inner Nasrid timber framework. These remains, consistently dated by Carbon-14 tests, were formed by fragments of two rafters, a false collar tie and a fragment of their wall plate. Their constructive study and position in regards to the inner timber framework has allowed the restitution of the original design of this Nasrid structural typology, distinctive in its structural conception and in its details from the contemporary roof's structures of the Christian-*mudéjar* context.



Fig. 22 Phase 1. Nasrid remains in the confined space

### Phase 2 (2013-2015)

Structural and constructive analysis and restoration of the original decorated timber framework that covers the main prayer space of the Oratory, together with the original decorated flat ceiling covering its entrance space. Discovery of several Nasrid carpentry solutions, decorative and epigraphic motives that were interpreted, consolidated and restored as important contributions to a deeper knowledge of Nasrid architecture and its associated techniques, in relation but also distinctive to the contemporary Christian-*mudéjar*.

Once the upper roof structure was removed, a careful constructive analysis of the external side of the Nasrid timber framework enabled the discovery of an unknown first Nasrid design of the timber framework, closely related to another Nasrid timber framework located elsewhere in the Partal Palace.

The dendrochronology dating tests applied to the final second version of this Nasrid timber framework have provided evidence for an earlier construction date of the Oratory, which would have been initiated by the sultan Isma'il I (1314-1325), instead of the previously accepted attribution to Yusuf I (1333-1354) (Uppsala Universitet, the Angström Laboratory / Tamdem Laboratory 2014; Rodríguez Trobajo 2014). This new dating and its relation to the other



Fig. 23 Phase 2. New additions and Nasrid elements

existing Nasrid framework in the same area has contributed to the whole reconsideration of the different construction stages of the Partal Palace and on its role in the construction history of the Alhambra.

The restoration of the decorative motives applied on the timber framework enabled the distinction between the original and the historical restoration interventions. The outcomes of the chemical and microscopic analysis of several samples applied on the timber framework (paintings' pigments, binders, primers) were coincident with the analysis made by the Restoration Department of the Alhambra on other consistently dated Nasrid paintings of the same period on other buildings of the Alhambra (Artyco 2015, I: 455-457).

### Phase 3 (2015-2017)

Restoration of the Oratory's internal plasterwork and external brick walls. A special attention was paid to the epigraphic and vegetal decorative of the plasterwork and on their painted decorative remains, which resulted from the complex interaction between original Nasrid motives, 1846 restored elements and the 1930 intervention, which partially eliminated the previous decorative layers. Thus, an aggressive cleaning process was undertaken as a result of Torres Balbás' first rationalist approach on his exclusive search for the authentic original Nasrid remains. This resulted in making indistinguishable the original Nasrid paintings from the nineteenth century restored ones; in many areas, it unfortunately removed both. By contrast, during the latest 2013-2017 restoration the two periods have been clearly differentiated by analysing both the different painting techniques and the chemical analysis of the colouring pigments. This enabled the distinction between the ones of common use during the Nasrid period with the others identified as being discovered and implemented in modern times (Parra Crego 2014)



## RESEARCH METHODS

1. For 2005 and 2007 preliminary research reports, archival research on the original state and historical restorations on the Oratory and the House of Astasio.

2. Photogrammetric survey, laser measurements and constructive analysis for the differentiation between the layers of historical restorations and the Nasrid original building, and their multiple relationships. In addition to the pathologies, this helped to clarify how these subsequent layers over time have shaped the condition of the two buildings prior to the intervention.

3. For Phases 1 and 2, the constructive analysis of the Nasrid timber framework assembling process was developed through traditional carpentry techniques. This was initiated by a disassembling process of its different components, focusing on a study of the distinctive Nasrid carpentry techniques. This was made by analysing their assembling nodes and the accurate control of its geometric design. Additionally, this method allowed the discovery of an earlier version of the Nasrid framework similar to another existing structure in the Partal Palace.

4. Laser and smooth mechanical, chemical cleaning and consolidation methods applied to the medieval timber elements, resulting on the discovery and recovery of original epigraphic inscriptions and painted decorations.

5. Differentiation of the original Nasrid timber elements and their painted decorations from the

19thC. restorations, through chemical analysis of the wood and the paintings' pigments components (Parra Crego 2014).

6. Laser measurements for carving out new timber prostheses assembled with epoxy glue to pre-existing structural elements of the timber framework. These new timber additions completed the missing or seriously degraded parts by differentiating its finishing with the restored ones, aiming for improving the legibility of its multiple historical layers.

7. The carbon-14 and dendrochronology tests have provided evidence on a new dating for the Oratory's construction processes, which has contributed to reconsider the different construction stages of the Partal Palace as a whole (Uppsala Universitet, the Angström Laboratory / Tandem Laboratory 2014; Rodríguez Trobajo 2014).

8. The constructive analysis of the Nasrid remains of the upper roof structure has allowed the restitution study of this original structural typology, unseen to date in Nasrid carpentry and different from Christian *mudéjar* solutions.

9. For Phase 3, the consolidation, cleaning and restoration of the plasterwork, its polychromy and the external brickwork included chemical tests and microscope analysis. This allowed the differentiation of the Nasrid original parts, the 19th century restored ones and the 1930 intervention, clarifying the way they have interacted with each other.

Fig. 24 Constructive analysis of the timber framework components and their assembling process

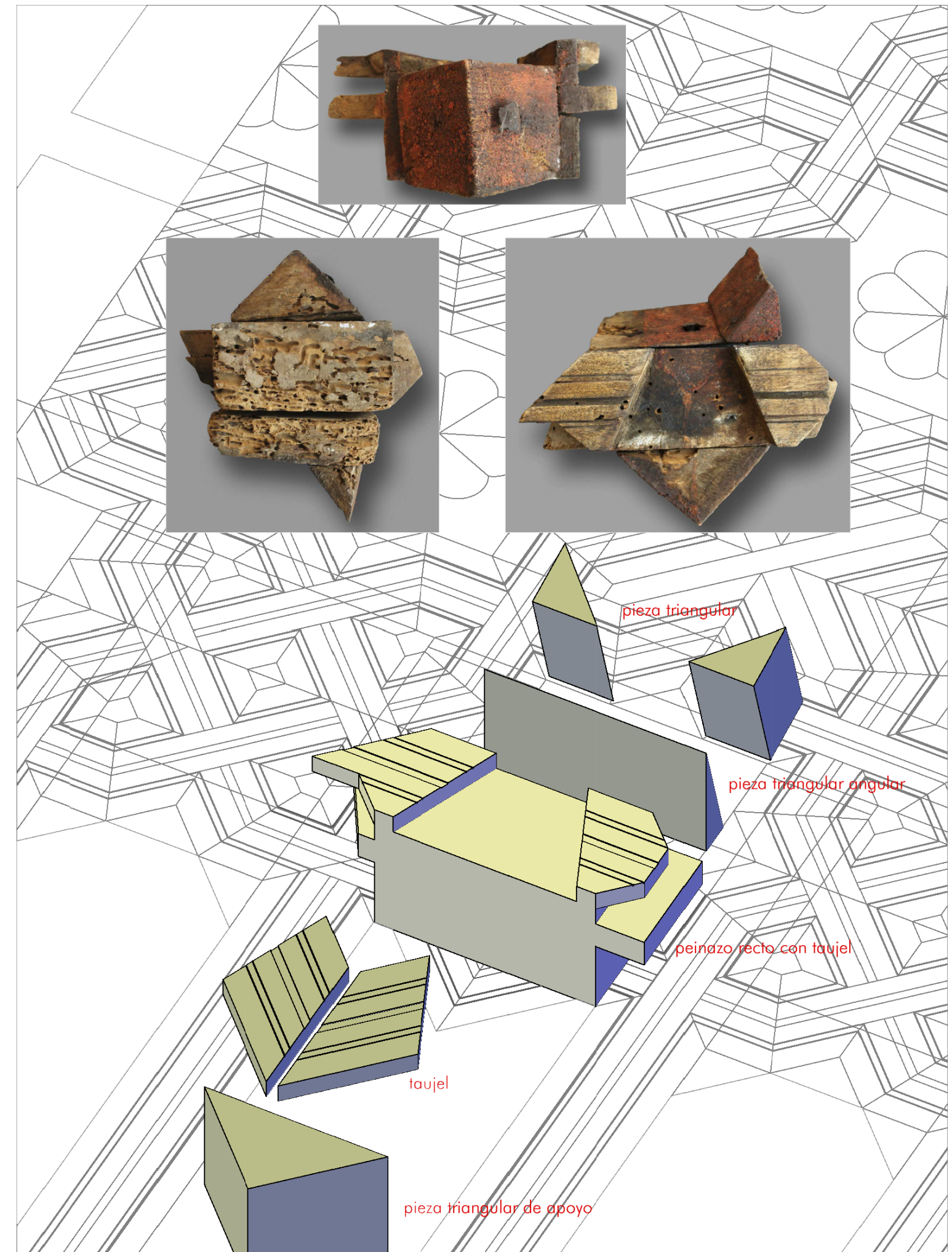






Fig.25 (*left*) & Fig.26 (*below*) Restoration and recovery of the original shape of the upper horizontal plane of the timber framework, formed by collar ties and noggings.



Fig.27 (*left*) Replacement of a section of the original Nasrid timber wall plate





Fig.28 Preliminary superficial cleaning of dust and organic remains with vacuum and brush.



Fig.30 Assembling of the rafters of the inner timber framework to the collar ties and the wall plate. Their new added prostheses are apparent on their upper end.



Fig.29 (right) Chromatic reintegration of the original pigments and their primer.





Fig.31 Fixation and consolidation of pigments with Japanese paper and synthetic adhesive



Fig.33 1846 restored plaster frieze chromatic reintegration with the other three Nasrid wooden friezes

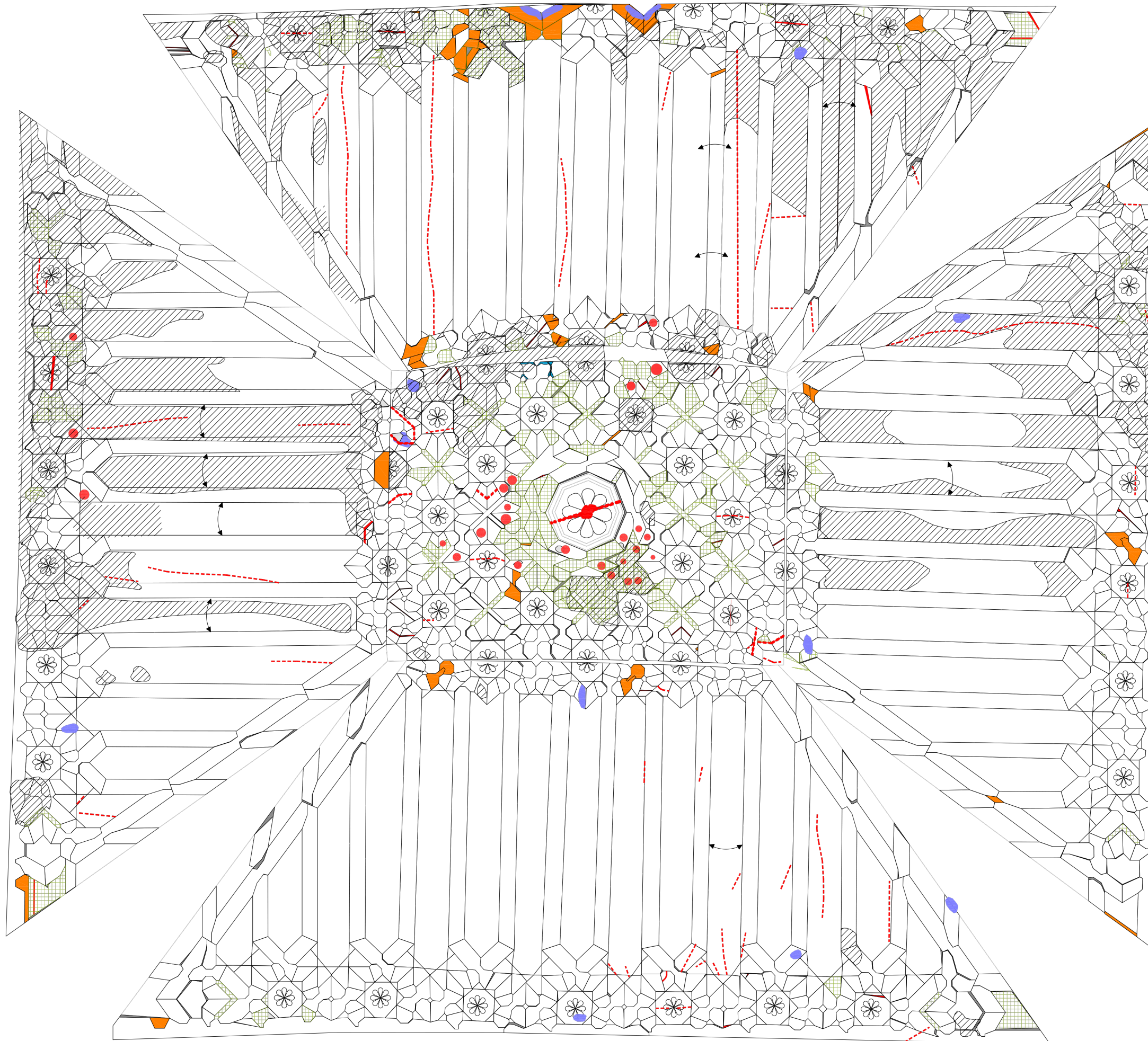


Fig.32 Sample collection of pigments for microscopic and chemical analysis in laboratory

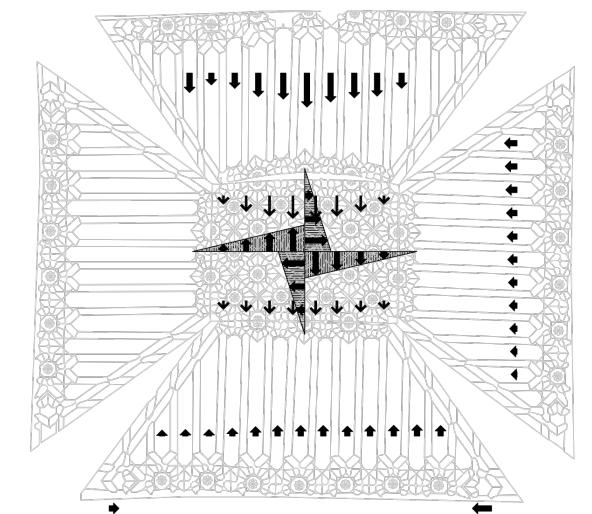


Fig.34 Cleaning of the last coating on the wooden frieze applied by the 1930 intervention with a laser of 1064 nm wavelength






-  Relocation of non-structural elements on their original position
-  Cracks and breaks repair
-  Finishing differentiation of newly added elements
-  Elimination of former inadequate repairs
-  Biocid treatment and support consolidation
-  Cleaning and treatment of rusted elements (nails)
-  Warped elements morphological recovery
-  Wooden support replacement



Analysis of the original shape recovery

 Vertical shape recovery


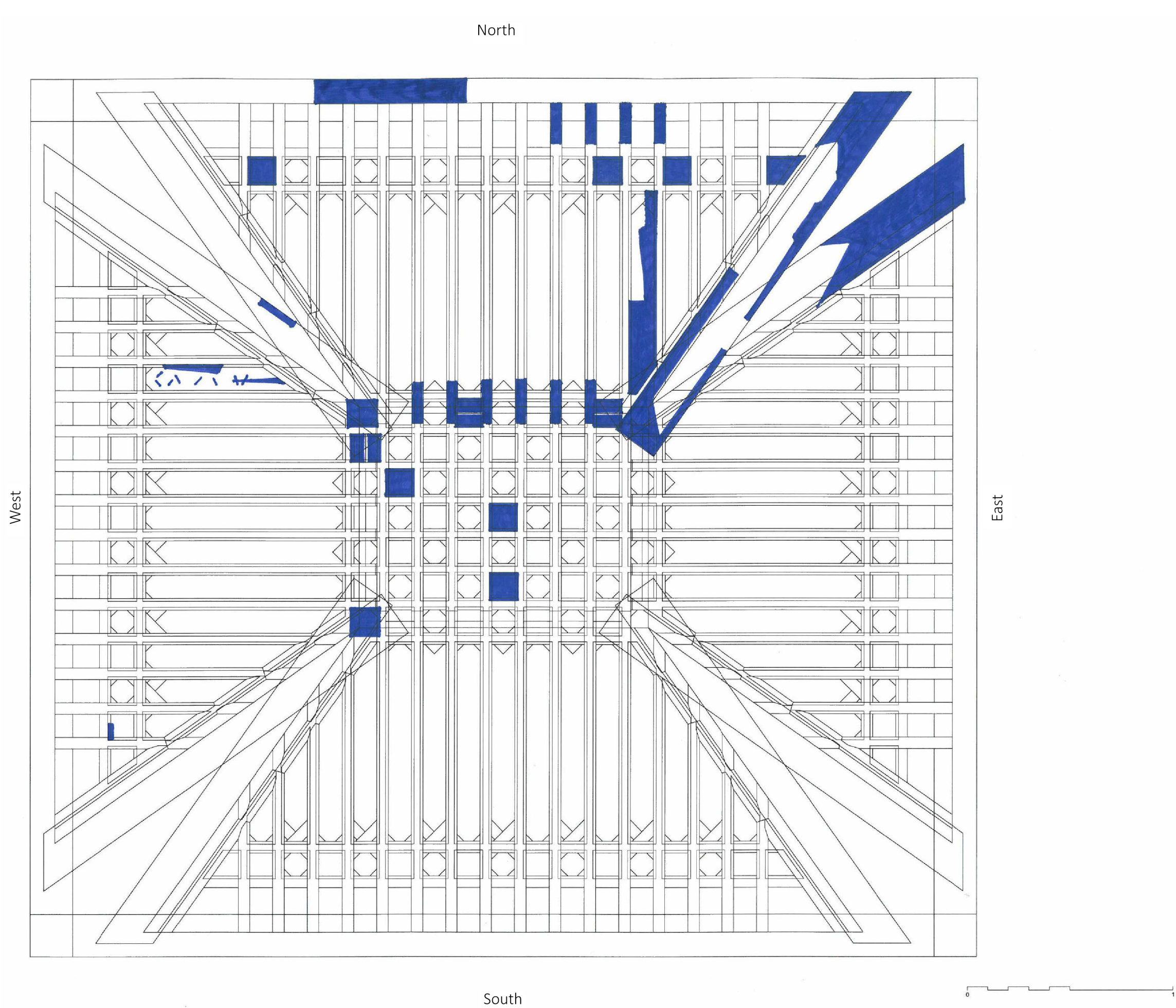
 Horizontal shape recovery

Fig.35 Timber framework restoration interventions mapping





prostheses

Fig.36 New timber structural prostheses mapping



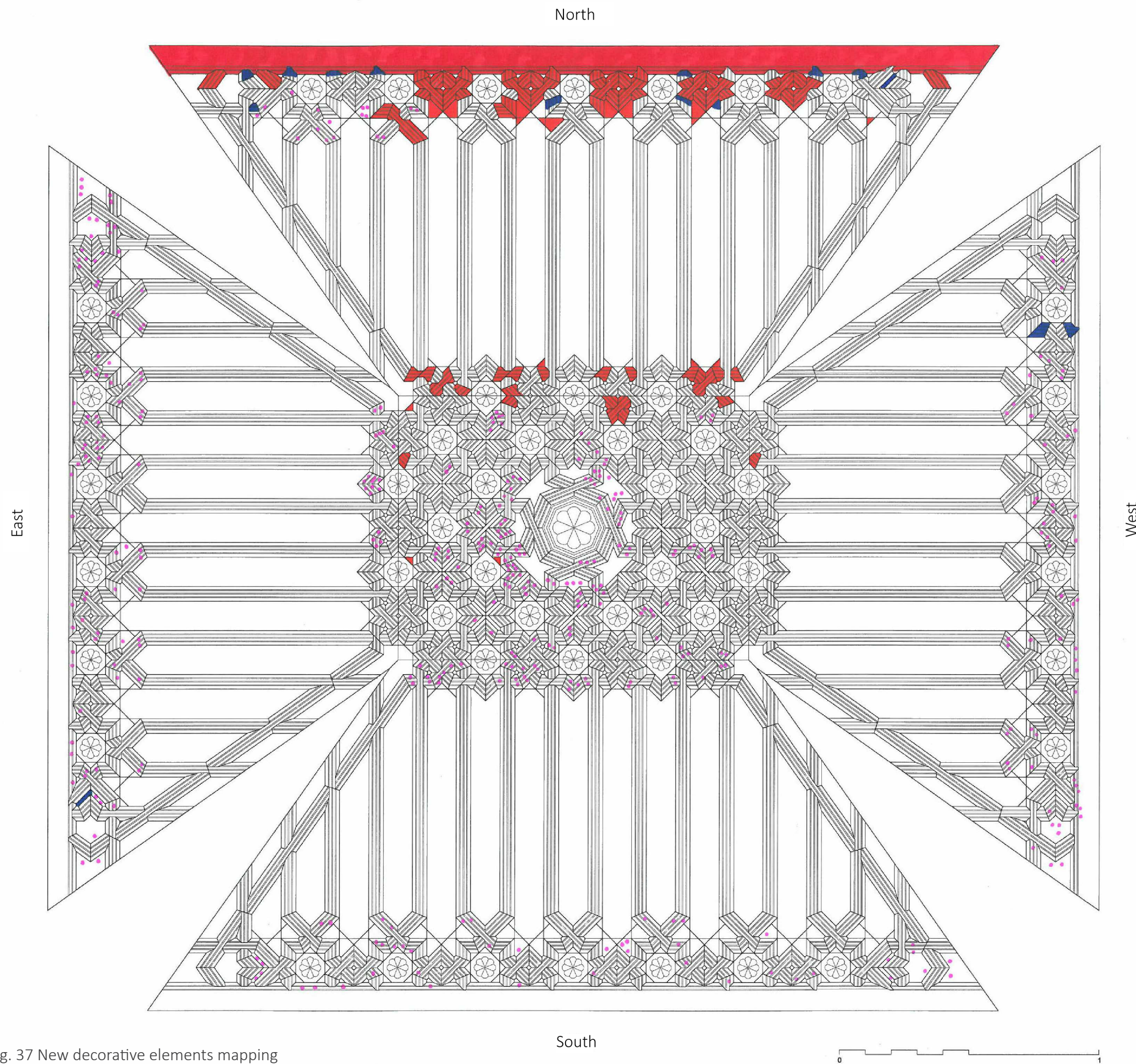
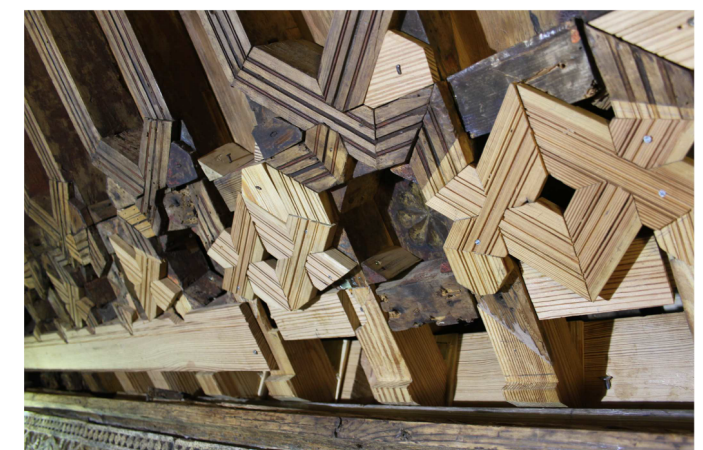
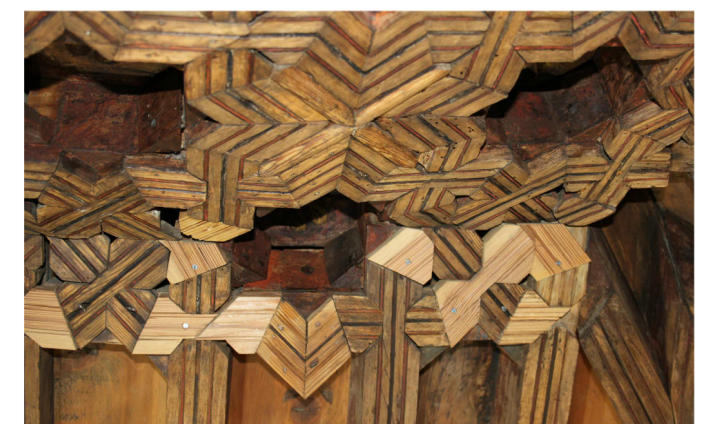


Fig. 37 New decorative elements mapping



- prostheses
- new elements
- new nails





Fig.38 Interventions of the external brickwork walls. North-east and south-east elevations





Fig.39 North-east elevation. Condition before restoration.





Fig.40 South-west façade condition prior to the restoration



Fig.41 North-west façade condition prior to the restoration





Fig.42 North-west internal elevation. Condition prior to the restoration



Fig.43 South-west internal elevation. Condition prior to the restoration



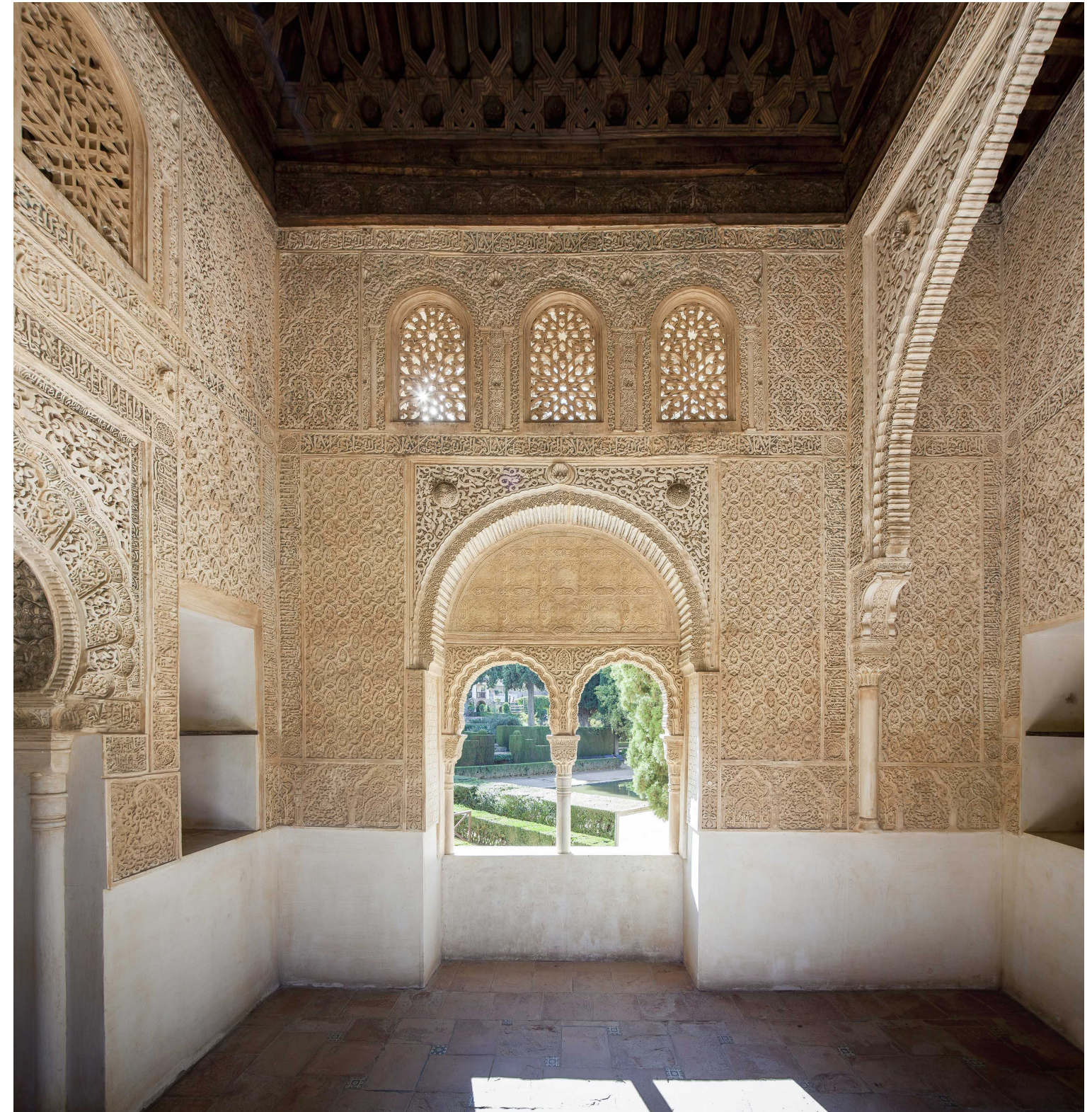


Fig. 44 (*above*) South-west inner elevation facing the Partial Palace gardens after the restoration

Fig. 45 (*left*) North-west access inner elevation after the plasterwork restoration





Fig. 46 The original Nasrid decorated timber frame (*almizate apeinado*) that covers the main praying space of the Oratory before the 2013-2015 restoration. (Alhambra Council 2015)



Fig. 47 The Oratory's timber framework after the 2013-2015 restoration. (Alhambra Council 2015)







## ORIGINALITY AND SIGNIFICANCE

### Carpentry

Until recent times, the medieval Hispano-Muslim carpentry has not been fully considered as a distinctive discipline from the *mudéjar* carpentry developed in Christian contexts (Nuere 2000).

Despite the context of an intense technological and artistic exchange between Christian and Muslim medieval kingdoms of the Iberian Peninsula during the frequent periods of peace (Wulff 2011), in most of the cases their constructive techniques remained distinctive. The *mudéjar* architecture, superimposed on the Christian Romanesque or Gothic styles, was mainly built by craftsmen of Hispano-Muslim background who lived for generations in the northern Christian kingdoms of the Iberian Peninsula, and therefore became clearly distinctive over time from their Hispano-Muslim counterparts of the Muslim al-Andalus, while holding common elements and origins. The recent 2013-2017 restoration of the Oratory of the Partal Palace has contributed to shed light into the particularities of the Nasrid carpentry techniques and on their decorative motives compared to the *mudéjar* carpentry in Christian contexts, where they probably had derived from. The detailed survey of the roof structures of the Oratory and the House of Astasio undertaken in the latest restoration has revealed unique and yet unknown structural elements dated from the original Nasrid building. They were retained in their original location by Leopoldo Torres Balbás in his 1930 restoration as constructive witnesses for being interpreted by subsequent interventions. These

were found within the confined space between the external roof's structure and the internal decorated timber framework, and consisted in the remains of a couple of rafters of white poplar wood (*Populus Alba*) formed by logs and by a double false collar tie embracing them. They have been consistently dated by carbon-14 with a 95,4% probability in 1280 AD - 1400 AD, with an additional 68.2% probability dating distributed into 1290 AD - 1320 AD (26.5%) and 1350 AD - 1390 AD (41.7%), (The Angström Laboratory / Tamdem Laboratory, Uppsala University 2014, 3). This dating indicates that these structural elements were most probably part of the original Nasrid elements of this roof structure. Roof structures formed by very simple rafters made of logs similar to these remains were a common solution in the Nasrid carpentry, as it has been evidenced in the Palace of Genil (*Alcázar Genil*) in Granada, built in 1218 during the Almohad rule (Malpica Cuello 2005, 140) and in the Nasrid roof structure of the Royal Hall of St. Dominic (*Cuarto Real de Santo Domingo*), also in Granada (Rodríguez Trobajo 2014, 2).

In addition, a further detailed analysis of other remains left in this confined space between the Oratory's external and internal timber structures has also revealed the presence of a wooden element which corresponds to a fragment of the original wall plate from where this original upper roof's structure was supported (Nuere 2014, 10-11; Artyco 2015, II, 13)



Fig. 48 Remains of the original Nasrid upper roof's structure: two rafters and a false double collar tie (Artyco 2015). These have been dated by a Carbon-14 test between 1290 and 1400 with a 95.4% probability (Uppsala Universitet 2014)



Fig. 49 Remains of the original Nasrid timber wall plate, with an unusual shape compared to its *mudéjar* equivalents (Artyco 2015)



The shape of this wall plate is clearly distinctive from the commonly used in the medieval *mudéjar*-Christian carpentry (Nuere 2014, 11). Therefore, all indicates that this supporting element was also part of the original Nasrid timber upper structure of the roof that protected the inner decorated timber framework.

As evidenced in the hypothetical restitution of this original Nasrid structure, the upper roof structure could have shared its support on this referred wall plate with the inner timber framework (Rodríguez Trobajo 2014, 2; Nuere 2014, 13). The cut found on the external side of the lower end of the best conserved Nasrid rafter could have been the support of a disappeared shorter rafter that might have formed the original roofs' eaves. The interpretation of this constructive solution is not only grounded on the interpretation of the cut on the upper side of this Nasrid rafter, but also on the particular shape of the referred original wall plate.

The analysis of this detail has contributed to advance in the knowledge of the Nasrid carpentry constructive techniques, evidencing its distinctive solutions compared to the *mudéjar*-Christian ones (Nuere 2014, 13).

The reconstruction process of the rafters' support of the north-east slope of the inner decorated timber

framework, seriously degraded by the penetration of rainfall, moisture and the xylophagous action, has shown another interesting evidence of the particularities of the Nasrid carpentry compared to the *mudéjar*-Christian ones.

The high level of complexity reached in the wood-carving for the assembling of these two rafters with their connected noggings on their lower end is totally unknown by *mudéjar* carpentry solutions. This degree of sophistication in the geometric control of its dimensions and angles includes the mortises that were carved out in both rafters' lateral sides. These were assembled with the noggings that form the upper and the lower points of the eight-point star decorative motive located between these rafters. These successive eight-point stars formed by rafters and assembled noggings constitute the main decorative motive of the lower area of this timber framework, while providing an additional structural rigid ring on the timber framework's base.

Despite the Nasrid carpentry could have been rooted in the *mudéjar* techniques in its first steps, by the first third of the fourteenth century Nasrid carpenters were confident enough for using their own constructive solutions, showing a high degree of dexterity in the geometric control of these complex nodes, together with an almost perfect constructive accuracy in their execution.



Fig. 50 Discovery of new fourteenth century Nasrid carpentry techniques, distinctive in their sophisticated solutions from their contemporary Christian-*mudéjar* carpentry (Artyco 2015)



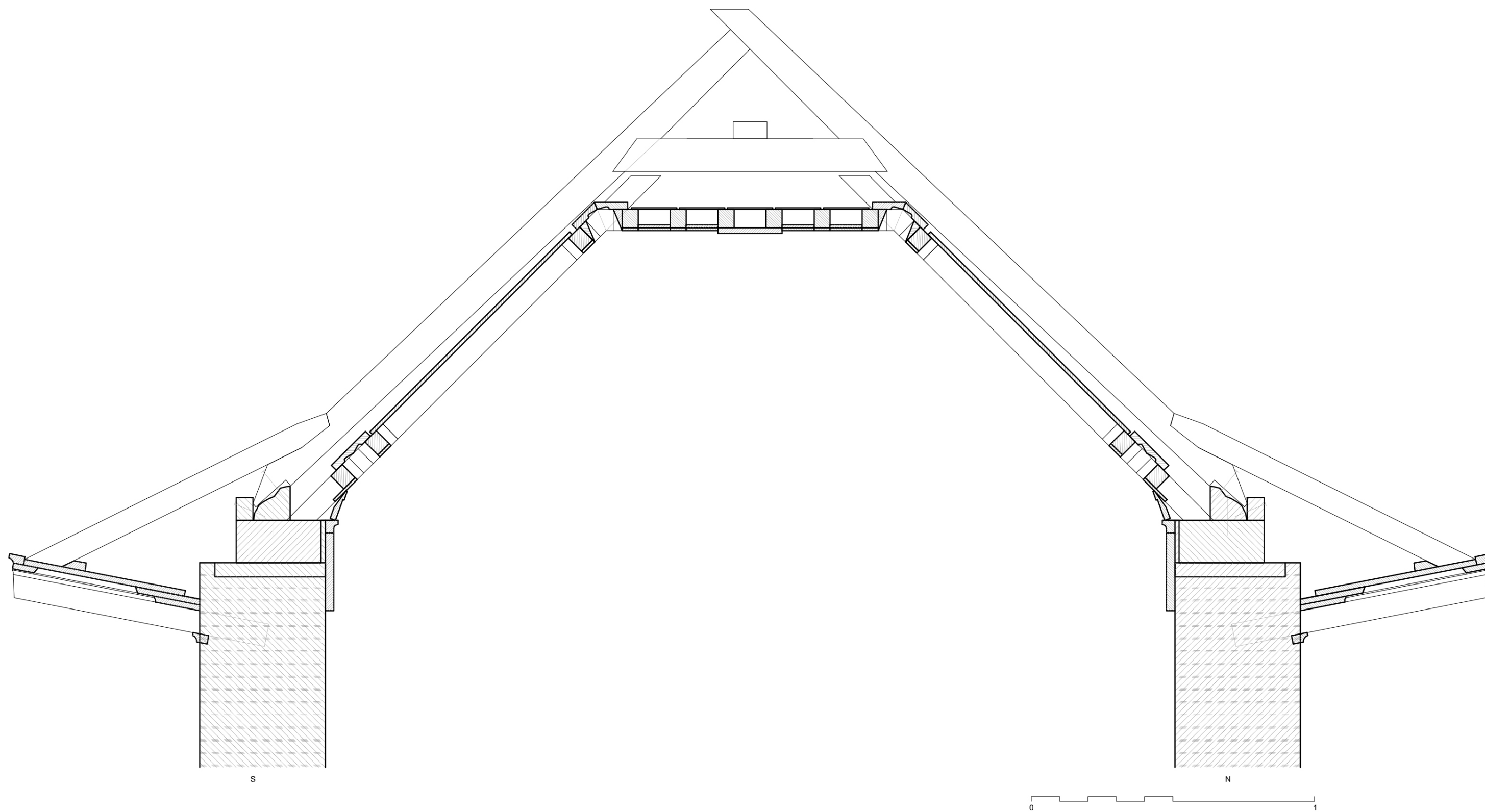


Fig. 51 Hypothetical restitution of the original Nasrid structure of the roof, based on the site survey of the restoration company Artyco. The hypothesis was that the three elements found between the inner timber framework and the upper roof's structure would have belonged to the original Nasrid roof structure. The cut found on the lower end of the best conserved Nasrid rafter might have been the support of a disappeared shorter rafter that would have formed the original roofs' eaves (Artyco 2015)



## Discovery of decorative and epigraphic motives

The timber framework has conserved areas that still retain their original painted decoration. One of the wooden planks covering the space between two rafters in the northwest slope has evidenced the remains of original Nasrid vegetal decorative motives. The analysis of the decorative motives of this wooden plank has evidenced a number of analogies with the painted decoration on the ceiling of the Plasterwork Hall (*Salón del Yeso*) of the Royal Palaces (*Reales Alcázares*) of Seville. The fabric of this palace was built under the previous Almohad dynasty during the last decade of the twelfth century, although its wooden ceiling was built in the same period as the Oratory's timber framework (Nuere 2014, 19; Manzano Martos 1999, 71; Tabales Rodríguez 2004, 46; Blasco López et al. 2009, 203). An unknown epigraphic inscription was also discovered on the upper board (*alicer*) of the wooden

frieze (*arroca*) that covers the wall plates supporting the decorated timber framework (Fig.52). The inscription was almost invisible under the last painting coat applied to the whole wooden structure during the Torres Balbás 1930 restoration. The carved part on the lower level of this wooden frieze has also conserved some remains of the original Nasrid painting (Artyco 2015, I, 425). This inscription only conserves the marks of its primer coat, but unfortunately has not retained its original pigments. This repetitive epigraph runs along all the perimeter of the upper board (*alicer*) of this wooden frieze. The arabist of the University of Granada (UGR) José Miguel Puerta Vilchez has studied and transcribed this epigraphic inscription and has revealed that is a Surah, a Quran's versicle (Puerta Vilchez 2011).



Fig. 52 Previously unknown epigraphic inscription was discovered on the upper board (*alicer*) of the wooden frieze (*arroca*). The interior carved part of the timber frieze also preserved original pigment remains.



Fig. 53 (*above*) The picture above shows the Nasrid painted decoration on a timber plank covering the space between two rafters on the north-west slope. The picture below corresponds to the ceiling of the Plasterwork Hall (*Salón del Yeso*) of the Royal Palaces of Seville, contemporary to the Oratory. The commonalities between these two decorative motives are striking (Nuere 2014).

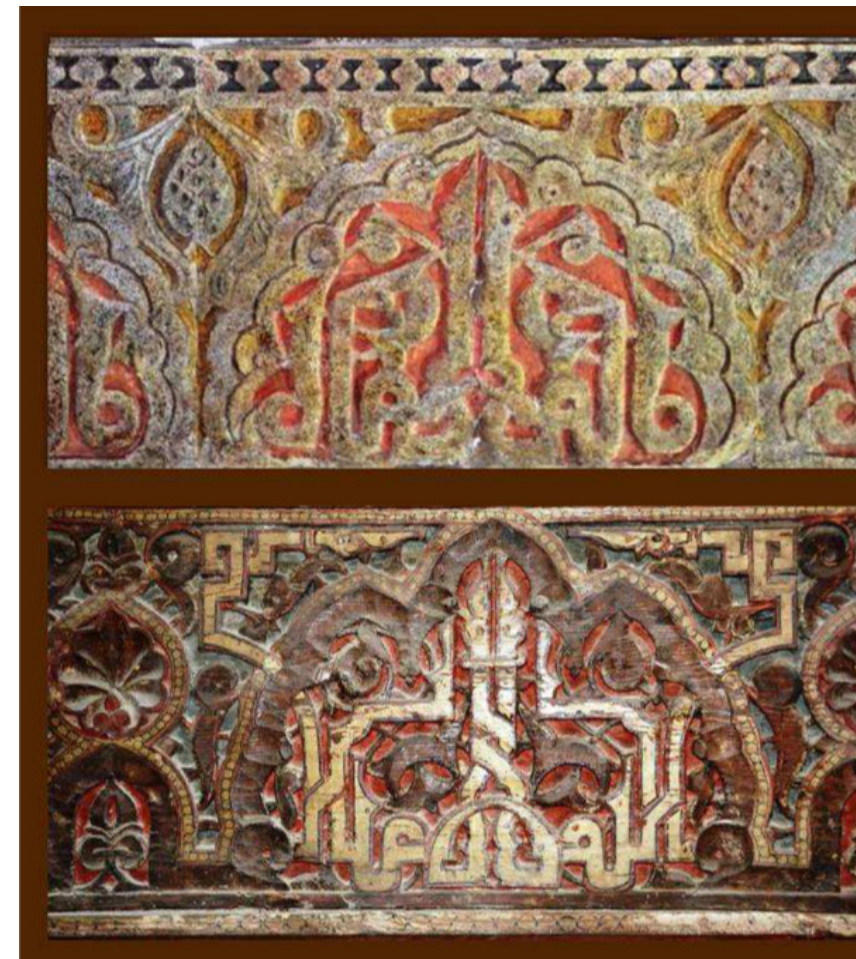


Fig. 54 (*left*) Additional almost identical decorative epigraphs on the Oratory's wooden frieze (*arroca*; *above*) and on the wooden ceiling of the Plaster Hall (*Salón del Yeso*) of the Royal Palaces of Seville (*below*) (Nuere 2014).



## Discovery of an earlier version of the Nasrid timber frame

In regard to the study of early constructive modifications of this Nasrid timber framework, its constructive analysis has demonstrated that the central decorative octagon of its upper horizontal plane (*almizate*) was the result of an earlier second redesign also executed during the Nasrid period. This has been revealed by the detailed constructive survey of its external side, where a first design conception of a regular pattern of eight-point stars decorative motives became apparent. These were located within the resulting spaces created by the assembling of the collar ties with transversal noggings. The current central larger octagon that is currently apparent on the internal side of the framework was the result of a second and final Nasrid modification, while the rest of the original eight-point star pattern

was kept as it had been conceived originally around this new central motive. This earlier design of a regular pattern of eight-point stars would have been identical to the existing one on the similar upper horizontal plane (*almizate*) of the referred Paintings' House timber framework (*Casa de las Pinturas*), also located in the Partal Palace complex, and attributed to Yufuf I's rule (1333-1354).

As evidenced below by the dendrochronology dating, this second version that includes the central octagon was also built during the Nasrid period in a surprisingly early date of 1332, therefore one year earlier to the beginning of Yusuf I's rule (1333-1354) (Rodríguez Trobajo 2014, 7).



Fig. 55 The external side of the upper horizontal plane of the timber framework (*almizate*) has revealed how its central space was initially conceived as a regular pattern of small octagons supporting the eight-point stars apparent on the internal side.

The current second Nasrid design version of this area with the large central octagon is visible in this picture by looking through this pattern of octagonal spaces. The nogging from the central octagonal motive is visible behind the squared space (2nd row from below, 2nd column from the left) (Rodríguez Trobajo, 2014, 3)



Fig. 56 The Paintings' House timber framework, also in the Partal Palace, attributed to Yusuf I (1333-1354). The regular eight-point star decorative pattern of its upper horizontal plane (*almizate*) is almost identical to the first version of the Oratory's timber framework, as shown in Fig. 55 (Wulff 2012).



## RIGOUR - USE OF MULTIDISCIPLINARY METHODS TO SUPPORT RESEARCH

### Historic dating

The outcomes of the carbon-14 and dendrochronology tests undertaken on the timber elements of this framework during the latest 2013-2017 restoration (The Angström Laboratory / Tandem Laboratory, Uppsala University 2014; Rodríguez Trobajo INIA 2014) have challenged the widely accepted dating for the construction of the Oratory of the Partal Palace and has impacted in the general conception of its building process. According to these tests, the date for the Oratory's project conception and the beginning of its construction could have shifted from the generally accepted attribution to the sultanate of Yusuf I (1333-1354) to an earlier date, most probably during the period of the sultan Isma'il I (1314-1325).

At the conclusion of the timber structure restoration works in 2014, Dr. Eduardo Rodríguez Trobajo, the Head of the Dendrochronology Department of the INIA-CIFOR (National Institute of Agricultural Research, Forest Research Centre (CIFOR), Ministry of Science, Innovation and Universities of Spain) was commissioned with a dendrochronology dating for the Oratory's decorated timber framework. His final report (2014) includes a detailed analysis of the different kinds of timber used in the Nasrid timber framework, a study of the different carpentry techniques utilised and finally an accurate dendrochronology dating.

The majority of the timber framework's elements were built in white poplar wood that could not be dated with dendrochronology dating techniques. Therefore, the first step for undertaking this dating was to focus on getting samples from the scarce

conserved elements made of Aleppo pine, which should also include sufficient annual rings. This discarded most of the Aleppo pine material from the four central rafters, the wooden planks used to cover up the spaces between them and the star-shaped decorative elements from the upper horizontal plane of the timber framework (*almizate*). Therefore, the most suitable samples selected did not belong to the primary structure, but instead to its superimposed decorative elements (*taujel*). This was the case of the samples taken from small wooden planks covering up the spaces between the assembled collar ties and the transversal noggings of the upper horizontal plane (*almizate*). The absolute dating for these centrally located planks forming part of the second octagonal design evidenced that they were cut off during the autumn/winter of 1332 (Rodríguez Trobajo 2014, 7). If these dendrochronology dated wooden planks would have been used in the Oratory's construction immediately after being felled, this would provide the evidence that the building had been conceived and its construction had been initiated at least one year earlier than the beginning of Yusuf I's rule (1333-1354), when he was 15 years old. Moreover, it's easy to deduct from a constructive logic that then the first version of this upper horizontal plane based on a regular eight-point stars pattern was conceived and built on an *ante quem* date to 1332, which would move back the dating for the conception and the beginning of the Oratory's construction to the sultan Isma'il I's rule (1314-1325).

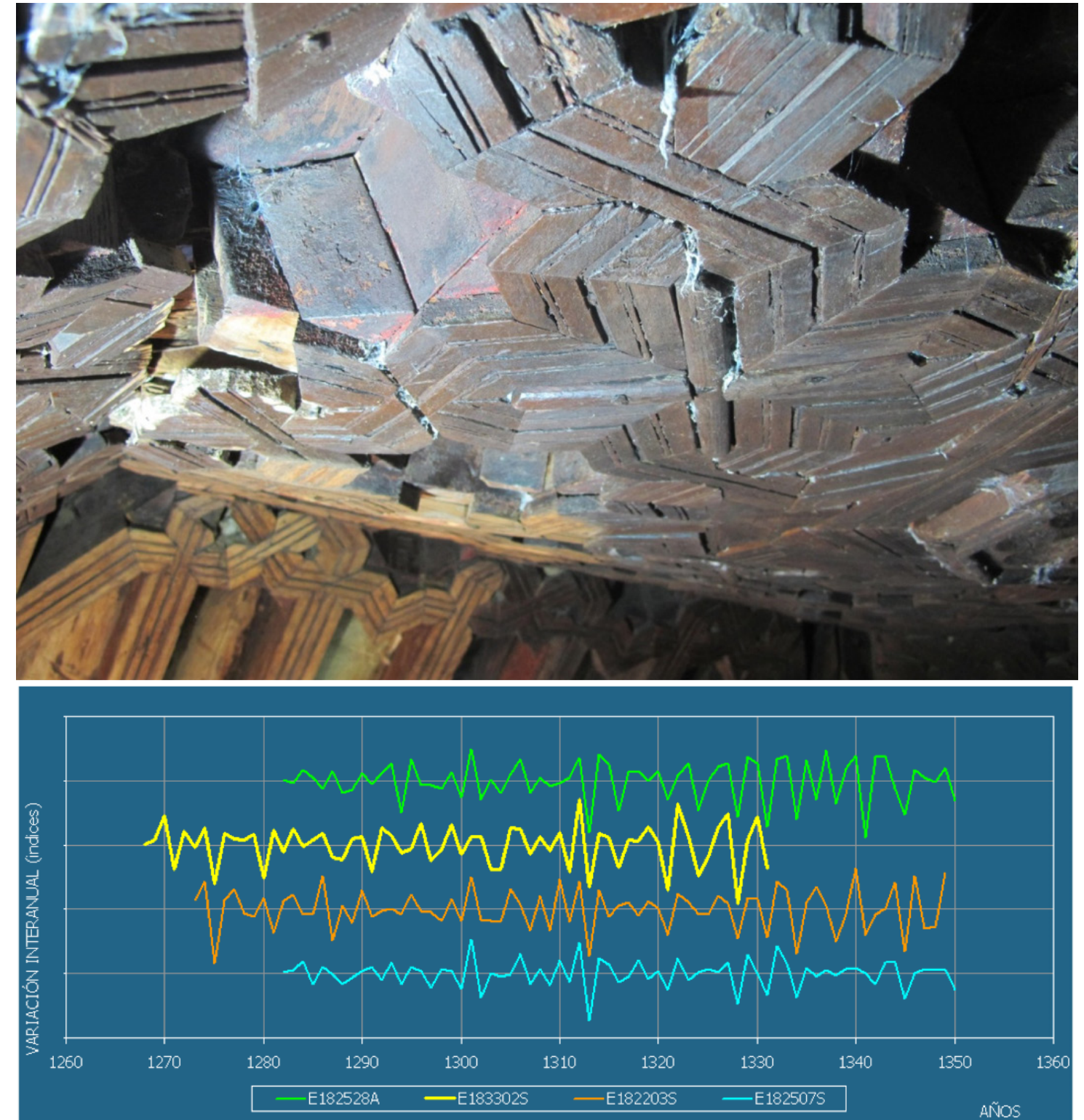


Fig. 57 & 58 New dendrochronology and 14C dating  
Timber cut in Autumn / Winter of 1332 (Rodríguez Trobajo, INIA 2014), conceived and initiated under sultan Isma'il I (1314-1325) and not under sultan Yusuf I (1333-1354), who finalised the works.



## Pigment analysis

The chemical analysis of the pigments used in the painting that was applied to the timber framework (Parra Crego 2014) evidenced remains of both oil and tempera-based paint. Therefore, all indicates that the original Nasrid decorative motives were executed with tempera-based paints applied on a wood support that had been previously coated with a glue primer. The pigments identified in this analysis were commonly used in the Iberian Peninsula in the decoration of medieval Islamic and *mudéjar* timber structures, such as vermillion, white lead, orpiment, lead oxide, earths and carbon black. Large quantities of beeswax and traces of other underlying varnishes, above all shellac, were found on the surface of the timber elements.

The analysis of the pigments, primer coat and binding agents were coincident with the outcomes of previous analytics done on Nasrid paintings in other areas of the Alhambra, consistently dated by the Restoration Department of the Alhambra as being original Nasrid (Artyco 2015, I, 432, 456). These pigments were identified as being the most commonly used in the medieval Hispano-Muslim and *mudéjar* timber structures: plaster, vermillion, white lead, orpiment, red lead, ruby sulphur (*realgar*), earths, indigo and carbon black (Parra Crego 2014, 11).

The samples identified as AOA-9 and AOA-12 in the pigments' analytics done during the restoration works were taken from this referred original deco-

ration (Parra Crego 2014, 19, 23) (Figs.59 & 60).

The AOA-9 sample, although very degraded by successive cleaning processes and varnish treatments, evidences a very thin tin glaze (3) over which a vermillion decoration was applied (4), (Fig.59). In the case of AOA-12 sample (Fig.60), the application of a similar tin coat is more apparent. It has been implemented in two layers; the wooden support still conserves part of these metallic remains (3). The blue decoration is rich in indigo, with some orpiment additions (4). The painting technique of this Nasrid decoration is tempera-based, applied to the wooden support after a coating preparation based on shellac and organic glue.

This detailed analysis of the Nasrid pigments during the last 2013-2015 restoration has enabled the restitution of the original painting techniques utilised on this referred wooden plank (Artyco 2015, I, 429). Furthermore, additional original pigment remains found on other wooden planks covering the spaces between rafters have demonstrated the existence of a decorative sequence of alternative red and blue backgrounds in their painted decoration. In addition, the laboratory results on the referred samples have evidenced an additional use of golden tin glaze in the decoration of the wooden planks. Together with the orpiment applied on the rosettes of the eight-point stars, both were used as substitutes to the very expensive gold leaf.

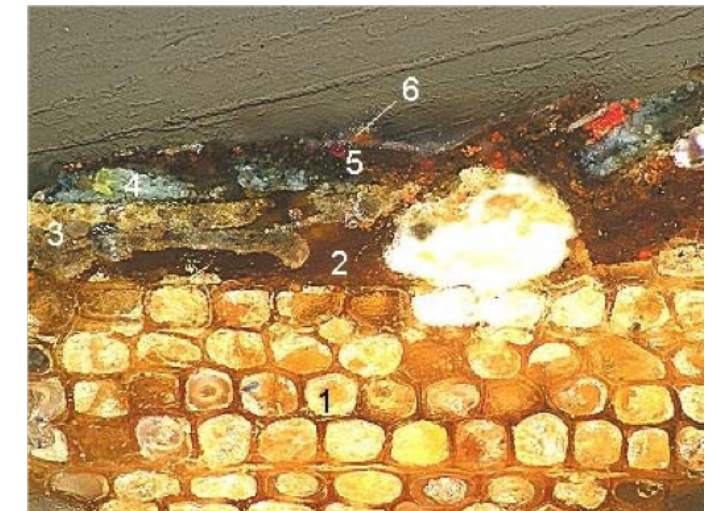


Fig.59 AOA-9 sample location (*left*) and the 300x microscopic analysis (*right*) (Parra Crego 2014; Artyco 2015)



Fig. 60 AOA-12 sample location (*left*) and a microscopic picture evidencing the different layers, 300X (*right*) (Parra Crego 2014; Artyco 2015)









Fig. 61 Europa Nostra Awards 2019. Paris City Council, October 2019. Presentation of the restoration of the Oratory by Dr. Federico Wulff Barreiro and debate with the other European awarded projects.



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