

# THE SALA DE LOS REYES PLINTH RESTORATION

## LA RESTAURACIÓN DEL ZÓCALO DE LA SALA DE LOS REYES

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**ABSTRACT** The tiled plinth of the "Sala de los Reyes", was restored between the years 2011-2012 due to the worrying state of conservation that it presented, mainly caused by capillary humidity. Only a few delicate remains of the original fourteenth-century plinth are preserved, along with a high proportion of imitative replacements with colored stucco made by Rafael Contreras between 1858 and 1859.

The intervention carried out under strict archaeological restoration criteria, has had numerous studies and interdisciplinary contributions, both of the original tiling, which was, and that related to the controversial nineteenth-century reproductions, which today, are part of the history and the changing concepts and criteria regarding the interventions aimed at the conservation and restoration of Cultural Assets.

**KEYWORDS** Plinth, tiles, reproductions, criteria, restoration.

**RESUMEN** El zócalo alicatado de la Sala de los Reyes, fue restaurado entre los años 2011-2012 debido al preocupante estado de conservación que presentaba, originado principalmente por la humedad capilar. Del zócalo original del siglo XIV sólo se conservan unos escasos y delicados restos, junto a una alta proporción de las reposiciones imitativas con estucos coloreados realizadas por Rafael Contreras entre 1858 y 1859.

La intervención, efectuada bajo estrictos criterios de restauración arqueológica, ha contado con numerosos estudios y aportaciones interdisciplinares, tanto de los alicatados originales, como de las, en su momento, polémicas reproducciones decimonónicas, que hoy en día están integradas en el conjunto y forman parte tanto de la historia de la Sala como de los cambiantes conceptos y criterios acerca de las intervenciones dirigidas a la conservación y restauración de los Bienes Culturales.

**PALABRAS CLAVE** Zócalo, alicatado, reproducción, criterio, restauración.

**COMO CITAR/ HOW TO CITE:** DE HOYOS ALONSO, P., SÁNCHEZ MARQUÉS, I., GUERRA LIBRERO, F., La restauración del zócalo de la Sala de los Reyes, *Cuadernos de la Alhambra*, 2021, 50, pp. ISSN 0590-1987



The Alhambra is a monumental complex whose uniqueness lies in the confluence of the different component buildings. It is also a privileged site which, due to its unique characteristics, became the protagonist of different types of occupation that led to the successive construction of different architectural structures, sometimes superimposed and sometimes hidden or overlapped by successive buildings and additions with complex sequences of archaeological levels. Their layout has often generated wonderful exceptional spaces, sometimes difficult to interpret.

Throughout its history, the Alhambra, as befits a living organism, has changed, transformed itself and been able to adapt to very different circumstances. For this reason, it has been, is and will continue to be a continuously evolving complex, the object of the curiosity, care and criticism of many professionals from different perceptions, and therefore, of the valuation of all the facets it offers. As a result, it has become a permanent focus of research that provides more data and knowledge of the ensemble, and thus more historiographical interpretations and reinterpretations.

This permanent transformation of the monumental complex, despite the sometimes drastic historical interventions carried out, has not diminished the marked personality of the Alhambra, whose powerful presence prevails over the additions, modifications and mutilations suffered since the origins of the fortress in the 9th century, when it began its journey of transformations, repairs, destructions and additions that modified its image and dimensions with the addition of different enclosures, subjecting it to a continuous metamorphosis.

In terms of criticisms and evaluations of actions related to heritage conservation and restoration, a similar evolutionary phenomenon is suggested. Concepts and criteria for action on Cultural Assets also appear, transform, encapsulate stratigraphically or thrive and coexist at the same time if they evolve appropriately. Each period in history develops its own lines of thought, which often differ and clash as they are diametrically opposed in their approaches, even at synchronous historical moments. In any case, the dynamic is almost always positive and stimulating, by expanding and redefining concepts, which enjoy greater or lesser popularity at each stage, but which at all times are creators and activators of different points of view from which to approach the complex problems that always accompany a Cultural Asset when it is decided to intervene in order to carry out any work aimed at its conservation-restoration.

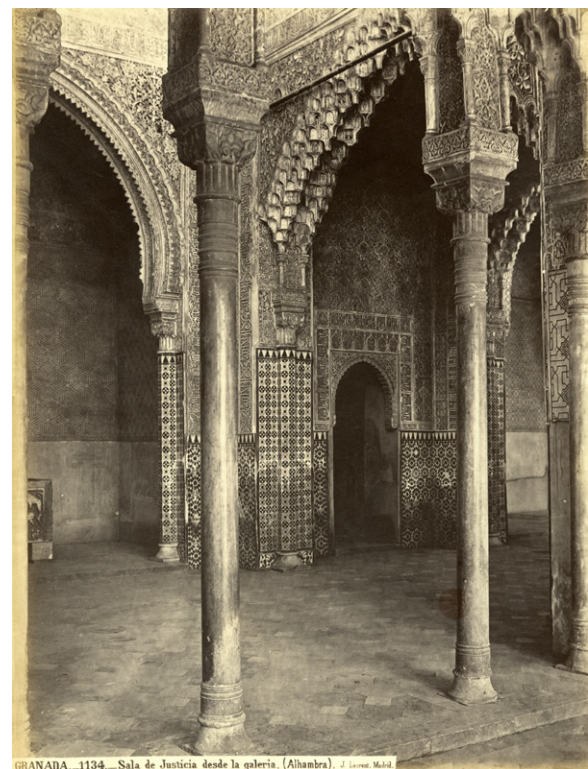
## THE INTERVENTIONS OF THE CONTRERAS FAMILY

In order to understand the circumstances surrounding the reconstruction of the tiling of the plinth of the Hall of the Kings in the 19th century, it is necessary to consider a series of facts that also had repercussions on the criteria and methodology of the last intervention carried out on the wainscot, which is the subject of this article.

Modifications to the Alhambra have been a constant feature of its history, but those that took place from the 19th century onwards were the most important and they were also the ones that recorded the most graphic and documentary information.

Interest in the monument had already had a precedent in the 18th century due to the growing concern of the enlightened for the recovery of the monumental past, which was synthesised in the expedition of 1766-67 brought about by the Academy of San Fernando.

This fruitful period for the documentation of the Alhambra was cut short by political events arising from the



II. 1. Jean Laurent, *Hall of the Kings a few years after the intervention of R. Contreras*, 1870. The Alhambra and Generalife Board of Trustees, Archive.

convulsive history of the time with the French occupation<sup>1</sup>. Subsequently, the impulse of Romanticism, although impregnated with fantasy and idealism, led to renewed interest in the conservation of the citadel, whose exotic decoration was the inspiration for many reproductions and imitations in historicist constructions in Spain, but also in an extraordinary way outside the country.

From 1824 to approximately 1907, a period of restoration began under the leadership of the Contreras family dynasty. This began with the figure of José Contreras Osorio, who was appointed supervisor of the works on the Nasrid monument, and who, from then on, would be the architect and promoter of the refurbishment and restoration works that were carried out on the monumental complex. Subsequently, his son Rafael and two more generations of the family continued these tasks with the same enthusiasm, attitude and criteria. All of this coincided with a greater allocation in the budgets, which led to the reactivation of repairs, finishing touches and other work that continued over time.

From the beginning, these interventions were not exempt from criticism and controversy, caused by the presence of other trends of thought opposed to the principles on which they were based, in which the interest in re-establishing the image of the monument by means of the restitution and reproduction of the decorative elements prevailed above all, rejecting the ideas of the other, more antagonistic side, which favoured a type of intervention on cultural assets based on conservationist criteria.

*Adornism*, a line of action undertaken by the Contreras family, was the dominant trend in these actions, and it cannot be understood without the existence of their famous casting workshop, which not only provided the necessary material for the works to be carried out, but also, under the direction of Rafael Contreras, it managed to market and export the decorative repertoires of the Alhambra in the form of luxury items, capable of recreating the sensations emanating from the palaces in an unprecedented aesthetic exercise ascribed to the so-called “*alhambbrismo*” (*alhambrrism*).

This context of disputes and reproaches towards the work of the powerful Contreras saga, carried out by different professionals involved or interested in the monument stood as the backdrop for the intervention on the tiling of the Sala de los Reyes (Hall of the Kings) took place.

## RAFAEL CONTRERAS'S INTERVENTION ON THE PLINTHS OF THE SALA DE LOS REYES

Like other spaces and buildings in the Alhambra, the Sala de los Reyes has not remained unaffected by changes and interventions throughout its history. Before those carried out in the 19th century, there is evidence that in 1576 and until 1618 it was used as a chapel, and that in the same year a number of unspecified repairs were carried out. In 1631, braces were put in place, as well as the roof trusses, and a few years later, in 1658, the eaves and roofs were repaired<sup>2</sup>.

But the most decisive actions took place under the criteria of the Contreras branch, when the transformations related to the Palace of the Lions were carried out, which included those carried out on the tiling of the plinth of this Hall.

The poor condition of these decorative elements was mainly due to the action of water, which had progressively deteriorated the original coatings. Under the supervision of Rafael Contreras, between 1858 and 1859 it was decided to replace the tiling in the Hall with reproductions of the same, which consisted of applying plaster plaques with hollowed out ceramic forms, imitating the decoration of the original glazed ceramic pieces. At the time, this reproduction technique was considered the only possible and the most economical solution to the technically complex and laborious option of tiling. The work was based on a reproduction technique that had been carried out in those years with great success and media coverage by French specialists, who provided the paste formula and the technique for this purpose<sup>3</sup>.

Unfortunately, a short period of time after the reproductions were mounted, the filtrations of the roof, the ambient humidity and no doubt the same humidity that had deteriorated the original plinth by capillarity, continued to act inexorably, seriously damaging the stuccoes, since during their mounting, no consideration was given to eradicating the source of the damage to prevent the destructive cycle from repeating itself. This fact was immediately brought to light when some scholars and visitors were able to see the Hall, and they questioned the performance and the result obtained.

2 SÁEZ PÉREZ, M<sup>a</sup> P. *Estudio de elementos arquitectónico y composición de materiales del Patio de los Leones. Interacciones en sus causas de deterioro*. Doctoral thesis. University of Granada. 2004, Pages 11-16.

3 BARRIOS ROZÚA, J. M. La Alhambra de Granada y los difíciles comienzos de la Restauración arquitectónica. *Academia*, Boletín de la Real Academia de Bellas Artes de San Fernando. First and second half of 2008 - Issues 106-10, page 148.

1 BARRIOS ROZÚA, J. M., “Una polémica en torno a los criterios para restaurar la Alhambra: Salvador Amador frente a Narciso Pascual y Colomer (1846-1849)”, *Reales sitios*, No. 180, Madrid, 2009, pages 42-70.



II. 2. © Ártico. Image of the state of the plinth before the work began. *Report on the conservation and restoration work on the plinth of the Sala de los Reyes. Alhambra (Granada). 2011-2012.*

In fact, as early as 1888, work was carried out to repair the prematurely damaged replacement plinths, whose deterioration was recorded in photographs from that time, the first taken by the photographer Jean Laurent around 1870, already showing damage to the lower part of the panels. Ten years later, another photograph by G. Braun shows that the deterioration of the plinths had increased considerably in height, and in 1900, another photograph signed by Gallegos shows how the traces of the damp in the stuccoes had reached a considerable height.

Subsequently, the architect Modesto Cendoya, who was responsible for the conservation of the Alhambra between

1907 and 1923, took over new repairs to the tile emulations on the plinths again in October 1913.

These early repairs on what had recently been replaced show how quickly the problems caused by the water were occurring and highlighted the incompatibility with the plaster used by Contreras, which is why the interventions to try to alleviate or at least cover them up has continued until present day.

### REFLECTIONS ON THE NINETEENTH-CENTURY INTERVENTION AND ITS IMPACT TODAY

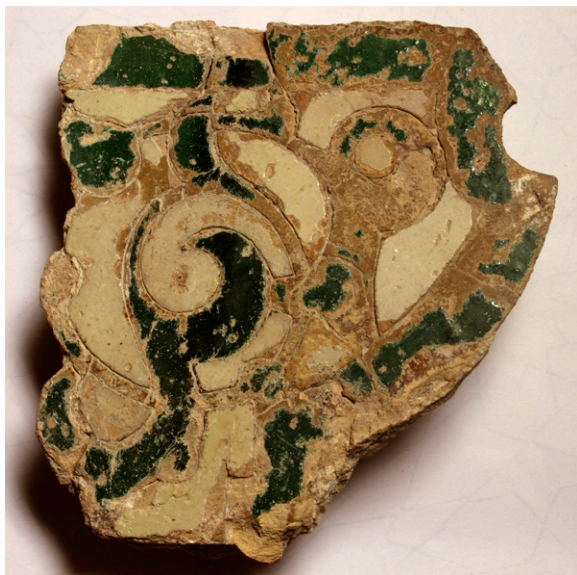
The controversial intervention of Rafael Contreras once again came to the fore since, in 2011 he had to restore not only the scarce remains of the original tiling of the plinth, but also, as an inseparable part of the plinth, the reproductions that were made from the original Nasrid tiling in the highly productive family workshop.

The updating of the controversy surrounding the drastic interventions that were carried out at the time took on singular importance when it came to undertaking the most recent restoration of the plinth. Time and history act interestingly and develop their peculiar sense of humour, having to act, with scrupulously archaeological criteria, on a property in which barely a minimal representation of the original legacy of the Nasrid past remains, but which proportionally conserves an enormous part of its surface area corresponding to the contributions of the controversial 19th-century restoration, already considered a conservable object and linked to the relatively recent history of the Alhambra.

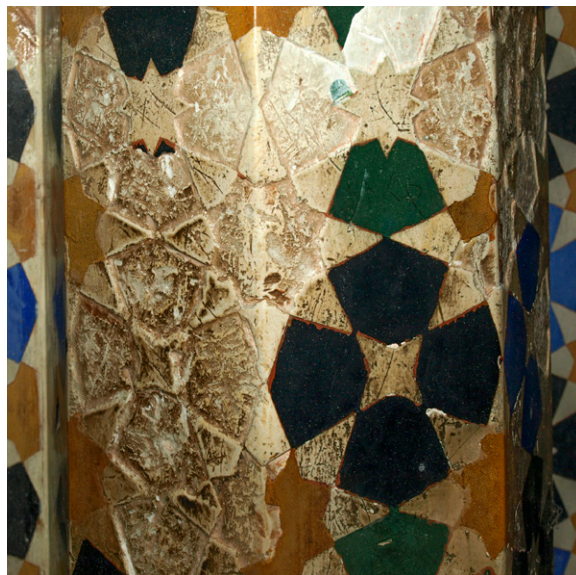
Restoring restorations is not new, as there have been repairs that have been made since ancient times, restorations that have acquired the status of historical and therefore have deserved and deserve to be treated as such, as is the case with the reproductions of the tiling. The irony of this case stems precisely from the controversy and criticism Rafael Contreras's intervention aroused, but which at the present time, by evaluating it differently, has acquired a new dimension that makes it an object worthy of being conserved and a paradigm of a specific mode of intervention, at a specific moment in history, of tackling a complex restoration with what, at the time, was considered to be the feasible solution.

Today, with the incorporation of new definitions of heritage interventions, Rafael Contreras's work on the plinth of the Sala de los Reyes would still be considered unorthodox and not particularly rigorous in terms of respect for the original remains of the tiling. However, objectively speaking, the least plausible aspect of his actions was the lack of knowledge





II. 3. © Ártico. Original piece of a base. *Report on the conservation and restoration work on the plinth of the Sala de los Reyes. Alhambra (Granada). 2011-2012.*



II. 4. © Ártico. State of conservation of the original tiling. *Report on the conservation and restoration work on the plinth of the Sala de los Reyes. Alhambra (Granada). 2011-2012.*

and understanding of Islamic art, which was widespread at the time, when the restorations carried out on this architecture showed serious errors caused by the inappropriate application of a restoration theory born and designed for stone architecture, which was imposed on another architecture characterised by the use of decoration based on very fragile materials, typical of an artistic culture related to the idea of replacement and the conservation of traditional techniques.

In the restorations of the Alhambra, various solutions were applied to tackle the deterioration of the ornamental plasterwork or tiled coverings, including those relating to the tiled plinth of the Sala de los Reyes, which offers many interesting aspects, relating to the solutions provided by Rafael Contreras, who found a wainscot invaded by damp, with loss of pieces, disintegration and problems of adherence to the walls. Faced with the difficulty of not being able to obtain materials similar to the originals due to the high cost of their production, he decided to make them out of stucco, and without being aware, his method, in some respects, was more coherent in terms of the choice of materials used in the plinths than other types of interventions under the theories imposed in Europe<sup>4</sup>.

4 GARCÍA CUETOS. M<sup>a</sup> Pilar. La arquitectura es el testigo menos sobornable de la historia. Una reflexión sobre autenticidad histórica y materia arquitectónica. *Conversaciones con.*, (6), Page 265.

Aware of this pathological situation, which was causing serious construction and structural problems at the time, interventions were carried out, partially dismantling the joists of the lion platforms and working on the foundations of the Patio<sup>5</sup>. However, they were not adequately resolved and so, despite the efforts, the action of water through filtrations, capillary rise and environmental humidity continued to be present and to affect the reproductions from the moment they were installed.

The real priority in the numerous works undertaken by the Contreras family in the Alhambra, without forgetting the collaboration of the institutions and people in charge, who supported and financed them, was to be found in another point of view. At that time, the preferred treatments contemplated almost exclusively the concern for the restitution of the image, dependent on the formal and decorative aspects that only sought to improve the ornamental elements of the monument and its aesthetic attraction, mostly overlooking constructive and/or structural connotations.

Despite the controversy generated at the time by the criteria for this action and the construction errors committed,

5 SERRANO ESPINOSA, F., "La familia Contreras (1824-1906): Ochenta años de intervenciones en el patrimonio hispanomusulmán y difusión del alhambriismo. Nuevas aportaciones en la línea de investigación". Documents of the 1st International Congress of the European Network of Islamic Museums. 25-7 April 2012, page 98.

today the intervention is viewed more benevolently and the positive aspects are considered, stemming from the boldness in relation to the materials, which was similar to the work carried out in previous years on buildings such as the Colosseum and the Arch of Titus in Rome, considered examples of reintegration of the image<sup>6</sup>.

Rafael Contreras devised a system for reproducing the tiles by creating preliminary moulds based on the original tiles that were still preserved, which made it possible to copy the Nasrid geometric grids. The later use of stucco for the reproductions—instead of glazed tiles—made it possible to differentiate the added part from the original. Therefore, some aspects of his method were pioneering and are now valid and accepted and even practised today, which recognises that Contreras' intervention made it possible for the plinth to survive to present day, offering valuable information on the lost tiling, which together with the other elements of the room, take us back to the appearance it must have had when it was decorated as a whole. For these reasons, this nineteenth-century intervention is now considered a document in its own right.

### THE RESTORATION OF THE PLINTH<sup>7</sup>

The physical characteristics of the materials used in the masonry and ornamental cladding played an important role in the evolution of their state of conservation. Brick, plaster, adobe, tiling and wood were easy to find and work with, and their versatility even allowed surfaces to be decorated and clad in such a way that the virtuosity of the workmanship and finish evoked richer and more sumptuous materials, as in the case of the exuberant decorative display used in the Nasrid palaces. The more durable stone materials were reserved for the supporting elements only, such as the marble capitals, bases and columns.

These same qualities of most of the aforementioned materials are the cause of their vulnerability to the different agents of deterioration, especially water, present in various forms (capillarity, condensation and infiltration). The combined action of this element in any of its phases, together with the daily and seasonal thermo-hygrometric variations to which the city of Granada is subjected, has contributed to worsening these

problems. Therefore, the materials involved in the construction and decoration of the complex have always been subject to these forms of stress and wear and tear, together with other natural agents such as the tectonic configuration itself and the no less important anthropogenic action, which encompasses a multitude of actions and activities produced since the beginnings of the monumental complex. Among them, it would be necessary to highlight the building activity that has taken place throughout history, with changes, reforms, extensions and demolitions at each stage, according to needs or personal tastes.

Along with the humidity, a chain of associated problems have appeared, such as the movement of soluble salts, disintegration, deformation, loss of material, the appearance of cracks and fissures and the detachment of panels, all of which have been exacerbated both by the configuration of the gardens surrounding the buildings as a whole, and by the impact of the climatic factors local to Granada.

It is indisputable that all ornamental cladding work, whether plasterwork, mural painting, tiling or stucco panels, is inextricably linked to the masonry and therefore bears constant witness to the problems suffered by the building. Each settling of the floors, the small collapses of the walls, the appearance of leaks in the vaults due to deficiencies in the roofs, the lack of maintenance endured for so many centuries... all of this is reflected in the plinths.

Other external agents that have contributed to the creation of continuous damage to these materials are related to natural incidents such as the presence of orogenic movements of greater or lesser intensity, to which Granada is subjected with a certain frequency due to its tectonic situation. Particularly noteworthy was the earthquake of 28 June 1822 and the aftershocks, which damaged the area of the Comares tower and other nearby buildings.

We must also bear in mind the important anthropogenic action, due to the pressure of the multitude of visitors in recent times and to the permanent constructive and destructive action that has characterised this monumental complex, in which transformation has been a historical constant. The combined action of all the agents that have had an impact on their conservation has played a decisive role in the periodic deterioration of these elements.

For all these reasons, the proposal for this action, based on the reintegration of the degraded areas, returns to the material techniques used by Rafael Contreras. However, on this occasion it was considered essential to take into account the correction of the problems derived from the damp contained

6 ORIHUELA UZAL, A. La conservación de alicatados en la Alhambra durante la etapa de Rafael Contreras (1847-1890) ¿Modernidad o provisionalidad? In: *La Alhambra: lugar de la memoria y el diálogo*. J. A. González Alcantud, Abdellouahed Akmir (eds.) Granada, 2008, Page 140.

7 ÁRTYCO, S.L. *Memoria de los trabajos de conservación y restauración del zócalo de la Sala de los Reyes. La Alhambra (Granada)*, 2012.





II. 5. © Ártico. Degradation caused by damp on a panel with a stucco reproduction by Rafael Contreras. *Report on the conservation and restoration work on the plinth of the Sala de los Reyes. Alhambra (Granada). 2011-2012.*

in the brickwork. For this purpose, a ventilated and insulated cavity was chosen, with the stucco panels installed on inert supports, thus making the ornamental finish and, consequently, the action of capillary rising damp independent of the wall support itself. The intervention was definitively guaranteed by the major renovation of the hydraulic installations in the Palace of the Lions.

On the other hand, although the surface area occupied by the remains of the original ceramic material accounted for a minimal percentage of the development of the plinth, its restoration, logically, was the work that required the most respectful and delicate criteria, techniques and care. However, these tiles did not present excessive conservation problems, except for a certain instability due to loss of adhesion to the substrate.

From the beginning of the intervention, consideration was given to inspections, studies and characterisations of the techniques and materials used for the original pieces and those

from the 1858 intervention, as well as analyses of their relationship with the building and its use, as they were the basis for a large part of the damage.

The field of study was developed from the widest to the closest environments and scales, from the knowledge of the techniques and materials used in its construction and taking into account the variables that defined the pathological state of the plinth and its relationship with the building, detecting faults derived from the problem of damp, as well as its state of constructive equilibrium. This inspection and analysis work was at all times supported by an exhaustive analytical and graphic inspection, developed from dimensioned planimetric surveys, construction details and damage and treatment mapping. A thorough photographic survey was also carried out, together with inspections related to the property and the collection of environmental data.

It is interesting to note one of the many pieces of information extracted from these studies on the intervention about





II. 6. © Ártico. Preparation and restoration of the walls. *Report on the conservation and restoration work on the plinth of the Sala de los Reyes. Alhambra (Granada).* 2011-2012

the prominence of the good craftsmanship of the masons who worked with these characteristic perishable materials, in which the care with which the decorations were executed is revealed in an apparent paradox: the patterns of tiling and stucco decoration are supposedly based on strict geometric models, but this is very different from the actual situation, as they were based on imperfect geometries, adapted to the dimensional needs of each section and the irregularities of the supports on which the decorated pieces had to be fitted. It is the same need to break the geometry to achieve the apparent design observed in the loop patterns of Nasrid plasterwork and structures. This marvellous imperfection that conveys the authenticity of these ornamental coverings also speaks of the flexibility and adjustments that had to be made *in situ* until everything fitted as designed. The result was an apparent formal perfection that the supports themselves did not have and whose differences in shapes and dimensions were corrected in the final assemblies, just as the Nasrid tiling was built, as Contreras's team had to do when they built the stucco panels and as had to be done with

the reproductions in this last intervention.

The approach to the work focused at all times on the premise of conservation, based on the attempt to recover all the elements of the existing plinth, whether original or from subsequent interventions, by means of specific treatments which, throughout the restoration process, would once again provide these pieces with the degree of consolidation and resistance required for their function. The criteria proposed for the conservation and restoration of the plinth were broadly the same as those required and used for any work of art, based on maintaining the interdisciplinary nature of the solutions, for which the team of architects, historians and restorers at the company Ártico were involved under the direction of Elena Correa, head of the Restoration Department of the Alhambra and Generalife Board of Trustees. The methods and systems of the intervention were based on the assessments of the causes and effects of damage obtained from the detailed inspections and investigations, the results of the various scientific analyses and the construction diagnoses, which provided objective in-

formation determining the composition of the materials, their pathological condition and their problems in relation to the building and its use.

In order to respect the integrity and authenticity of the plinth, special care was taken to maintain the traces left by time, which are considered to be as respectable and conservable as the elements themselves, i.e. the wear and tear of the tiling and stucco, the polished and blunt edges, the small cracks and craquelure, the ageing and oxidation of some materials, among others, are what really offer us the contemplation of an authentic and vivid work of art.

The intervention was complex as it had to deal with numerous aspects of the work, also conditioned by other restoration work being carried out in the Hall, such that the phases of the work had to be synchronised independently of each other.

#### The original tiling

On the one hand, the original tiling focused on the incomplete panels of the two pillars on the north side of the hall, which were made with glazed tiles in the five traditional Islamic colours of white, green, blue, honey-coloured and black. Gentle mechanical cleaning was carried out. In order to consolidate a specific area of the adobe wall with lime mortar, two small ceramic pieces were removed and reinstalled using the same type of mortar with similar textural and chromatic characteristics to the original.

All the mortars used in this intervention contain the addition of mineral particles with fluorescent properties, whose characteristics allow, if an ultraviolet light is projected on the restored surface, the identification of the material added in the process. These characteristics are essential in order to comply with the criteria of reversibility and differentiation required in the process of integrating new materials into the work of art. The application of this innovative system is based on research carried out by Ramón Rubio, head of the Restoration of Plasterwork and Tiling Workshop of the Conservation Service of the Alhambra and Generalife Board of Trustees.

#### The stuccoes of Rafael Contreras

First of all, it was necessary to remove the inappropriate cement mortar, plaster and whitewash applied in previous interventions, which contributed salts to the plinth materials and favoured water retention. Work continued on the restoration of the walls and the cleaning of the stuccoes, removing different types of deposits, adhesions and protections. The disintegrated plates were consolidated and small fragments were

bonded. Cracks and edges were also sealed, detached layers were fixed and volumes were reintegrated using mass-coloured plaster with the addition of fluorescent mineral particles. In some pieces with colour loss, small, discreet chromatic intonations were made.

#### The reproductions

The reproductions were intended to fill in the large gaps in the plinth that extended around the lower perimeter of the Hall. This work by Rafael Contreras to reintegrate the lost surfaces of the stuccoes took up most of the time of the intervention, and consisted of different phases: study of the cutting, manufacture and installation of the panels, preparation of the moulds and manufacture of the stucco panels, which completed the large lost surfaces amounting to an area of 25.80m<sup>2</sup>, installation on inert supports, construction of chambers, anchoring and covering of joints.

The main challenges lay, firstly, in analysing and understanding the layout system of the different geometric meshes, then in understanding the conscious misalignments of the designs to adapt them to the formal requirements of the room, and finally, in the need to rigorously and millimetrically match the tracings of the nineteenth-century stuccoes conserved with the geometry of the perimeters of the new reproductions.

Initially, the walls that were to receive the new reproductions were cleaned and consolidated by repairing their surfaces, filling in cavities and fixing unstable ceramic elements.

In the meantime, theregulatory designs and their deformations were prepared to make the moulds for the stuccoes. For the positives, after studying the work of Rafael Contreras, it was determined that it was necessary to act broadly following the same generative method that he used. It was observed that for the reproductions of the entire surface that had to be replaced, the Contreras team made a total of seven moulds, with different motifs, which, with rotation and inversion systems, were used to make all the reproductions; an eighth mould had to be added for the crenellations.

After several tests, the positives were made using boards, onto which the corresponding templates were transferred and the cut wooden pieces were adhered, adjusting them to the deformed geometry in order to obtain silicone moulds from them.

The plaster reproduction of the plaques already had the white geometric motifs in full thickness relief, while the coloured ones remained at a lower level and then received the mass-coloured stucco inside them.



## ALHAMBRA OF GRANADA. Plinth of the Hall of the Kings

## BUTTRESS 1



STATE OF CONSERVATION



INTERVENTION

## STATE OF CONSERVATION

## Materials

- Original tiling
- Contreras Reproductions

## Additions

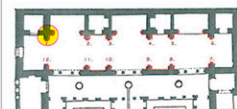
- Cement mortar
- Plaster/Pastes
- Whitewashing on original

## Damage

- Volume losses (ceramic/stucco)
- Disaggregations
- Efflorescence
- Graffiti
- Metal elements
- Cracks and fissures

## INTERVENTION

- Photonic cleaning
- Removal of metal elements
- Chemical consolidation
- Mortar injection
- Crack and fissure sealing
- Replacement of new panels
- Reintegration of volume and colour
- Installation of new panels



II. 7. © Ártico. Damage mapping of Buttress 1 with original tiling. *Report on the conservation and restoration work on the plinth of the Sala de los Reyes, Alhambra (Granada).* 2011-2012.





II. 8. © Ártico. Layer fixation. *Report on the conservation and restoration work on the plinth of the Sala de los Reyes, Alhambra (Granada), 2011-2012.*

In order to adapt to the geometric irregularities of the mesh, it was necessary to make precise adjustments to the perimeter of the new plaques to fully adjust them to the tiling and the 1847 panels. To do this, a tracing was made of each joint area and the geometry was shaped to meet each panel or pilaster.

Logically, many tests were carried out beforehand to choose—with the advice and support of the technical department—the most suitable materials in each case. It was decided to build the plaques and pilasters using a very fine-grained plaster of high hardness and resistance to guarantee a more stable material. Fluorescent pigment was added to this material, as for the reintegration of the tiling conserved in the Hall.

Once the panels had been integrated with coloured plaster and before polishing, they were mounted on self-supporting panels according to the previously planned and prepared dimensions and cut-outs. These inert panels are very light and resistant to bending and buckling as they are constructed with a core of aluminium cells reinforced with glass fibre and epoxy resins on both sides, thus providing great stability to the final panels.

In the case of the pilasters, the new replacements required—due to their shape and the greater thickness that had to be provided—internal reinforcement of these pieces during their manufacture to provide greater strength and stability, so that they could be easily manipulated during the subsequent colouring, polishing and assembly process.

Once the panels had been adhered, they were polished and then packaged, indicating their identification number, which

was included both on the piece itself and on the outside of the packaging. They were then transported to the Hall for installation in the appropriate location.

It was necessary to carry out important and meticulous control and logistics work during all the manufacturing, storage, transport and installation processes, given that each piece was different and made for a specific location, so at each moment it was necessary to take extreme measures to ensure that its identification was perfectly assigned.

In order to fix these load-bearing panels to the wall, 10 cm long stainless steel screws were used to ensure a stable anchorage and to enable the plumbing and levelling adjustments of the new reintegration panels to be carried out easily. On the other hand, the ventilation of the air gap between the wall and the panel was improved. These anchorages were strategically placed by using holes that had previously been left unblocked with coloured mortar and already prepared with the drill-holes for the screws.

Once the panels were anchored, all the joints and the geometric motifs containing the screws were sealed with the coloured mortars corresponding to each row, using the same system as in their manufacture, i.e. finishing with the polishing and protective surface treatment processes, carried out with micro-crystalline wax.

### The manufacture of ceramic pieces

The decision on the materials to be used for the connection of the panels to the tiling was compromised. The chambers ensured the isolation of the walls, but it was necessary to guarantee the same isolation with the floor slab to ensure that damp could not enter at any time.

On the other hand, to form the plinth, imitating the original both formally and dimensionally, rectangular and pseudo-trapezoidal pieces had to be in contact with the columns. As for the most special pieces, located on the sides of the bases, two originals were preserved: one on display in the Museum and the other in the restoration workshops. It was decided to place this last piece in situ, as a way of guaranteeing its conservation, and it was jointly decided to make the rest of the pieces in glazed ceramic—imitating the existing ones, and with a slightly duller tone—given that it offered a good guarantee of resistance to humidity and the cleaning and maintenance of the room.

These parts were mounted, using epoxy resin, on the self-supporting panels with the new plates. In this way, instead of adhering them with lime mortar directly to the wall, they were isolated from the masonry, and with the same objective,



II. 9. © Ártico. Consolidation work. *Report on the conservation and restoration work on the plinth of the Sala de los Reyes, Alhambra (Granada). 2011-2012.*



the lower sealing was dispensed with to achieve greater contact with the floor and to allow slight ventilation with the interior air chamber. The panels were laid on lead strips to ensure isolation with the tiling.

In the study of the two unique ceramic pieces, two decorations were discovered, which, although similar, were different, so it was decided to respect the designs for each reproduction (each side of the base). The reproductions of these pieces were made in the workshop of the potter Fernando Malo. Numerous tests were carried out beforehand in order to select the most appropriate colours, layouts and shapes.

The aim of all the work was to save the authenticity of the plinth and its uniqueness, its materials and construction systems, respecting the materiality of the work, as simultaneous testimony to an anonymous building skill and know-how, ensuring, after a meticulous documentation process, that the new would reflect what was lost, with the intention that the old and the new would reciprocally revalue each other, not by contrast, but by having achieved a new continuity.



II. 10. © Ártico. Cleanliness indicator. *Report on the conservation and restoration work on the plinth of the Sala de los Reyes. Alhambra (Granada). 2011-2012.*





II. 11. © Ártico. Mould. *Report on the conservation and restoration work on the plinth of the Sala de los Reyes. Alhambra (Granada). 2011-2012.*



II. 12. © Ártico. Mould. *Report on the conservation and restoration work on the plinth of the Sala de los Reyes. Alhambra (Granada). 2011-2012.*



II. 13. © Ártico. Priming of the positive. *Report on the conservation and restoration work on the plinth of the Sala de los Reyes. Alhambra (Granada).* 2011-2012.





II. 14. © Ártico. Final condition. *Report on the conservation and restoration work on the plinth of the Sala de los Reyes. Alhambra (Granada). 2011-2012.*





II. 15. © Ártico. Final condition. *Report on the conservation and restoration work on the plinth of the Sala de los Reyes. Alhambra (Granada). 2011-2012.*