

**Realidad Aumentada para la Alhambra
una reconstrucción del monumento como sujeto artístico a partir de
los documentos del archivo**

**Augmented Reality for the Alhambra
A reconstruction of the monument as an artistic subject through
archival documents**

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I. Introduction

In the past decades, the world of cultural institutions has begun a transformation that has led to gradually incorporate digital elements into the museum experience, thus hoping to take advantage of novel technologies to both enhance the relationship with the visitors and aid research. In light of the recent pandemic, the development of similar tools has accelerated as a number of institutions opted to engage with their public through virtual tours and in the foreseeable future analogous instruments are probably going to continue and expand their existence, leading to a hybrid visiting experience. Nevertheless, the transition to novel technologies in the world of cultural heritage is not without difficulties and at times the potential of digital instruments remains largely untapped. Indeed, the ideation and realization of apps and virtual museums requires a variety of competences that range from a deep historical and artistic knowledge of the specific institution to advanced coding skills, thus needing interdisciplinary teams able to efficiently communicate and collaborate towards the final result.

In this context, digital humanists can function as catalysts, bridging the gap between art history and information technology in terms of managing expectations and limits, ensuring scientific accuracy and offering a clear vision of the final objectives. Moreover, such projects grant a notable degree of creativity, an element which appeals to a number of scholars, including the author of this thesis.

This research was inspired by a dual interest, constituted by the extraordinary potential of Augmented Reality for Art History and by the fascinating cross-cultural history of a unique cultural heritage site, the Alhambra.

These interests were developed and cultivated in parallel through a series of conferences and courses focused on the theoretical framework of Digital Humanities, the characteristics and interpretations of Nasrid art, the practical methodologies of Digital Art History, and the centuries-long fascination that artists had for the emblem of Granada. Moreover, thanks to a three-month-long mobility program at the Human Interface Technology Lab New Zealand (HIT Lab NZ), part of the University of Canterbury in Christchurch, it was possible to obtain practical experience in modeling a digital reconstruction based on historical documents while cooperating with a team whose objective was to create a Virtual Reality game dedicated to the history of Fonthill Abbey.

These experiences have led to the acquisition of a varied skillset and the ideation of the project proposed in this thesis.

The research has been structured in three main parts: while the first one focuses on the methodological and technological tools to apply digital innovation to the Humanities, the second traces the evolution of the representations of the Alhambra and the third and final part joins the previous ones by proposing an Augmented Reality application and a companion virtual museum for the monumental complex of the Alhambra.

More specifically, the first chapter offers a brief description of the history, characteristics and core values that define the Digital Humanities, in order to then delve into their adoption in the fields related to Cultural Heritage. The focus is centered in particular on Digital Art History, offering an overview of two instrument employed by academics in this arena, namely 3D digital reconstructions and Augmented Reality, while also providing a number of notable examples of their adoption with respect to both Islamic art monuments and museums in the Western world, institutions than can provide inspiration and constitute benchmarks for the project proposed in the third chapter.

In order to properly convey the extension of the topic such project hopes to present to the public, the second chapter offers an excursus of the history of the Alhambra and, more importantly, of its depictions.

From its symbolic value as the victory of Christianity over Islam during the Reconquista to the views of XVI and XVII century voyagers, the monument quickly became a favored subject for a number of artists, so much so that, after the studies guided by the Illuminist approach of the Real Academia de Bellas Artes, the palace attracted travelers who could not consider their Gran Tour complete without a visit to Granada and who became enamored with its Romantic interpretations. Between the XIX and XX centuries, the methodic work of Owen Jones, who catalogued the ornamental apparatus of the monument, and the relative objectivity introduced by the invention of photography coexisted with a fascination for the exotic which led to the creation of a fabled time and place known as the Orient, emblematically represented by the Alhambra. Finally, the appeal of the monument as a source of inspiration is well documented by a number of artists who concentrated their efforts on capturing specific aspects of its aesthetics, from Impressionist views focused on light and water, to Escher's mathematical approach, to a contemporary tendency towards abstractionism.

The third and final part of the research conjugates the methodology and tools described in the first chapter with the content explored in the second one, proposing two companion instruments that would be able to appropriately communicate to the public the vast influence of the Alhambra on artists.

After highlighting the motivations for the selection of such technologies as well as the aims and the benefits of employing both an Augmented Reality app and a virtual museum, the chapter provides information about the theoretical and practical aspects of developing the proposed instruments for this specific monument. Finally, it delves into the organization of different types of content, offering examples pertaining each kind in the case of one of the most emblematic areas of the complex, the Patio de los Leones, and it concludes with a brief consideration on how the employment of novel technologies could aid cultural heritage sites facing contemporary issues such as accessibility and sustainability.

Indeed, the necessity to address such challenges in a proactive and effective manner represents one of the main motivations for the selection of this research topic, as the proposed project could offer a model for other monuments with a similarly rich stratigraphy and history.

These sites could greatly benefit from tools that grant virtual access to a wide public, thus allowing a more democratic diffusion of knowledge and providing scholars globally with the possibility to further their research, while at the same time ensuring better conservation conditions. This study aims not only to underline how successfully technologies can respond to similar needs, as documented by a number of examples, but also to offer a paradigm for the creation of such instruments and the organization of the contents, which can be easily adapted to other contexts in order to improve the visitors' experience and foster academic research.

II. Digital Humanities for Cultural Heritage sites

1. Digital Humanities

In recent years, the academic world has shown a tendency towards interdisciplinary approaches via a wider employment of new technologies even in more traditional areas. This trend finds its epitome in the development of the Digital Humanities, which conjugate innovative research methods with classical humanistic fields of study, while showing a marked interest for ethics in academia and a general desire to “build and make” rather than just critiquing.

This rapidly growing scholarly community is also highly heterogeneous, as attested by the ongoing debate on the requirements for belonging and the role of Digital Humanities in universities. At its core, the discipline offers a methodological outlook focused on publicly visible, collaborative scholarship that takes advantage of state-of-the-art technology to investigate a varied array of humanities-oriented topics.¹

1.1. A brief history

Originating from visionary attempts to combine computing and textual analysis, the Digital Humanities were introduced in academia relatively recently, spreading from American universities to the rest of the world.

The history of the discipline, briefly resumed by Schreibman, Siemens and Unsworth,² finds its prologue in Humanities Computing, a field pioneered by Italian priest Roberto Busa, who, in 1949 began indexing the words in all of St. Thomas Aquinas’s works aided by IBM punched cards. His ambitious research paved the way for other literary scholars to experiment first with concordances and then with quantitative analysis, as technology permitted to manage a copious amount of textual material, despite the obvious early limitations.

Such novel approach and its consequent challenges encouraged academics to share not only results but also ideas and issues, concentrating on practical aspects as well as theoretical ones. Dedicated conferences and journals started spreading in the 1960s, promoting the dissemination of information regarding the new field and slowly leading to the founding of specialized centers.

¹ (Day of DH: defining the Digital Humanities, 2012), (Ramsay, 2013)

² (Schreibman, Siemens, & Unsworth, A companion to Digital Humanities, 2004)

As digital tools became more user-friendly, the following decades saw an increase in the number of electronic text archives, often publicly available. The commercial success of personal computer provided scholars with a readily accessible instrument for their experiments, thus encouraging innovation. Additionally, it was accompanied by a more and more pervasive use of email, which fostered networking and amplified the sense of community, especially through mailing lists which turned discussions into global conversations. Soon, the internet allowed projects to become international collaborations and, in the 1990s, the discipline further expanded as it was finally possible to digitize multimedia information such as image, audio and video.

Philosophic questions accompanied methodological ones throughout this evolution, addressing the objectives and purposes of research in order to better evaluate and implement its procedures. Born-digital media further highlighted the need for such debates, providing scholars not only with a new type of material but also with additional theoretical problems.

In late 2001, the current name of the discipline first appeared in a conversation between Ray Siemens, editor of “A companion to Digital Humanities”, and John Unsworth, director of the Institute for Advanced Technology in the Humanities. While discussing the book title, the term was deemed a worthy substitute for “Humanities Computing” and “Digitized Humanities”, emphasizing the interpretational aspect over simple digitization. Moreover, in the same years, the Alliance of Digital Humanities Organizations was founded and in 2006 the Digital Humanities Initiative, a major federal grant, was launched, thus consolidating the use of such phrase to indicate the budding field.

This period also marks a renewed sense of community felt by digital humanists, fostered by a variety of initiatives and events, as well as specialized journals, conferences, societies and summer schools, not to mention a particularly active presence on social media.

In less than twenty years, the interest in Digital Humanities has been steadily increasing, as the academic world turns more and more towards rapidly evolving technological tools. While text encoding and analysis might still be the prevalent area of expertise for DHers, innovative projects are spreading to new areas, actively aiming for high levels of interdisciplinarity, by taking full advantage of the instruments available. In fact, as they have done since their very beginning, the Digital Humanities continue to showcase imagination and innovation and stretch the limits of technology.

1.2. Institutional and future perspectives

The growing attention devoted to the Digital Humanities is exemplified by how they are approached by international organizations, which dedicate specialized funding programs to projects within the discipline's realm.

In particular, the European Union has launched a series of efforts that aim towards a progressive digitalization of libraries, archives and museums.³ The institution aids such projects through funding strategies such as the framework programmes, Horizon2020 and Connecting Europe Facility (CEF).⁴

The most notable case is Europeana, which since 2008 responds to the organism's need to provide citizens with content reflecting its multicultural heritage.

Through the participation of over 3700 institutions and collections, the online repository offers access to more than 53 million items ranging a wide array of media, such as text, image, audiovisual and three-dimensional material.⁵ In 2017, the platform has won the Application Programming Interface award for its application building tool, REST API.

Among the many objectives of such a multifaceted and complex program, Europeana aims to create a connected network among the various aspect of the European Union's cultural heritage, thus promoting integration and understanding as well as fostering a sense of community among citizens. In addition, the project provides a platform for scholars and lifelong learners alike to easily and comfortably search and view resources from institutions all across the continent: such practicality should not be undervalued, as it enhances the occasions for comparing and linking objects, ideas and themes, following their development through time and space. Finally, the material on Europeana can be used by content creators to generate educational content, edutainment and entertainment applications and games, documentaries, tools for tourism, design and several other products.⁶

Thanks to the Horizon2020 calls for research, the European Union has supported a number of other initiatives related to the Digital Humanities.

³ (European Commission, 2011)

⁴ (European Commission, 2019)

⁵ (Europeana, 2019) (Europeana, 2019)

⁶ (European Commission, 2008), (European Commission, 2018)

Some explore the field of literature, like CALRIN, which aims to provide users with access to all digital language resources,⁷ or POSTDATA, centered on poetry analysis and classification.⁸ Others are centered on historical humanities, such as DFitHH, which applies digital forensic analysis to born-digital corpora,⁹ or, in many cases, the cultural heritage, communicated through Virtual Reality by the team of eHeritage¹⁰ or machine vision by the homonymous initiative,¹¹ with tools for scholars to monitor the artwork, such as SmARTS,¹² or for the public to engage with it, as is the case of SMARTIFY, affectionately nicknamed “the Shazam and Spotify for Art”.¹³

Beyond encouraging international partnerships, similar projects offer added economic benefits, as the material can be used for creative industries across the European Union, promoting tourism as well as design, cinematography, video game development and many other sectors.¹⁴

The significance of the digital, however, plays an important role beyond the boundaries of the continent, as it is included in the United Nations Sustainable Development Goals.

The 2030 Agenda, adopted in 2015 and aiming towards peace and prosperity through global partnership, recognized the value of new technologies as a powerful instrument to pursue the seventeen objectives which the member states hope to achieve.¹⁵ Such tools are explicitly included in the declaration with regards to the Goals for environmental wellbeing, in particular to Goal 8, “Decent Work and Economic Growth”, and to Goal 9, “Industry, Innovation and Infrastructure”, but they also affect Goal 4, “Quality Education”, and Goal 11, “Sustainable Cities and Communities”. Specifically, such objective includes the “efforts to protect and safeguard the world’s cultural and natural heritage” and the promotion of culture as an impacting factor for sustainable development. Moreover, this fundamental aspect of heritage is highlighted as an element to stimulate sustainable tourism and therefore foster sustainable economic growth.¹⁶

⁷ (CLARIN, 2012)

⁸ (CORDIS, 2016)

⁹ (CORDIS, 2019)

¹⁰ (CORDIS, 2016)

¹¹ (CORDIS, 2018)

¹² (CORDIS, 2016)

¹³ (CORDIS, 2017)

¹⁴ (European Commission, 2011)

¹⁵ (United Nations, s.d.)

¹⁶ (United Nations General Assembly, 2015)

Although they are not explicitly mentioned by the Sustainable Development Goals, it appears evident that the Digital Humanities can offer valuable contributions to the realization of the future envisioned by the United Nations.

In the first place, the field's experiments with regards to interactions with technology offer useful insights for educational objectives regarding both students in scholastic environments and lifelong learners. As a part of digital humanists have been exploring the advantages of technology for teaching for decades, several methodologies have been developed and a number of related applications are now available for pedagogical practices that exploit virtual elements to provide better accessibility.¹⁷ Furthermore, the Digital Humanities are involved in a series of activities that promote a sustainable growth in wealth and employment, as well as citizens' psychological and emotional wellbeing. In countries such as Egypt, the government has started cultural heritage digitalization projects as part of the Sustainable Development Goals, as similar strategies are implemented in order to create a better economic and social environment while responding to a general need to access artwork and monuments.¹⁸ Digitalization initiatives encourage awareness of the value of culture on both a local and global scale, thus helping preservation and dissemination efforts.

As these institutional stances exemplify, the Digital Humanities are gaining a considerable reputation not only within scholarly environments but also in the wider society, thus prompting questions about the next developments of the field.

With regards to the academic world, it appears to be more and more evident that digital tools are rapidly becoming indispensable for everyday activities, leading to a generalized transformation of humanistic research. Similarly, collaboration and experimentation are progressively emphasized within such projects, as is the application of the scientific method, which allows for repeatability and proof.¹⁹ Different scenarios can therefore be hypothesized for the future of Digital Humanities, which could become a separate discipline, an auxiliary branch of traditional humanistic studies or even risk

¹⁷ (Woodworth, Ekong, & Borst, 2017)

¹⁸ (Markopoulos, Markopoulos, Liumila, Almufti, & Romano, 2020)

¹⁹ (Mastandrea, 2018)

fading away.²⁰ As a self-sufficient study area, they could either be primarily focused on tools and methodology, thus working closely with other departments, or concentrate on digital artifacts.²¹ However, because of the permeating nature of technology in today's world, the field might gradually replace analogue humanities, but only if capable of systemizing the methodology and transforming its contribution into a lasting legacy. Rising up to face such challenges, exemplary projects such as those mentioned promote collaboration across scholarly areas as well as public and private sectors, advancing the fundamental understandings well as producing practical usable instruments for academics and the general public alike and, in doing so, herald a bright future for the Digital Humanities.

1.3. Towards a definition

As previously underlined, before settling for the current term, the Digital Humanities have been known under an array of names, such as “Humanist Informatics”, “Linguistic computing” and “Digital resources for the Humanities”.²²

However, one of these original phrases, “Humanities Computing”, offers an important clue as to what the initial definition for this discipline was, i.e. the automation of the analysis of human expression. As such, it includes a variety of humanistic activities that can be explored and interpreted not only through traditional methods, but also by experimenting with technological advancements. The objective is to use information technology to shed light on the human record and promote its deeper comprehension.²³

Nevertheless, because of their evolving nature, the Digital Humanities are hardly encompassed by a single definition; rather, the issue of a precise description which correctly and completely characterizes the variety of the field's endeavors is still a debated topic,²⁴ with some academics going as far as affirming that there is no such definition.²⁵ To promote dialogue regarding such theme and

²⁰ (Müller, 2019)

²¹ (Svensson, Big Digital Humanities: Imagining a Meeting Place for the Humanities and the Digital, 2016)

²² (Terras, Nyhan, & Vanhoutte, 2013)

²³ (Schreibman, Siemens, & Unsworth, A companion to Digital Humanities, 2004)

²⁴ (Gibbs, 2013)

²⁵ (Alvarado, 2012)

at the same time increase visibility, the University of Alberta sponsors the “Day of DH”, an initiative that encourages digital humanists to document their academic day and focus on issue such as a shared vision for the discipline’s present and future.

Scholars are also asked to reflect on how they define Digital Humanities, offering some interesting insight on the subject, such as highlighting their multifaceted essence, the strong relationship between scholarship and pedagogy in its wider sense, the interaction with machines and with other researchers, the importance of the process as well as the outcome and, ultimately, the new opportunities granted by technology.²⁶

In fact, while there might be no systematically organized shared methodology, what could be considered the essence of the Digital Humanities is the ability to engage with traditionally humanistic materials in a new way, thanks to an inventive and sometimes visionary use of computational tools. This employment of the digital facilitates answers to questions that were previously difficult to address, and, at the same time, opens to new perspectives, for computer analysis of great amounts of data highlights patterns and connections that would be otherwise go unnoticed.

The community’s focus on such approach has therefore been suggested as the central component of a possible definition, transferring the problem from an ontological to a pragmatic field. Accordingly, the Digital Humanities can be described as the discipline researched and taught by those scholars of the expressions of humankind who embrace technological media and believe such instruments contribute to a transformation of the interpretative work.²⁷

1.4. Principles and values

As mentioned, academics in the field of Digital Humanities explore a wide range of areas and topics, nevertheless, they share common notions and ideas that have become the founding principles of their scholarship, from both a practical and ethical point of view.

²⁶ (Day of DH: defining the Digital Humanities, 2012)

²⁷ (Alvarado, 2012)

Firstly, the community equally values theory and application, due to the relationship which ties instruments to understanding, especially when considering data representation. Because of such belief, digital humanists actively concern themselves with project conception and management, which constitute important research themes to broadcast. The choice of appropriate tools, which can never be considered neutral and must be engaged with through a critical lens, also plays an important role as a contributing factor in analysis and interpretation.

At the same time, other elements must be taken into account when selecting a digital instrument, in order to anticipate any issues regarding interface and usability, as well as obsolescence. In particular, the ethos of Digital Humanities requires to employ technologies that allow for equal accessibility, while also ensuring the preservation of the media, thus posing a complex challenge.

Digital Humanities revolve around cooperation, due to their transdisciplinary nature and consequent employment of a range of expertise. In order to best tackle research questions, academics in this field often operate in teams, adopting approaches from different scientific areas. Such focus on collaboration also translates into the creation of physical and virtual spaces for sharing experiences and doubts, as well as a decidedly less hierarchical structure within academia.

The importance of openness and diversity is also underlined by digital humanists, often leading to question standard academic habits. The use of open software and creation of open content are established best practices aimed at democratizing knowledge and expanding the dialogue beyond economic or education barriers. Such objective is further pursued by encouraging multiple perspectives, especially focusing on involving the disenfranchised and engaging minorities.

Finally, partly because of their innovative nature, the Digital Humanities value experimentation and risk-taking. The field methodology is varied and still developing, once again adapting elements from the sciences rigorous procedures to better handle the data, instruments and problems, while conjugating them with more traditionally humanistic interpretation and exploration techniques.²⁸ For the digital scholar, the encounter with technology cannot be judged merely a mean, but rather is in itself an end, offering rewards during the process as well.²⁹ Therefore, failure is considered useful

²⁸ (Schreibman, Siemens, & Unsworth, A companion to Digital Humanities, 2004)

²⁹ (Alvarado, 2012)

and appreciated as a tool for learning and an acceptable scholarly result, provided it is well-documented. In conclusion, DHers attribute a higher value to curiosity rather than success when developing novel research practices.³⁰

1.5. A varied landscape

As previously mentioned, both Gold³¹ and Alvarado³² highlight how part of the difficulty encountered when attempting to define the Digital Humanities is due to the lack of shared elements from a practical point of view, such as materials, methodologies and processes.

In fact, despite the common core values described above, the discipline encompasses a plethora of academic efforts, marked by the incorporation of digital media. Such category, however, is in itself vast due to the pervasiveness of technology in everyday life, therefore rendering the field a complex, multifaceted research area in which finding and codifying practices common to all scholars can become a struggle, due to various reasons.

In the first place, the relationship between the humanities and the digital can be considered in several ways, for example treating technology as a functional tool, a medium, a study object or a laboratory. The instrumental approach represents one of the most common ones, particularly when considering the digital as a data manipulation technique originated from formal methods. Data mining, information design and modelling find a wide application in contemporary academia. Databases, in particular, offer a valuable instrument to systemize the objects of study and have therefore become one of the primary implementations of Digital Humanities.

Nevertheless, their preponderance has gradually led scholars to view them not only as a collection of materials but as an object of academic criticism. The choices operated when organizing such repository can be analyzed in order to assess the value of research based on the materials they contain, especially highlighting issues of exclusions and selectiveness that could skew results.

Through the example of the evolution of databases from academic aid to study object it is possible to grasp the complexity of the intersections between humanities and technologies, which regard both

³⁰ (Gold, *The Digital Humanities Moment*, 2012)

³¹ (Day of DH: *defining the Digital Humanities*, 2012)

³² (Alvarado, 2012)

the type of material or the disciplinary approach and the relationship to the digital as tool, cultural artifact or metaphor. The number of possibilities allows an intuitive estimation of the variety in Digital Humanities and the consequent difficulty in defining them.

When these elements are taken into consideration, the fundamental focus is on interpretation of human expression, mapped in several frameworks and thus crossing the boundaries of disciplinary fields and technological instances.

Consequently, a complete taxonomy of the Digital Humanities appears to be a rather burdensome task, but it is possible to consider the gradual expansion of the type of studied artefacts in order to gain an understanding of the discipline's articulation.

Because of their origin as Humanities Computing and of the technological limitation of the time, the Digital Humanities first focused on projects that applied computing procedures to text, the type of humanistic data most easily handled by information technology, creating dynamic archives as well as statistical analysis algorithms, still promoted by the Text Encoding Initiative and similar programs. However, despite the fact that text may be the type of humanistic data most easily handled by information technology, the discipline has expanded to incorporate a number of different fields that benefit from novel approaches to the material. As better digital tools developed, the study and interpretation efforts initially dedicated to text alone have reached an array of media.

Schreibman, Siemens and Unsworth³³ highlight how computing has offered new methodological focal points, such as preservation, data management and representation as well as manipulation, which permit the discovery of less evident characteristics of the study object.

An approximate idea of how varied the Digital Humanities landscape is can be gained by examining the different types of projects.

A few examples of categories include archives and databases for both analog and born-digital material, such as “Transcribe Bentham” or “Preserving Virtual Worlds 2”, respectively centered on literary texts and videogame environments; scholarly communication and publishing, like “Zotero”, “Anthologize” and a number of open access initiatives; data mining and visualization, including “HyperCites”, for historical city spaces, and “TAPoR”, for text analysis. However, the scholars also

³³ (Schreibman, Siemens, & Unsworth, *A companion to Digital Humanities*, 2004)

devote their efforts to advocacy, pedagogy networks and digital fabrication,³⁴ while still situating such works at the intersection of the digital and the humanities.

However, because of its ties to issues regarding the definition, the classification of the theoretical Digital Humanities represents a significant question that has been addressed in multiple ways.

A typology can be found when organizing the field by different purpose, thus suggesting the existence of three broad areas, computing, blogging and multimodal humanities. The computing humanities aim to build infrastructures and tools, while the blogging ones concentrate on issues regarding online publication and peer-to-peer writing. The junction of these two sectors is represented by multimodal humanities, which also include other media in their works.³⁵

Another option is constituted by following a path of evolution similar to that of the web itself, thus describing Humanities 2.0 as strongly interactive and participatory in order to decenter knowledge.³⁶ Nevertheless, the discipline has to this day defied any attempt of systematic organization, remaining a broadly defined field in which many categories overlap.³⁷

From an institutional point of view, Digital Humanities centers are often dependent on traditional departments; nevertheless, the field's dynamic and inclusive approach allows for participation of researchers from an array of backgrounds, thus gaining a liminal position that fosters interaction and change.

While Digital Humanities scholars are most widespread within literature departments, especially in English-speaking institutions,³⁸ the field has extended to research history, music, media and performance studies, as well as art history. Such articulation has been referred to as “Big Tent Digital Humanities”, a term employed in 2011 to indicate the variety of scopes and directions that had developed within a decade of formally naming the discipline, a welcome consequence of its inclusivity.

³⁴ (The City University of New York, s.d.)

³⁵ (McPherson, 2009)

³⁶ (Davidson, 2008)

³⁷ (Svensson, *The landscape of Digital Humanities*, 2010)

³⁸ (Sula, Hackney, & Cunningham, 2017)

2. Digital Humanities and Cultural Heritage: Digital Art History

Since their origins, the Digital Humanities have been concerned with preserving and exploring the cultural heritage, starting with literary texts. The advent of the internet further expanded such interest, entrusting the discipline with putting such heritage online for the benefit of researchers, lifelong learners and the general public, as well as future generations.

As previously mentioned, the digital revolution has also allowed academics to focus on a wider range of materials, thus applying the methodology to more than written words, shifting their attention to different types of media. Therefore, the Digital Humanities have gradually become able to tackle the unique challenges posed by fundamentally visual objects of study, such as in the case of Art History.³⁹ For example, graphics programs have transformed from simple printing devices, used for charts and drawings, to more complex instruments, able to generate and handle three-dimensional models and intricate data visualizations. Nowadays, geographical information systems combine sophisticated interactive maps and data, while digital models based on laser scanning, photogrammetry and computer-assisted design software (CAD) aid the reconstruction of objects and monuments.

Such an approach has finally permitted the discipline to encompass an array of fields that had hitherto been left to the margins due to the very nature of the study objects, like Art History, Archaeology or Museum Studies. Research areas related to visual arts have been provided with the tools to properly engage with material culture, therefore managing the conservation of a different kind of heritage.

However, “Digital Art History” represents a possibly ambiguous term.

In fact, as in the case of Digital Humanities in general, it can refer both to the analysis of traditional objects of study through digital media, or the investigation of digital objects via regular contemporary methodology. As art itself has turned toward technology as a mean of producing new meaning and challenging conventional techniques, art historians have started to engage with born-digital works, studying them according to analog methods or through the aid of processes involving new software. The phrase can therefore describe both definitions, for both the line between classical and contemporary art practice and the border separating different academic methodologies progressively blur.

³⁹ (Drucker, 2013)

2.1. *A brief history*

Rather unsurprisingly, the evolution of Digital Art History closely parallels that of the Digital Humanities, following a similar if somewhat accelerated trajectory. The works of Bentkowska-Kafel,⁴⁰ Promey and Stewart⁴¹ and Zweig⁴² briefly retrace this history. In the mid-1980s, the establishment of the “Computer and the History of Art - CHArt” group marks the beginning of this path and the struggles with the discipline’s name, definition and ontological status. One of the term’s first appearances dates back to 1997, when in the article “Digital Art History: a new field for collaboration”, Sally M. Promey and Miriam Stewart notice how technology for visual scholarship offer novel scenarios for curators and art historians. By then, the integration of information technology, first used to accelerate existing processes, had led to the development of new methods and paradigms, stimulating a dedicated conference in 2001.

Some key concepts and ideas that to this day are considered fundamental for Digital Art History were theorized even before the proper tools for implementing them had become available and truly bloomed beginning in the 1980s.

The Getty Art History Information Program promoted the creation of linked data banks, soon addressing the problem of different cataloguing practices. The development of pattern recognition software allowed scholars to manage image collections by scaling and comparing instruments, together with databases and three-dimensional models, which soon demonstrated their remarkable utility. Overlaying images also proved important in order to highlight visual rhyming and other compositional elements. Projects such as “Visual Arts System for Archiving and Retrieval of Images”, or “VASARI”, were exemplary digitalization initiatives with regards to innovation, to collaborative methodology and to attention towards building a tool. Another example is the “MORELLI” project, which pioneered pattern recognition and automated classification of images, emphasizing the importance of computers when handling large data sets.

From an ethical point of view, accessibility, collaboration and interaction are considered foundation stones for the Digital Art History practices. They are, obviously, accompanied by the values that

⁴⁰ (Bentkowska-Kafel, 2015)

⁴¹ (Promey & Stewart, 1997)

⁴² (Zweig, 2015)

already characterized the parent field of the Digital Humanities, in particular the strong relationship between the theoretical aspects and the need to experiment with building and making.

As investigational applications of the digital have permeated the fields, the conceptualization and systematization of Digital Art History practices is still an open topic, as scholars strive to connect methodologies and find commonalities.

Moreover, academics debate whether the study area truly differentiates from traditional Art History from a cognitive point of view, as it addresses comparable fundamental questions. Recently, the introduction of “Big Image Data” as a study material has reignited such controversy, for while some scholars deem it a possibility to enhance traditional analytic tools, others perceive it as a threat.

However, like the Digital Humanities in general, the discipline could be considered as a spectrum rather than a binary, for the employment of digital tools ranges widely from project to project, engaging with research as an instrument for data management, object preservation, statistical and network analysis, augmented observation and many other functions.⁴³

Digital Art History has gained attention beyond the academic world, as international organisms have shown interest in the interaction between technology and the cultural heritage.

The European Commission Directorate general for Communication Networks, Content & Technology considers virtual museums and related projects as an opportunity to reach and engage broader audiences through creative content, consequently developing dedicated coordination and funding policies, in accordance with the Europe 2020 strategy. In particular, the Digital Agenda has been introduced to facilitate the digitalization and preservation of Europe’s heritage as a fundamental goal, optimizing its cultural and economic potential.⁴⁴ In order to achieve such results, the Commission’s Expert Group on Digital Cultural Heritage and Europeana (DCHE) meets twice a year and implements strategies and policies, promoting cooperation among member states with regards to digital preservation and accessibility, as well as monitoring the progress on digitalization efforts.⁴⁵

⁴³ (Mullen, 2013)

⁴⁴ (European Commission, 2011)

⁴⁵ (European Commission, 2017)

The European Union grants dedicated funds to projects within the field of Digital Art History in its broader sense, thus including museum studies, archaeology and, in general, disciplines concerned with heritage conservation and communication.

The funded projects address a wide range of aims and applications. Proposals such as GIFT focus on exploring and fostering emotional appropriation of museum objects, increasing curiosity in a way analogous to PLUGGY, which pursues the same objectives by encouraging visitors to share their cultural experience through social platforms. Such engagement is also the focus of EMOTIVE, a project that encourages storytelling as a tool to both induce an emotional response in participant and to promote creative and cultural industries. Technology can be used to showcase heritage that would be unreachable under normal circumstances: it is the case of iMARECULTURE, which takes advantage of Virtual and Augmented Reality to access underwater cultural objects.

Through Horizon2020, the European Union has also funded cost-effective technologies for advances three-dimensional modelling, some of which integrate positioning systems, others concentrating on the reconstruction of broken objects or on layering multi-sensorial data. Grant-winning projects differ also in the targeted demographics: for example, CROSSCULT aims to connect resources and use them as the starting point for interactive experiences to engage citizens, while ArchAIDE proposes computer-based classifications to help scholars; I-Media-Cities develops a shared audiovisual archive, whereas ARCHES focuses on inclusivity for a dynamic ecosystem.⁴⁶

The importance of cultural heritage for the United Nations Sustainable Development Goals, combined with the emphasis on technology as a tool for positive long-term change provides another representative example of recent awareness of the value of Digital Art History on behalf of an international institution.

Culture is deemed a catalyst for urban development and economic growth linked to tourism, innovation and creativity, as well as remarkably increasing quality of life.⁴⁷ it seems natural that heritage preservation and communication are therefore effective instruments to pursue many of the objectives to which the United Nations aim, as recognized by the UNESCO. Digitalization projects that promote cultural heritage information, therefore, constitute an instrument to enrich citizens education and improve urban environments, in accordance to Goals 4 and 11, actively encouraging

⁴⁶ (European Commission, 2017)

⁴⁷ (Hosagrahar, Soule, Fusco Girard, & Potts, 2016)

democratization of knowledge through accessibility.⁴⁸ In particular, the role of digital platforms for information sharing appears to be crucial to achieve cultural sustainability, being, on one hand, a valuable asset for governments to reach such objective and, on the other, offering the users a way to further their education and providing academics with research material.⁴⁹

The number and variety of publicly funded projects demonstrates how deep the institutional interest in Digital Art History is, for international organisms recognize the discipline's significant role in advancing academic studies and producing an array of applications capable of transmitting such research to the general public, sustaining at the same time an economic sector considered ever more important in the age of automation, that of cultural and creative industries.

2.2. Opportunities and challenges for Digital Art History

In the first place, technology appears to be ideal to keep record of examined objects, especially in areas which have a strong need for data management systems. This desire also generates constant efforts regarding the standardization of such entries, aiming toward shared lexicons and taxonomies, sometimes even across disciplines, such as the Getty Art and Architecture Thesaurus.⁵⁰ In fact, a thoroughly organized database can offer interesting interpretation opportunities when viewed through a series of mathematical and computing tools, such as statistical analysis.

The inclusion of digital methods into standard art historical practices is becoming a benchmark of the field, with respect to cataloguing, managing and analyzing evidence, crossing disciplinary boundaries, cooperating, sharing data and publishing results.⁵¹

More than offering just a practical way to catalogue and share information, technological instruments also provide noteworthy research avenues. Techniques for image analysis or computational analysis, for example, can reveal aspects of artwork that have not been investigated before, while also challenging traditional views of how to conduct academic inquiries. Enhanced observation, scale

⁴⁸ (United Nations General Assembly, 2015)

⁴⁹ (Koya & Chowdhury, 2019)

⁵⁰ (Schreibman, Siemens, & Unsworth, A companion to Digital Humanities, 2004)

⁵¹ (Baca, Helmreich, & Gill, 2019)

variation and aggregation of optical documentation foster comparisons⁵² and take advantage of mathematical analysis to determine patterns and focal points, even aiding scholars in correctly attributing works to artists. Image analysis has also been used to investigate the accuracy of perspectives in paintings and drawings, prompting academics to analyze the reasons for voluntary deviations, exemplifying how the results of digital processes merely constitute a starting point for deeper research.

The employment of technological instruments grants art historians the opportunity to apply data mining to properly catalogued objects, opening new horizons regarding provenance, historical context, materials and technique, influences and several other areas. Moreover, the progressive digitalization of sources constitutes an occasion to reflect on the evolution of the discipline itself, exploring issues such as its use of terminology, its relation to the market, the cyclical forgetting and rediscovery of artists.⁵³

From a museum curator's perspective, Digital Art History offers a chance to expand the reach of cultural institutions, reaching a greater, more diverse audience and better engaging with it. Most notably, the use of the digital to implement virtual museums is gradually intensifying, as more and more institutions recognize the value of offering their collections online, often accompanied by an array of informational data and metadata that can easily be searched.

This kind of initiatives offer a number of benefits for both museums and visitors. First of all, displaying artwork online provides cultural institutions with the possibility of virtually opening their vaults, showcasing to the public objects that are not usually seen. Such element of intimate knowledge, combined with the proximity of images on screens triggers a positive reaction in users, who deem the oeuvre less like a distant and vaguely mystical object and more as artwork with which they have a personal connection.

Issues regarding accessibility in its various forms, such as physical, cognitive and economical, can be addressed by technology, finding innovative solutions to the related obstacles. Furthermore, it allows the communication of a broader range of expressions and in a deeper and more meaningful way.⁵⁴

⁵² (Manovich, 2015)

⁵³ (Drucker, 2013)

⁵⁴ (Promey & Stewart, 1997)

Finally, Similar projects encourage user participation, for example by actively engaging visitors in the creation of museum routes focused on specific themes through the selection of the appropriate artwork directly on the website. More and more virtual museums are integrating social media as well, not only increasing the related institution's visibility, but also fostering a general sense of community around it and promoting a culture of knowledge and humanism.

At the same time, digital art historians are more and more aware of the concerns arising from working with technology, especially regarding the importance of critical engagement. In fact, while offering powerful analysis tools, the digital cannot substitute human interpretation abilities: academics focus on properly building and organizing data sets, proposing hypotheses and deciphering the results, truly essential tasks at the core of research that highlight how scholarly choices affect results.⁵⁵ Analogously to what is a valuable consideration for Digital Humanities in general, the need for critical engagement with the analytic and statistical tools is emphasized as a crucial aspect of Digital Art History.⁵⁶

Furthermore, particularly in this field, employing technology is not necessarily synonym with speed or simplicity. The need to curate and prepare documents and data as well as to carefully consider the context of the artwork are just two main examples of how the digital does not constitute a solution in and of itself, but rather a methodology with its own challenges. The action of collecting data, in particular, is especially time consuming, also due to issues such as reproduction quality and copyright: because of this, the availability and openness of existing data sets provide valuable resources to scholars that can therefore focus on other aspects of their research.⁵⁷

Moreover, some academics have been questioning the idea that the digital change truly represents a milestone for the history of the discipline, wondering whether it merely embodies a new way of undertaking old work.⁵⁸ On the other side of this discourse, digital art historians affirm that such tools provide scholarship with new understanding of the meaning and value of objects: the abundance of data combined with the technological capacity to properly handle it proves especially precious when studying and highlighting relationships among artwork and artists across time and space. The ability

⁵⁵ (Baca, Helmreich, & Gill, 2019)

⁵⁶ (Bishop, 2018)

⁵⁷ (Klinke & Surkemper, 2015)

⁵⁸ (Bentkowska-Kafel, 2015), (Drucker, 2013)

to discover and underline networks of cultural relations, founded on repository creation and metadata enhancement as well as provenance studies, offers bases for unexpected interpretations.⁵⁹

Despite the ongoing debates on the problems of Digital Art History, the novel approach produced by the inclusion of digital instruments has also fostered welcome changes. Similarly to what has happened other areas of the Digital Humanities, the increasingly complex projects have promoted collaborations that go beyond traditional disciplinary boundaries, encouraging teamwork and communication as well as the implementation of project management practices.

Moreover, a trend of sharing not only conclusions but material evidence and analytic processes has emerged, allowing scholars to autonomously study data sets. This tendency is slowly transforming into a desire for more open publications as well, thus leading to a reevaluation of classical measures of academic success.⁶⁰

The digital revolution, therefore, has been the starting point for a renovation of the field with regards to both methodology and ethos, leading art history towards a more significant and democratic future.

2.3. Digital Art History projects: an overview

As mentioned, Digital Art History encompasses a variety of approaches to the material, ranging from practical case studies to theoretical investigations regarding the discipline's purpose, values and methodology systematization. A brief overview of some projects can, however, aid in assessing the field's range.

The first applications of technology to the world of art historic research can be found in the digitalization of texts regarding artwork. Such projects centered primarily on building large data sets which could be studied by exploiting computational capacities, thus resulting in repositories of documents with a common topic.

In terms of databases, the Getty Provenance Index constitutes a notable endeavor with respect to aggregating records of ownership regarding a number of artworks. Users can send queries to a system

⁵⁹ (Drucker, 2013)

⁶⁰ (Baca, Helmreich, & Gill, 2019)

that searches through archival inventories, sales catalogs, dealer stock books and public collections, permitting academics to easily and almost effortlessly track the history of a piece of art.⁶¹

Thanks to the progressive digitalization of collections from galleries, libraries, archives and museums, large image repositories are now the object of various initiatives that explore visual perception and analysis in machines to better understand it in humans.

The Perceptual Intelligence Lab at the Delft University of Technology aims to examine how XVII century painters represented glossy materials such as grapes through a series of characteristics that allow viewers to perceive them as realistic. In order to do so, the study employed self-defined algorithms for identifying and quantifying these factors, ultimately comparing them to the instructions from a painting manual dating back to the same period and finding them coherent.⁶²

Other academics investigate image recognition and categorization, finetuning the combination metrics and visual features that best allows machines to emulate an art historian's capacity to catalogue works by artist, genre and style.⁶³

The Gugelmann Galaxy, instead, focuses on presenting vast collections to users in a viable and understandable way. The team has developed an image cloud through which it is possible to navigate, selecting items that are shown surrounded by their eight closest neighbors, offering a high level of control.⁶⁴

A similar curatorial project, receiver of a Getty award, is "Beautiful Data: Telling stories about art with open collections". The Harvard University team studies how technology allows better understanding of digital and digitized artifacts in terms of analysis, visualization and annotation.⁶⁵

Network analysis takes advantage of such large image repositories as well, highlighting relationship among artworks which would otherwise be difficult to find.

The technique has been used to study how printmakers expanded and influenced one another in XVII century northern Europe, especially focusing on how such connections changed in terms of

⁶¹ (Drucker, 2013)

⁶² (Di Cicco, Winjntjes, & Pont, 2019)

⁶³ (Saleh & Elgammal, 2016)

⁶⁴ (Bernhard, 2016)

⁶⁵ (Harvard University metaLAB, 2015)

centralization. Thanks to collections from both the British Museum and the Rijksmuseum, researchers have investigated the records of individual artworks to understand how the social structure of the printing industry developed and transformed over time.⁶⁶

For the exhibition “Inventing abstraction” the Museum of Modern Art has also employed network analysis, creating an interactive diagram illustrating the connections among several artists involved in pioneering abstraction during the early XX century. Users can explore these relations by visualizing the entire network or concentrating on individuals and how each relates to the system.⁶⁷

Data visualization represents an important aspect of Digital Art History, as challenges arise due to the increasing amount of information available and its format: issues such as the preservation of features and the logical, useful arrangement of items lead scholars to take advantage of different techniques, such as slice histograms and growing entourage plots.⁶⁸

With respect to data representation, the VIKUS project embodies the efforts of an interdisciplinary team from the University of Applied Sciences Potsdam that aims to investigate how to visualize cultural collections. The scholars have experimented with original types of user interfaces that allow viewers to explore digitized cultural heritage in novel and interactive ways.⁶⁹

A recent comprehensive study of the state of the art regarding visual interfaces highlights the importance of understanding the user’s expectations, motivations and background in order to properly design a tool to enable a collection’s representation. Moreover, such approach clarifies how these instruments can and should be considered cultural artefacts in need of interpretation and critique.⁷⁰

Other scholars strive to develop ambitious multilayered initiatives by combining several of the methodologies illustrated above, as well as three-dimensional models and Virtual or Augmented Reality, which are described more in depth in the following paragraphs.

An example is represented by the efforts to digitally reconstruct the historic center of Dresden, destroyed by bombings during World War II. To achieve such a bold objective, the HistStadt4D

⁶⁶ (Lincoln, 2016)

⁶⁷ (Museum of Modern Art, 2012)

⁶⁸ (Crockett, 2016)

⁶⁹ (Glinka, Meier, & Dörk, 2015)

⁷⁰ (Windhager, et al., 2018)

research team has relied primarily on the thorough analysis of an extensive photographic data base to gradually reconstruct a digital model of the city center through various eras while studying the perception of urban space through its representations. The methodology questions that have arisen focus on data processing and information retrieval, pondering the need for uniform standards depending on the final purpose of the project.⁷¹

Analogously, the project *imagineRio* provides users with a digital atlas showing the evolution of Rio de Janeiro through images from a number of archives. Any specific location can be explored along temporal and spatial coordinates, comparing urban plans to actual developments, thus offering a scholarly tool as well as an educational application for the city's visitors.⁷²

The initiative *Mapping Gothic France* takes the technique a step further, exploiting a large database including a variety of media in order to illustrate how gothic sacred architecture evolved. Users can explore emblematic monuments thanks to different starting points, namely a map of European gothic churches, a timeline of their construction and a collection of stories and essays. Furthermore, the website dedicates a section to comparing plans, measurements and several of architectonic elements, thus introducing a fundamental art historic methodology to the general public.⁷³

A comparable assortment of tools is offered by the project *Drawcivitas*, funded by the Spanish Program for the Promotion of Excellent Scientific and Technical Research. Centered on the systematization of graphical documents representing urban views of the Iberian Peninsula from the XVI century to the diffusion of photography, the initiative studies how these drawings and paintings employ different artistic practices such as perspective and projection, in accordance with mathematical and optical theories. Besides offering insights on the science of art, the interdisciplinary and international team provides the public with a map situating the objects of these representations, especially highlighting the routes of foreign visitors through Spain and Portugal.⁷⁴

⁷¹ (Münster, et al., 2017)

⁷² (Rice University, 2019)

⁷³ (Murray & Tallon, 2012)

⁷⁴ (López Vílchez & Campos López, 2018)

3. Digital Art History applications: 3D Digital Reconstructions and Augmented Reality

During the past decades, several of the technological innovations exploited by Digital Art History have led to the implementation of projects regarding museum education, offered to the public with remarkable effects on user engagement and satisfaction.

In particular, the employment of three-dimensional models has demonstrated useful for showcasing stratigraphy and comparing the aspect of a work of art through different periods. Such technique, combined with the use of Augmented Reality applied to the cultural heritage, constitutes an interesting research area for the discipline as well as a powerful tool to better communicate artefacts and monuments to the public.

3.1. 3D digital reconstructions

As demonstrated by recent initiatives, the progressive digitalization of museum collections promotes the analysis of study objects while decreasing their physical handling, thus granting better chances of conservation without hindering academic examination and curatorial practices.⁷⁵ The evaluation and comparison of three-dimensional artefacts is greatly aided by the creation of virtual spaces and even more by the inclusion of the temporal dimension.

Similarly, virtual modelling provides art historians with a powerful instrument for combining research and preservation. In fact, its employment in reconstructions allows for speculation while ensuring that the artifact remain undamaged, thus permitting the exploration of an array of possibilities in terms of the object's original aspect. Issues regarding use, style and engineering can be addressed in previously impossible ways, once again proving extremely useful for highlighting comparisons, ultimately fostering a deeper understanding of the artwork in its context.⁷⁶

A common concern with regards to the diffuse digitalization of artwork is a lessened desire to engage with the original on behalf of the public. However, as previously mentioned, the results of such practice have positive effects on the psychology of museum visitors, fostering a sense of familiarity with the objects which leads users to truly consider them as their own heritage. This feeling of

⁷⁵ (Promey & Stewart, 1997)

⁷⁶ (Drucker, 2013)

intimacy with the artwork prompts a higher level of engagement, manifested both as a desire to see the original more often⁷⁷ and as a willingness to embark into a deeper exploration of the object's history and the knowledge it can to offer.

While digitalizing existing artefacts is an act of technological translation from object to representation which can be relatively easily carried out through laser-scanning or photogrammetric techniques, virtual reconstructions of artefacts that are no longer available in their original or anticipated state requires an additional step of data preparation and interpretation in order to then proceed to computer modelling. The need for appropriate sources is thus a fundamental part of the method, as historical images and texts must be combined with contemporary maps and plans, taking into account analogies with artifacts from the same period, location and style.⁷⁸

This type of visualization, however, offers several benefits: large amount of data can be more easily handled and merged, while the final product can spark the perception of previously unnoticed characteristics and scale relationships, therefore helping scholars formulate new hypotheses.⁷⁹ This aspect in particular is the focus of a methodological issue concerned by the distinction between strongly documented elements and educated guesses in virtual reconstructions.⁸⁰ Such uncertainty is an unavoidable component of the majority of three-dimensional models; however, it should be addressed by clearly distinguishing parts of the reconstruction through an array of visual or textual clues.⁸¹ The underlying decision process can be made explicit in the project file, thus allowing scholars to verify and adapt it.

Because of such advantages, a number Digital Art History projects have focused on digitalization, three-dimensional modelling and their integration into Augmented Reality environments.

As previously mentioned, the European Union launched a dedicated call for research on the topic of advanced virtual reconstructions, selecting proposals such as Inclusive Cultural Heritage in Europe through 3D semantic modelling (INCEPTION),⁸² Geometric Reconstruction And noVel semantic

⁷⁷ (Promey & Stewart, 1997)

⁷⁸ (Münster, Friedrichs, & Hegel, 3D Reconstruction Techniques as a Cultural Shift in Art History?, 2018)

⁷⁹ (Ware, 2004)

⁸⁰ (Boeykens, Maekelberg, & De Jonge, 2018)

⁸¹ (Schäfer, 2018)

⁸² (di Giulio, 2019)

reunification of cultural heritage objects (GRAVITATE), Scan4Reco and DigiArt. Focusing on different aspects of how the technology can be used within the context of art history and museum studies, these projects aid object preservation as well as hypotheses exploration.⁸³

Another notable endeavor is represented by CyArk, a non-profit dedicated to preserving world heritage through digital documentation. The team has employed photogrammetry as well as laser scanning to capture more than two hundred sites at risk, working closely with UNESCO and publishing their models on an open-access platform in partnership with Google Arts & Culture. The models are also used to create Virtual Reality experiences which sensitize users to the different problems faced by each site, such as the various effects of climate change, or towards the social movements to which the heritage is linked, also thanks to the integration of narratives and testimonies.⁸⁴

In fact, several Digital Art History projects concentrate on vast potential of three-dimensional modelling to convey a number of educational and emotional experiences to the users.

Contemporary light art installations and environments, for example, strongly benefit from such technological applications regarding their reproduction, which must go beyond the mere photographic or audiovisual aspect, and therefore their diffusion and consequent deeper understanding on behalf of the public.⁸⁵

Moreover, similar reconstructions prove beneficial under different points of view. When accurately built, they provide academics with a tool for richer exploration of the interplay between the artifact and its environment, as exemplified by studies regarding the original lighting conditions of Leonardo da Vinci's "Last Supper"⁸⁶ or the optical transformation that astronomical alignments permitted at the Palace of Jaguars in Teotihuacan.⁸⁷ Besides offering valuable insights regarding the artist's work environment, some of these projects exploit new media to underline the technical expertise and cultural significance of artifacts from civilizations and groups towards which art history has largely shown a lack of interest, as is the case of the indigenous peoples of the Americas.⁸⁸

⁸³ (European Commission, 2017)

⁸⁴ (Underhill, In Conversation with CyArk. Digital Heritage in the 21st Century, 2018)

⁸⁵ (Crespillo Marí, 2018)

⁸⁶ (Underhill, The Twilight of Presence: Pictorialized Illumination in Leonardo da Vinci's Last Supper, 2019)

⁸⁷ (Underhill, 2014)

⁸⁸ (Underhill, Forensic visualization of two Kwakw aka'wakw kík'w, 2016)

3.2. *A case study in 3D virtual reconstructions: Fonthill VR*

Besides the advantages illustrated above, digital models of historic monuments provide academics with a compelling tool for engaging the general public through edutainment activities, which consist in strategies combining education and entertainment. Pedagogical video games are a typical example of such techniques, for they allow users to learn about a topic in a lighthearted and attractive way. Moreover, associating the positive emotions experience through gameplay to the subject at hand fosters better retainment and, in the case of Digital Art History, encourage participant to create a bond with the artwork.

An initiative which pursues such objectives is Fonthill VR, created by the team of professor Bartneck at the Human Interface Technology Lab New Zealand. The project focuses on interactive conservation of the cultural heritage through the development of a Virtual Reality game based on the history of Fonthill Abbey.⁸⁹ The large English estate where William Beckford isolated himself for decades was designed and built by the owner together with architect James Wyatt starting in 1796. Beckford's Folly, as the Gothic revival Abbey was later nicknamed, featured an impressive central tower that collapsed under its own weight several times, eventually destroying one of the four wings of the building in 1825. The only part of the monument still visible today is a fraction of the northern wing; however the history of both Beckford's melancholic life and his grandiose mansion represent a fascinating fragment of Georgian England.

The inspiration for the project is provided by the mysterious invitation which Beckford extended to three prestigious guests, Lord Horatio Nelson, Sir William Hamilton and his wife, Emma, Nelson's lover. This call, on Christmas Eve of the year 1800, is the only occasion in which Fonthill Abbey's doors were opened to any visitors and therefore prompts a number of questions regarding the reason for such invitation.

The Beckford's enigmatic nature and the desire to communicate his story to a wider audience were further encouraged by the opportunity to do so in an innovative and engaging way thanks to the use of contemporary technology.

⁸⁹ (Bartneck, La Duca, Niehaus, & Tong, 2017)

The small team adopted a learning-by-doing approach, creating a functioning prototype of the game in just under three months using tools with which none of the participants had previously had any experience.

The main storyline was developed in Twine, an open-source software that allows users to generate nonlinear stories. Cognitive Science student Susanne Niehaus interwove the thematic elements of isolation and madness into an adventure focused on dialogue and introspection, thus creating a maze of decisions with over twenty different endings.

At the same time, the generation of the virtual model took place, articulated in different phases and tasks. Firstly, the appropriate documents were gathered in order to obtain a clear visual objective for the final look of the building. Thanks to textual descriptions as well as drawings and engravings, it was possible to recreate Fonthill Abbey in a detailed way, producing a monument rather faithful to the original. The architectural model, generated with 3DS Max, was then imported into Unreal Game Engine, a software which allowed the creation of the surrounding environment. Moreover, it permitted the production of gameplay aspects such as the generation of determinate effects depending on a character's actions.

In the following phase of the project, thanks to a close collaboration, the written story was transformed into a visual gaming experience. In order to do so, each playable character was assigned a set of characteristics and their corresponding values, which could be increased or decreased depending on their decisions, exploiting a dynamic similar to that of roleplaying games. Such values and decisions also influenced the user's ability to explore different parts of the Abbey and discover more about the history of the building and William Beckford.

Finally, user experience and web designer Kris Tong created a website through which the results of the initiative were made available to the public. In particular, part of the starting documentation and the final three-dimensional models can be found online, as well as the Twine storyline, a demonstration of the final game and a series of videos illustrating the development of the project.

Thanks to the collaborative hands-on methodology fostered by professor Bartneck and the Human Interface Technology Lab New Zealand, the project developers greatly improved collective and individual abilities regarding storytelling, digital modelling, artistic conservation and game design. The different objectives determined by the interdisciplinary nature of the team combined into the creation of an interactive experience for players which encourages learning and introspection, promoting an emotional bond with the heritage site.

3.3. *Augmented Reality: definition and characteristics*

As described in the previous paragraphs, Digital Art History projects often rely on Augmented Reality or Virtual Reality in order to offer users the possibility to interact with digital models. By adopting these technologies, academics and content creators can combine the benefits of virtual reconstructions with further public engagement. In order to accurately explore such trend, its advantages and the challenges it poses, it is first necessary to better understand what defined Augmented Reality and how it differs from its counterpart. In this respect, Sherman and Craig's manual⁹⁰ can prove particularly useful as a guide.

Augmented Reality is a medium for human-computer interaction which allows for digital manipulation of the physical world through an array of stimuli, especially visual and auditory ones. In an Augmented Reality experience, the participant interacts with an existing environment enriched by virtual documentation.⁹¹ Digital elements grant quick access and visualization of the information while also permitting its modification based on a variety of circumstances, ensuring real-time interactivity, a crucial characteristic of this instrument.⁹²

Augmented Reality is based on applications, programs that coordinate the tools involved, namely sensors, the processor, user interfaces and various devices. The application manages the content offered to the participants, which includes all the objects, ideas and sensory inputs of which the experience consists, including the laws of nature which govern it, fundamental to tie it into the physical world.

In an Augmented Reality experience, users play an active role, because, besides receiving stimuli and digital information layered over the environment, they can modify the experience itself with movements and actions that trigger a response from the system.

A fundamental characteristic of such applications is the combination of both real and digital elements, which allows the distinction between Augmented and Virtual Reality: digital data are closely linked to a real environment, which remains visible, for the objective is not to make the user believe he is in

⁹⁰ (Sherman & Craig, 2013)

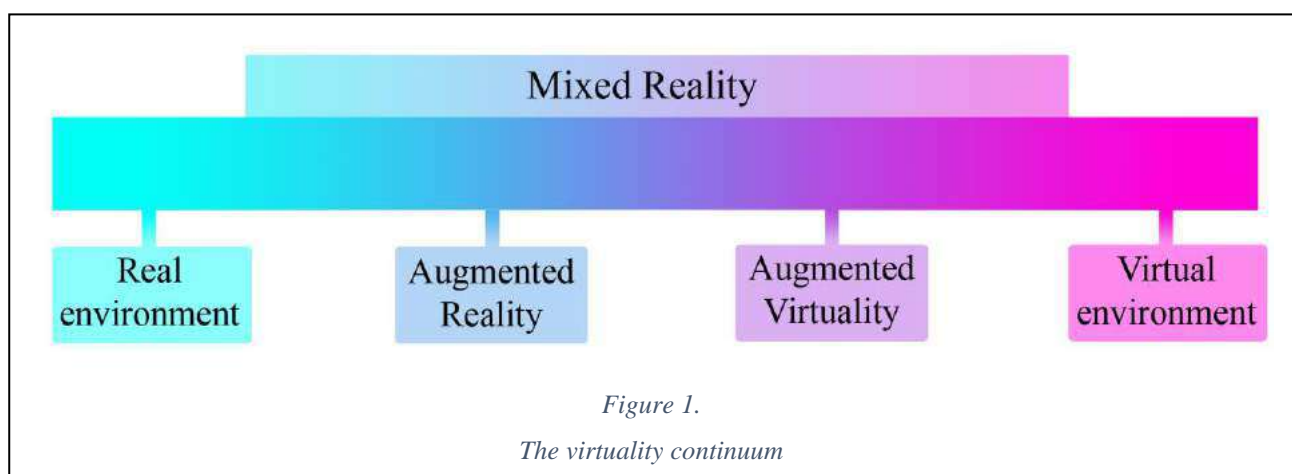
⁹¹ (Ruiz Torres, 2013)

⁹² (De Paolis, 2012)

a different place, as with Virtual Reality, rather to enrich it with useful information. Participants can therefore perceive the surrounding environment through their senses, as they normally would, at the same time enjoying the additional digital content.

The methods utilized in order to integrate the physical world without excluding it can be divided into two main processes: registering information from the physical world, uniting it to that digitally created and visualizing them through a computer; or projecting digital content directly on existing elements.

The close connection between physical and virtual world found in Augmented Reality places this instrument in an intermediate point of the virtuality continuum (Figure 1), an idea introduced by P. Milgram e F. Kishino in 1994.⁹³ Such term indicates the level of virtuality which the user experiences thanks to a digital medium: between the two extremes of reality and virtuality there is the vast category of Mixed Reality, in which physical and digital objects are combined within the same space. This is the case of Augmented Reality, in which the real environment prevails, and Augmented Virtuality, which is based on the opposite relation.⁹⁴



⁹³ (Bonacini, 2014)

⁹⁴ (Fiasconaro & Guiducci, 2012)

4. Development and use of an Augmented Reality application

In order to produce an Augmented Reality application it is necessary to create the content which must be transmitted to the user and the program which allows its communication. Firstly, some closely related information technology issues must be addressed; then it is possible to develop the components that would be used by the application and the digital objects which it would access at the appropriate time.

From an external point of view, an Augmented Reality experience consists of two main phases: initially, the application determines the current state of both the physical and virtual world; subsequently, it visualizes the digital information linked to that particular state of the environment, in order to allow users the perception of virtual elements superimposed on the physical location. For these processes to function, intermediate phases are required and it is necessary to account for both hardware, the tangible part of the instruments, and software elements, the logical IT part (Figure 2).

4.1. Preliminary issues

The first step in the creation of an Augmented Reality application is the study of some basic notions of information technology which permit its development and play a key role in its use, such as computer graphics, dimension and depth problems, registration and latency.

Computer graphics focuses on the creation of digital images, a fundamental asset for most Augmented Reality applications, for they can be integrated into the physical environment.

Usually, computer graphics mathematically describes elements to generate three-dimensional objects, while the image visualized by the user interface is two-dimensional and depends on the point of view. Programs for creating, editing and managing three-dimensional graphics can be divided into two main categories: importation software (e.g. Agisoft Photoscan) allow the virtual reproduction of real objects thanks to photographic or scanning processes, while creative ones (e.g. 3DS Max) describe the object as a set of polygons or a rotational solid. Moreover, it is possible to assign qualities such as color, reflection, refraction and texture to the surface of such objects, as well as determine a specific lighting and link the desired point of view to a camera. The creation of two-dimensional graphics can also be based on vectors, often used by illustrators, or raster, especially utilized to modify pre-existing images.

Due to the possibility to create digital objects and overlay them on a real environment, an issue closely linked to Augmented Reality is that of dimensionality, i.e. the number of dimensions involved in the experience. Augmented Reality includes the three-dimensional physical world and the virtual one, which can have any number of dimensions, in order to reproduce them on a two-dimensional display, It is therefore necessary to use some depth indicators.

These are often visual and can be categorized in monoscopic, such as interposition, shadow, linear and atmospheric perspective; stereoscopic, i.e. derived by visualizing two slightly different perspectives; kinetic and physiologic, such as muscular tension or gaze convergence. They can also be auditory, such as echo and reverberation.

Augmented Reality must also account for problems regarding the correct alignment between the physical and virtual world, especially registration, which mostly depends on the tracking system, and latency, or the delay with such alignment, usually due to the processor's computational capacity.

The main consequence of the relation between the environment and digital information, in fact, is the need to register objects, i.e. the idea that virtual elements must have a specific location in the real world, from both a spatial and temporal point of view.

Spatial registration can be relative or absolute and use an array of instruments, called tracking sensors, with different levels of precision. While creating an Augmented Reality experience, in fact, it is important to consider different resolutions necessary depending on the purpose: an error of a few centimeters can be insignificant for large-scale applications and yet critical for smaller ones (e.g. surgery simulation).

Temporal registration also poses some difficulties due to information capturing and processing time. In an Augmented Reality application, every movement by the user determines a change of perspective, thus forcing the program to render a new image, which can cause slight delays in the system, compromising the precision of its temporal registration.

The observer's point of view is therefore a fundamental element which must be considered when dealing with Augmented Reality, also as minimal interaction requirement, for the experience must be able to change depending on the input by users, who in some applications can even create new information.

Such interactivity is a significant characteristic of Augmented Reality and partly motivates its success among the general public. Creating an application based on this technology necessarily implies the

development of different possibilities to be offered to the participant, in order to allow interaction with virtual objects (i.e. manipulation), with the environment (navigation) and with other users (communication). If the user is allowed to choose how to move in a space, all possible paths must be developed; in the same way, if an application allows an active presence in the narrative, contents must be organized in coherently with the user's selected options.

Finally, some additional elements are necessary to program an Augmented Reality application, such as simulators, debuggers (i.e. software to avoid system errors), tools for managing multimedia and to create web content.

4.2. Hardware

The application hardware consists of sensors, which allow to investigate the state of the real world, a processor, to evaluate inputs received by the sensors and generate the signals required for visualization, and a display, to create the illusion of coexisting physical and virtual environments.

Sensors can be divided into three main categories, depending on their purpose: for tracking, for gathering information from the environment and for gathering the user's input.

The objective of tracking sensors is to establish the exact position of the participant, of the real world and of the Augmented Reality devices by verifying localization and orientation. In order to achieve this, it is possible to use cameras and markers, which are images that computer vision (i.e. the ability of a program to identify the image framed by the camera as one of the stored ones) can easily recognize and link to a determinate position in space. These can be natural elements or, more often, artificial markers, usually asymmetrical, such as QR (Quick Response) codes. The Global Positioning System (GPS) is another tool available to Augmented Reality, as it permits the program to know latitude and longitude coordinates of the receiver using three out of the twenty-four satellites which constitute its network, while adding a fourth one offers information about altitude as well. The main limitation of the system is its insufficient ability to determine the subject's orientation: due to this, GPS is not commonly used in Augmented Reality applications by itself, but rather combined with gyroscopes or accelerometers, usually already built in devices for such applications.

Sensors for gathering environmental information can determine atmospheric conditions, temperature, pH, radio frequencies and several other aspects of the physical world in which the Augmented Reality experience is integrated.

Sensors for gathering user input allow the participant to directly interact with the application thanks to keyboards, touchscreens and similar elements. The user can choose how to conduct the Augmented reality experience by deciding to access certain content or by creating information that can be shared. Thanks to computer vision, cameras can also act as this type of sensors.

The key component of any Augmented Reality system is the processor, which serves the purpose of coordinating and analyzing the data received by sensors in order to generate appropriate response signals and send them to the user interface.

It is fundamental for the computer to complete the assigned tasks in real time, especially when simulating actual objects: in Augmented Reality experiences, the image on the display must be reloaded several times each second to guarantee a realistic effect. Systems for Augmented Reality applications generally consists of one or more multiuse microprocessors for the central processing unit (CPU) and one or more for the graphics processing unit (GPU), optimized for three-dimensional graphics. Most modern smartphones and tablets already offer such elements, thus allowing their use for Augmented Reality experiences, only imposing a limit on the memory storage. This obstacle can however be overcome by using a server to which the device is connected.

Finally, the user interface allows the participant to obtain information about the virtual world as well as the physical one. This category encompasses screens, projectors, head-mounted displays, as well as tools to convey auditory stimuli and technologies to interact with smell, taste or touch.

4.3. *Software*

An Augmented Reality application software is the information technology component which governs the hardware and is generally supported by pre-existing libraries, such as tracking or rendering ones.

One of the first elements needed is the environmental acquisition software, primarily focused on coordinating the system and various sensors used to gather data from the world, whether they be visual, auditory, based on GPS, depth or other input gathering devices.

The following step consists in integrating the array of gathered signals and converting them into information which is useful for the application. For example, the data could show an image within which the software must search for markers in order to identify a participant's location. Such process needs to be constantly repeated, so that any movement can be determined and therefore used to

calculate the camera and marker's relative positions once again. The objective of signal integration is also to combine received information, as is the case when using GPS, gyroscopes and accelerometers, as well as user input.

Another fundamental software component is the application engine, which gathers data from the integration software and generates instructions to render signals which must be transmitted to the user interface.

Moreover, it handles the rules on which both the simulation and content management are based, including coupling markers with virtual resources and loading them. Such characteristics plays a particularly important role in the case of applications destined to mobile devices with limited memory storage, as it is responsible for the ability to exchange objects no longer necessary with those that the application must use at the moment.

Generally, the engine is specially developed for each application, relying on preexisting Augmented Reality libraries as building modules.

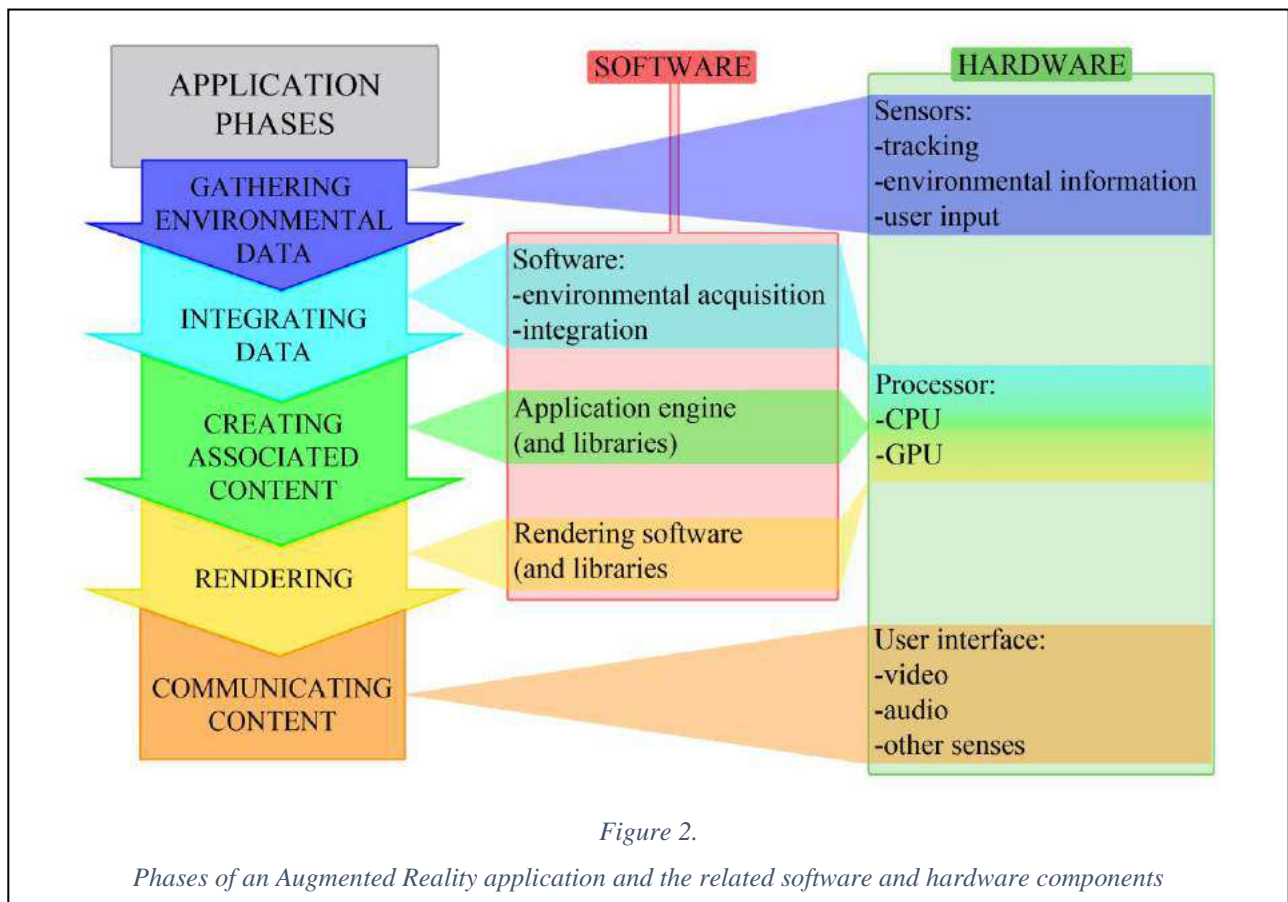


Figure 2.

Phases of an Augmented Reality application and the related software and hardware components

5. Classification of Augmented Reality applications

Augmented Reality represents a communication medium, similar to writing or cinematography: even though its relative novelty could be momentarily sufficient to spark the general public attention, it is paramount to maintain such interest by communicating stimulating and involving content.

In order to achieve this objective, developers must create a strong tie between the experience and the spatial and temporal coordinates for which it is designed. An effective and compelling Augmented Reality application is set in a specific real-world location, which it enriches with digital information, allowing the user to enjoy an otherwise impossible experience.

5.1. Types of Augmented Reality applications

It is possible to distinguish several types of Augmented Reality applications, while considering that there can often be mixes between various categories.

“Magic book”, created by Mark Billinghurst in 2002 is widely regarded as the first Augmented Reality application, integrating a children’s book with virtual objects, visible thanks to a head-mounted display. This type of application permits to add to a text three-dimensional elements that can change through time, while the book can also be used in the traditional way.

Similar categories are “magic mirrors”, through which the physical world is reflected and enhanced with virtual objects; “magic windows” or “doors”, through which it is possible to look at the existing reality with the addition of digital elements; “magic lenses”, which play a similar role using objects through which the participant observes the environment e.g. glasses, binoculars, etc.

Other kinds of Augmented Reality applications are those used to navigation assistance; nonreferential augmentation, in which the digital component only has a marginal impact on the surroundings; objective view Augmented Reality, in which users see themselves represented in the application.

Augmented Reality can also be easily adapted to collective experiences, whether they involve multiple participants at the same moment, therefore called simultaneous, or users engage with the application at different times, thus referred as asynchronous.

5.2. *Augmented Reality for mobile devices*

In the past years, Augmented Reality applications have developed a tendency towards mobility, thus allowing users to carry them wherever they please.

To achieve this aim, creators favor devices such as smartphones and tablets, lightweight and easily handled even while walking,⁹⁵ whereas HDMs are still not perceived as sufficiently comfortable or safe, despite the availability of similar technology in the form of glasses or lenses.

Besides practicality, one of the main benefits of Augmented Reality applications designed for smartphones or tablets is the possibility to enjoy the experience directly in situ at any moment. Furthermore, such technology also represents an economically advantageous choice, especially since most users already own a similar device, thus additionally benefitting from familiarity with the tool.

On the other hand, mobile devices only offer relatively limited memory storage, computational and graphic-generating capacity, input and output options.

Some of these obstacles can be circumvented by employing a range of strategies, for example by allowing the application to only load on the device the virtual objects needed at the time, gradually exchanging them for new elements when they are no longer necessary.

From an environmental point of view, lighting conditions must be taken into consideration and carefully evaluated: if scarce, they could limit the camera ability to capture images of the surroundings, thus hindering the program's recognition capacity; if excessive, they could represent a problem for the user when looking at the display. Furthermore, the noise level must be such as not to interfere with any audio generated by the Augmented Reality experience. Finally, a wireless network needs to be available in order for the application to connect and download content.

⁹⁵ (Sherman & Craig, 2013) p. 209.

6. Augmented Reality and 3D digital reconstructions for Islamic Art⁹⁶

As elucidated by the examples above, Augmented Reality has proven to be a powerful instrument of communication for the cultural heritage, providing the public with engaging and personalized content. Among the various categories of museum and monument that have adopted this technology, the institutions of the Western world focused Islamic art have found it particularly advantageous, especially as the novel tools permit curators to explain in a clear and intuitive way several aspects of a topic regarding which most visitors may have no previous knowledge. Due to the range of media that Augmented Reality applications can offer to the public, they can be used to guide the audience through the discovery of aesthetical factors such as art styles, materials and techniques, as well as the historical and cultural context, through text, images, archival documents, videos or digital models. The wide variety of options offer a high level of personalization while also resulting highly interactive, for participants have the possibility to select the content which most interests them.

6.1. New technologies for Islamic art museums in the Western world

In recent years, a number of museums have explored the opportunities provided by Augmented Reality and their endeavors have generally been met with great approval by the public.

In the field of Islamic art, one of the first cases for Western institutions was the application developed by the Louvre-DNP Museum Lab in 2008. Created for an exhibition which for six months would shine a spotlight on the most notable elements of the Louvre Islamic art collection, the Augmented Reality guide had primary goals: firstly, it concentrated on directing visitors towards the artwork according to a prescribed order; secondly, it offered users background knowledge with respect to the selected pieces. In order to achieve these objectives, Augmented Reality animations illustrated the correct route for the public and provided explanations once visitors reached the artwork. Moreover, thanks to information layers, specific pieces of the collection were employed as models to demonstrate an array of artistic processes, as well as the history of the conservational challenges with which scholars restoring the artwork were faced. The audience perceived the application as an

⁹⁶ (La Duca, 2016)

especially useful instrument, for it also gave them the ability to closely observe details and to digitally manipulate the artefacts in order to better view them, for example showing the reverse side of ceramic tiles.⁹⁷ The success obtained by the guiding system produced for the exhibition lead curators to adapt the results to the permanent collection when it was reorganized in 2012.

The following year, the Sackler Museum in Harvard launched the exhibition “In Harmony: the Norma Jean Calderwood Collection of Islamic Art”, which took advantage of the application Layar in order to provide visitors with additional content regarding six of the displayed pieces of art. Due to its ability to analyze each object, such Augmented Reality application offered access to supplementary information, incorporating photographs of the conservation procedures, comparative images and videos demonstrating which techniques had been used to create the artefacts. According to digital communication manager at the Harvard Art Museums, Jennifer Novak, the application not only expanded the public’s knowledge, but also encouraged more meaningful relationships with the artwork, in particular thanks to the interactive nature of the guide.⁹⁸

In 2014, the Metropolitan Museum of Art of New York followed the example set by the Louvre-DNP Museum Lab and employed an Augmented Reality application to offer visitors a chance to better explore the galleries of its Department of Islamic Art. In particular, the application concentrated on the ceramic artwork, as it mainly consisted of fragments or single tiles, therefore appearing difficult for participants to understand without proper guidance. Thanks to a two-month-long collaboration, designers Betty Quinn and Sarah Wever generated a software that allowed visitors to visualize the original aspect of these pieces, when the tiles were used to create patterns that covered extensive areas such as walls and floors. Thanks to the employment of object recognition programs, the Augmented Reality application was able to correctly identify each artefact and consequently offer users the opportunity to explore how designs were created. An intuitive graphical interface clarifies the algorithms and equations that permitted the generation of each tile, thus allowing the public to easily visualize the process and how a change in parameters reflects on the final design, which evolves according to the participant’s input. Such interesting and educational engagement with the art that is

⁹⁷ (Miyashita, et al., 2008)

⁹⁸ (Aubin, 2012)

exhibited in the Department of Islamic Art proved beneficial to the audience's understanding of the complex mathematical procedures involved in the creation of such tiles and the relative patterns.⁹⁹

6.2. *New technologies for Islamic art monuments in the Western world*

Academics have been exploring the possibilities of three-dimensional digital models to visualize and communicate the original aspect of Islamic artefacts of a larger scale, such as the aristocratic estates known as *munyas*. Their fragmentary remains, though valuable for archaeological studies, can seem enigmatic to the general public, therefore warranting a novel approach in order to allow visitors to discover their importance in terms of historical and aesthetical significance within the larger landscape of Islamic Art.

The “Digital Munya project” pursues such objective through the development and employment of navigable three-dimensional models that exploit the Unity gaming platform to visualize the original aspect of two villas near Córdoba, *al-Rummaniyya* and *Madinat al-Zahra'*. While the generation of accurate reconstructions proves to be a difficult endeavor, the initiative still manages to offer both scholars and general users an instrument to better understand and analyze these heritage sites, exploring the visual possibilities in an engaging way, as the game allows participants to experience alternative visualizations based on archaeological evidence and the integration of museum artefacts from the same period. Furthermore, in order to gain the ability to change the aspect of the model, users need to answer questions about al-Andalus, thus improving their comprehension of the history and art of the region.¹⁰⁰

Similarly to Western museums including collections of Islamic art, monuments regarding the same cultural context have also begun exploiting the advantages of Augmented Reality applications to better connect with visitors. Granada, in particular, hosts several emblematic projects, due to the fact that Moorish artefacts represent a significant and vital part of the city's heritage, as can be seen both in the Albaicín district and in the monumental complex of the Alhambra.

⁹⁹ (Quinn, 2014)

¹⁰⁰ (Anderson & Lastra, 2017)

In the Islamic neighborhood called Albaicín, visitor can discover Granada's Moorish past through the "Dobla de Oro" route, which includes three heritage sites in which the Agencia Albaicín offers geolocalized digital reconstructions in order to allow the public to discover the original aspect of the monuments. In fact, as the audience visits the thermal baths of the Bañuelo, the aristocratic residences of the Casa de Zafra and the Casa Horno de Oro, visitor are granted the possibility to observe the heritage sites as they would have appeared during the Zirid or Nasrid period, while also reading about the most important characteristics of such buildings.

Furthermore, the Agencia Albaicín provides the public with another interactive option to discover the district through new technology. The "Casa Zafra" application, easily downloadable on smartphones and tablets, permits users to access different types of content, such as a map of the area, different tour routes suitable for adults and children, and an Augmented Reality tour. This element in particular allows participants to view historic photographs of the main landmarks of the Albaicín, superimposing them on the physical environment in order to underline differences and similarities in their aspect then and now, thus offering an intuitive rendition of their stratigraphic evolution.¹⁰¹

In 2013, Augmented Reality became part of the Alhambra visitor experience as well, thanks to the monument's participation in the 36-month-long "Tag Cloud" project. The initiative developed an application to guide visitors through the complex, providing them with practical information as well as comments and photographs uploaded by other users, thus highlighting the social element of the experience.¹⁰² This first experimentation, however, barely skimmed the surface of the potential of an Augmented Reality application for the Alhambra in terms of educational and experiential advantages for both the general public and scholars.

6.3. *Further research: an application for the Alhambra*

In order to advance the investigation on how Augmented Reality could represent a valuable asset for both scholars and curators communicating with the public of the Alhambra, this study proposes a different approach to the creation of such application, also based on the success enjoyed by similar tools employed by other museums and monuments linked to Islamic art.

¹⁰¹ (Granada, 2016)

¹⁰² (de los Ríos, et al., 2014)

Due to its extraordinarily richness in both historical and artistic elements, the Alhambra epitomizes the significance of the Islamic influence on medieval Europe, with an influence that extended well beyond its geographical and temporal limits. The variety of aspects which could be explored and communicated to the audience is virtually infinite and could therefore be best explored through an expanding application employing several media.

While a basic guide would offer an interactive map as well as audio and text files providing an array of information, a valuable addition for visitors would be the option to view geolocalized digital reconstructions of complex through different periods of its evolution, in a similar fashion to what is provided in the “Dobla de Oro” heritage sites. Moreover, documents from both the archive and the museum of the Alhambra, as well as from any other suitable source, should be layered over the physical environment, advancing the example of the “Casa Zafra” application. Further options could include the ability to explore interdisciplinary connections, such as comparisons with other artwork, reconstructions of artisanal techniques, the scientific and mathematical processes used in the creation of the monument, the epigraphy that decorates its halls, in particular visually highlighting and translating the poems.

This Augmented Reality application is envisioned not only as a guide for the visitors, but also as a tool for academics, thanks to the practical advantages of direct on-site access to archival documents, thus representing an improvement for digital art historians interested in the monument, increasing the transmission and generation of knowledge and therefore the conservation and valorization of the Alhambra.¹⁰³

The design and creation of such a complex and vast application represents an ambitious objective for which a team of scholars, designers and information technology experts would be needed. Therefore this study, while presenting the idea as a proof of concept for what could be achieved by exploiting novel technology, primarily focuses the research on a particular feature, which could represent one of the most beneficial aspects for academics.

In the following chapters, the connections between the Alhambra and other artwork inspired by it are explored as preliminary research for the content of such section of the application, demonstrating

¹⁰³ (La Duca, 2016)

both the influential role of the monumental complex through centuries and the importance of properly communicating it to the public.

III. The image of the Alhambra through documents and artwork

1. A brief history of the Islamic Alhambra

The monumental complex of the Alhambra, in Granada, represents one of the highest achievements of al-Andalus, a civilization born of the encounter between Christianity and Islam when, in the VIII century, the Iberian Peninsula was occupied by the so-called Moors, a term which indicates people from Arabia and Northern Africa. After a rapid conquest, the newest province of the Damascus Caliphate obtained independence under the Ummayyad emir Abd al-Rahman I, who transformed the South of Spain into the political, economic and cultural center of a flourishing kingdom. During the following centuries, the alternating fates of the monarchs were reflected by those of al-Andalus itself, as wars of succession weakened the emirate and brilliant intellectuals livened its court, while adjacent Christian states exercised pressure on its borders in a slow yet unrelenting process known as the Reconquista. These events frame the foundation of the Kingdom of Granada in 1232, at a time when the Islamic rule over the Iberian Peninsula was already evidently declining.

The rise and fall of Granada and the Alhambra under Islamic rule, as well as the subsequent events, has been a topic of interest for a number of authors, as chronicles by Muslim writers have been accompanied by the diaries of travelers since the Renaissance until the Romanticism. In the past two centuries, the broad subject has been the focus of several scholars, who have detailed different aspects of the multifaced and winding history of the city and its palace. Among them, the main bibliographical references are the volumes of Manuel Gómez Moreno,¹⁰⁴ which offer a fundamental historical and archaeological analysis of the monumental complex, the text of Oleg Grabar,¹⁰⁵ who studied the palaces from a formal and aesthetical point of view as well, and that of Fernando Aznar,¹⁰⁶ focused on the artistic characteristics and their evolution within the context of al-Andalus. More recently, the studies of Carlos Vílchez Vílchez,¹⁰⁷ concentrated on the XX century restorations, and those of

¹⁰⁴ (Gómez Moreno, 1892)

¹⁰⁵ (Grabar, 1980)

¹⁰⁶ (Aznar, 1985)

¹⁰⁷ (Vílchez Vílchez, *La Alhambra de Leopoldo Torres Balbás (Obras de Restauración y Conservación. 1923-1936)*, 1988)

Antonio Malpica Cuello¹⁰⁸ constitute some of the key sources for reconstructing the history of the Alhambra.

1.1. From early settlements to the XII century

The territory of Granada has been described since ancient Greek and Roman times by authors such as Strabone and Plinius, due to its privileged position from both an economic and military point of view. The great fertile valley, known as the vega and surrounded by mountains, is crossed by rivers Darro and Genil, which have always guaranteed water resources as well as providing a natural route for commerce. Early settlements developed on the hills along the riverbanks, which Granada dominated from its elevated position atop three hills near the Sierra Nevada. One of them in particular, the Sabika, would later host the Alhambra, for it allowed to easily defend the territory it oversaw, blocking the northern access. In fact, these aspects were noticed and exploited by the Romans as they built the oppidum Iltuir, which in the IV century b. C. became the city of Iliberri and, later, the Municipium Florentium Iliberitanum. As the Roman Empire rose and fell, so did the Municipium: when the North-African populations arrived in the VIII century, the territory was almost entirely uninhabited and easily became part of the Western Caliphate, conquered by Abdelaziz in 714.

The earliest account of a so-called Moorish fortress in the area date back to 889, when, according to local chronicles, governor Sawwar ben Hamdun took refuge from a revolt in a building known as al-Hamra, a fortress roughly corresponding to the Alcazaba. The term indicated the distinct red coloring of the clay which was abundant in the territory and which still determines the name of the monument.

In the XI century, due to political quarrels and wars of succession, Granada became one of the numerous taifas, small kingdoms into which the Caliphate had fragmented. The territory quickly passed under the Almoravid empire and then the Almohad one, becoming the capital of the province of Elvira in 1012. A multicultural center for commerce, the city was then governed by the Zirid dynasty, of Berber origin, under which the capital grew both economically and demographically, while hosting Christian, Islamic and Jewish communities as well as a thriving cultural elite. In fact, in his XII century text, “In praise of al-Andalus”,¹⁰⁹ the poet al-Saqundi describes Granada as the

¹⁰⁸ (Malpica Cuello, 2007)

¹⁰⁹ (al-Saqundi)

Damascus of al-Andalus, high upon the vega, surrounded by silver streams and emerald trees, a description echoed by Abd Allah Ibn Buluggin, last Zirid king of Granada. During this period, the hill of the Albaicín was urbanized, while on the Sabika Yusuf ibn Nagrela, Zirid vizir, built his fortified residence. Called Qalat al-Hamra, or ‘the red castle’, the palace was attacked in 1066, as well as in 1144 by warrior Zafadola, during a rebellion against the Almoravids, and in 1162 by Ibn Mardanix.

1.2. Muhammad I’s kingdom and his palace, the Alhambra

In 1232, Muhammad ibn Yusuf ibn Nasr, known as al-Ahmar or ‘the red one’, started the Nasrid period of dominance over Granada, establishing in the city the new capital of its kingdom.

Due to Christian incursions in other Islamic areas of al-Andalus, Granada had become a refuge for a number of exiles, including poets, artists and philosophers from nearby courts. The demographic increase resulted in an advantage for the city, as its economic resources were sufficient to welcome such arrivals. In fact, the fertile vega, the mines of precious metals and gemstones, as well as the flourishing trades guaranteed a great wealth to the kingdom. Muhammad ibn Nasr further increased such favorable conditions by expanding the territories, aiming to unify Islamic Spain and vanquish the Christians. In 1248, however, as Sevilla was conquered by the opposing armies, Granada remained the last Islamic kingdom in the Peninsula and only its remarkable economic fortune allowed it to resist for over two more centuries.

The traditional patronage that Islamic monarchs extended to the cultural elite continued under Muhammad I, who surrounded himself with writers, philosophers and scientist. Moreover, his interest in transforming the court in a center for the arts led towards the foundation of the Alhambra: according to the chronicle of Ibn Idari al-Marrakusi,¹¹⁰ in 1238, the sultan marked the foundations of the castle on the place known as al-Hamra. There, he built the Torre de la Vela, strengthening the Alcazaba and creating an aqueduct to obtain water from the Darro. The construction of the palace, of which there appears to be no detailed description, lasted until the death of the sultan in 1273, who effectively transformed the Alhambra from a simple fortress to a palace, a medina which included a political and administrative center.

¹¹⁰ (al-Marrākushi)

1.3. *Expansion of the Alhambra*

The sultan's son, Muhammad II, continued his predecessor's efforts in both fighting Christian armies and building the fortress, especially focusing on its defensive system, but it was during Isma'il I's kingdom, between 1314 and 1325, that the architectural complex acquired the characteristics of a palace.

Indeed, the monarch was responsible for building the Mexuar, the most ancient part of the Nasrid Palaces still visible today. Most of the complex, however, was built by Muhammad V in the second half of the XIV century, as he commissioned the residential areas of both the Palacio de Comares and the Palacio de los Leones, dedicating the Mexuar to administrative task. The opulence of the Alhambra was meant to be a reflection of the cultural and economic wealth of the kingdom of Granada, as architects and artists designed and decorated its halls, aided by mathematicians to study harmonic proportions and poets to compose the verses inscribed on its walls, thus creating what is still considered the epitome of so-called Moorish art.

The Alhambra impressed a number of Islamic travelers, who narrated their experience of the city, such as Ibn Said al-Magribi,¹¹¹ prince Abulfeda,¹¹² who remarked on the sturdy fortification and the similarity between Granada and Damascus; Ibn Battuta,¹¹³ who designated Granada as the heir of Cordoba and Sevilla; Abd al-Basit,¹¹⁴ who visited the city in 1465. While short descriptions of the Alhambra and comments on its luxurious aspect are often included in such texts, it appears that no image representing it was produced.

The heirs of Muhammed V, such as Yusuf II, mainly finished or maintained the complex according to original plan, as the kingdom of Granada gradually lost its strength, wrecked by internal conflicts, until in 1492 Muhammad XII Boabdil, the last Nasrid sultan, surrendered to the Catholic Monarchs, Ferdinand II of Aragon and Isabella I of Castile. The conquest of Granada marked the end of the Reconquista and delivered one of the jewels of Islamic architecture to the Spanish Crown.

While the conservation of the Nasrid Palaces is remarkable and they constitute the main point of interest for voyagers since the time of their construction, it must be noted that they underwent a series

¹¹¹ (al-Maghribi)

¹¹² (l-Fidā')

¹¹³ (al-Ṭanġī)

¹¹⁴ (al-Ḥanafī)

of interventions as numerous governors, resident and sometimes even tourists left their mark on the palatial complex.

2. The Catholic Alhambra, a symbol of the Reconquista

Following the Reconquista, the Catholic monarchs did not make substantial changes to the urban architecture of Granada, for the most part limiting their interventions to minor restorations. On the other hand, from a social and political point of view, they transformed the crucible of cultures by casting away the Jewish community and forcing Muslims to either convert or go into exile. At the same time, like most of Andalucía, the city prospered thanks to the trades with the New World, expanding in territory and population.

The Catholic Monarchs adopted a similar approach towards the Alhambra, apporportioning relatively few modifications that nevertheless had great symbolic value: the construction of the Puerta de Granadas, similar to a triumphal arch, as well as the addition of easily defensible round towers and the transformation of the mosque into the Church of Santa María, clearly marked the passage from Islamic to Christian domination. The ornaments of the Nasrid Palaces were partially transformed, for elements of the Renaissance aesthetics as well as the insignia of the conquerors were incorporated into the existing decorations and some areas were transformed into chapels. Both the Alcazaba and the medina, deeply damaged by the conflict, were not restored, thus depriving the complex of important aspects and turning it into a more ordinary Western royal palace.¹¹⁵

Since its arrival in Granada in 1526, Emperor Charles V showed great interest in the city, where he started building a Renaissance-style palace inside the Alhambra, while also strengthening its fortifications, such as the Torre del Agua, de los Picos, de la Bruja, de los Siete Suelos and the Torres Bermejas. During the same period, in the Nasrid Palaces the Cuarto Dorado and the Patio de la Reja y Lindaraja were modified, while in 1540 the glass ceiling of the Mexuar was replaced by a wooden one in order to obtain a second story.

The monarchs' interest in the Alhambra, however, gradually decreased. The construction of the imperial palace extended in time and was never terminated, while the complex started to be considered almost exclusively a military fortress. In 1590, an explosion destroyed part of the Sala de

¹¹⁵ (Galera Mendoza, 2014)

los Mocarabes, almost entirely obliterating its muqarnas ceiling: the event marked the beginning of a period during which the palace was neglected by the Crown and started degrading, eventually becoming a refuge for the lower classes.

Nevertheless, since the end of the XV century, both the city of Granada and the Alhambra became the subject of graphical representations, thus beginning their long history as a topic of interest for the arts and gradually exercising a deeper influence on a number of disciplines. The earliest images heavily focused on the symbolic value of the city and its royal palace, showcasing its importance during key phases of the Reconquista while often greatly stylizing and simplifying the aspect of the urbanistic environment in order to synthesize it into few easily recognizable elements. The work of Antonio Gámiz Gordo, published in 2008,¹¹⁶ offers a systematic and detailed overview of how such depictions of the Alhambra gradually evolved and therefore constitutes one of the primary resources for such topic.

2.1. The sculpture in the choir of the Cathedral of Toledo

The reliefs of the choir of the Cathedral of Toledo include the first sculpture of the city of Granada. The artwork, started in 1489 and finished by 1495, was commissioned by archbishop Pedro Gonzàles de Mendoza, who witnessed many of the scenes of the Reconquista depicted on the choir backrests, to Rodrigo the German.

¹¹⁶ (Gámiz Gordo, 2008),

The Palace of the Alhambra appears in two of the reliefs, the one dedicated to Santa Fe (

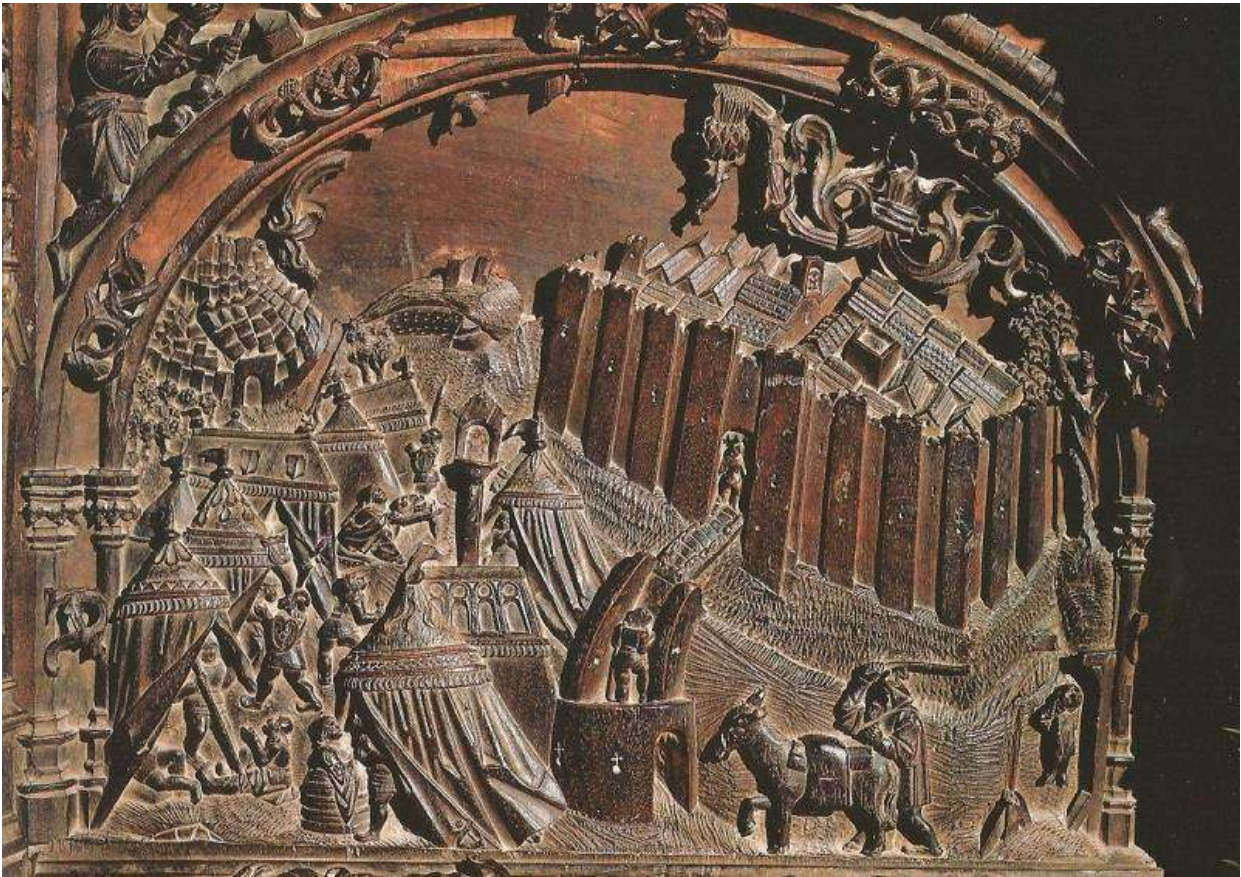


Figure 3) and the one depicting the conquest of Granada (Figure 4). In the first one, the upper part of the artwork is occupied by a small representation of Granada, characterized by the river Darro, the Albaicín and the Alhambra, recognizable thanks to the towers of the Alcazaba.

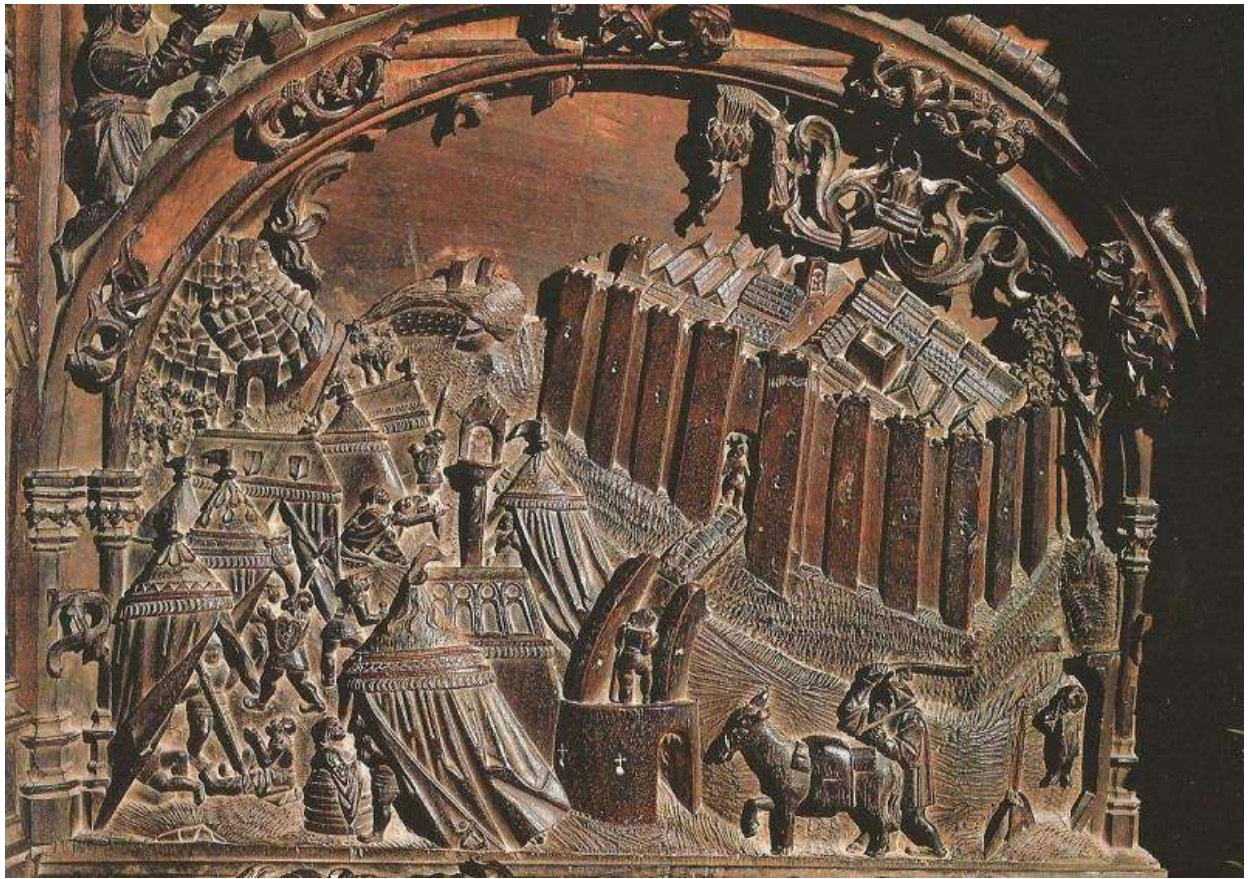


Figure 3.

Relief of the choir of the Cathedral of Toledo: Santa Fe; Rodrigo the German; 1495

Similar details are included in the relief entirely dedicated to the final act of the Reconquista, which corresponds to the seat of honor to the right of the archbishop. In this representation of Granada, the Alhambra can be seen in the upper right, once again indicated by its fortifications and towers. The scene is completed by a narrative element, as Boabdil, last of the Nasrid sultans, kneels in the lower right corner and surrenders the keys to the city to king Fernand II of Aragon.

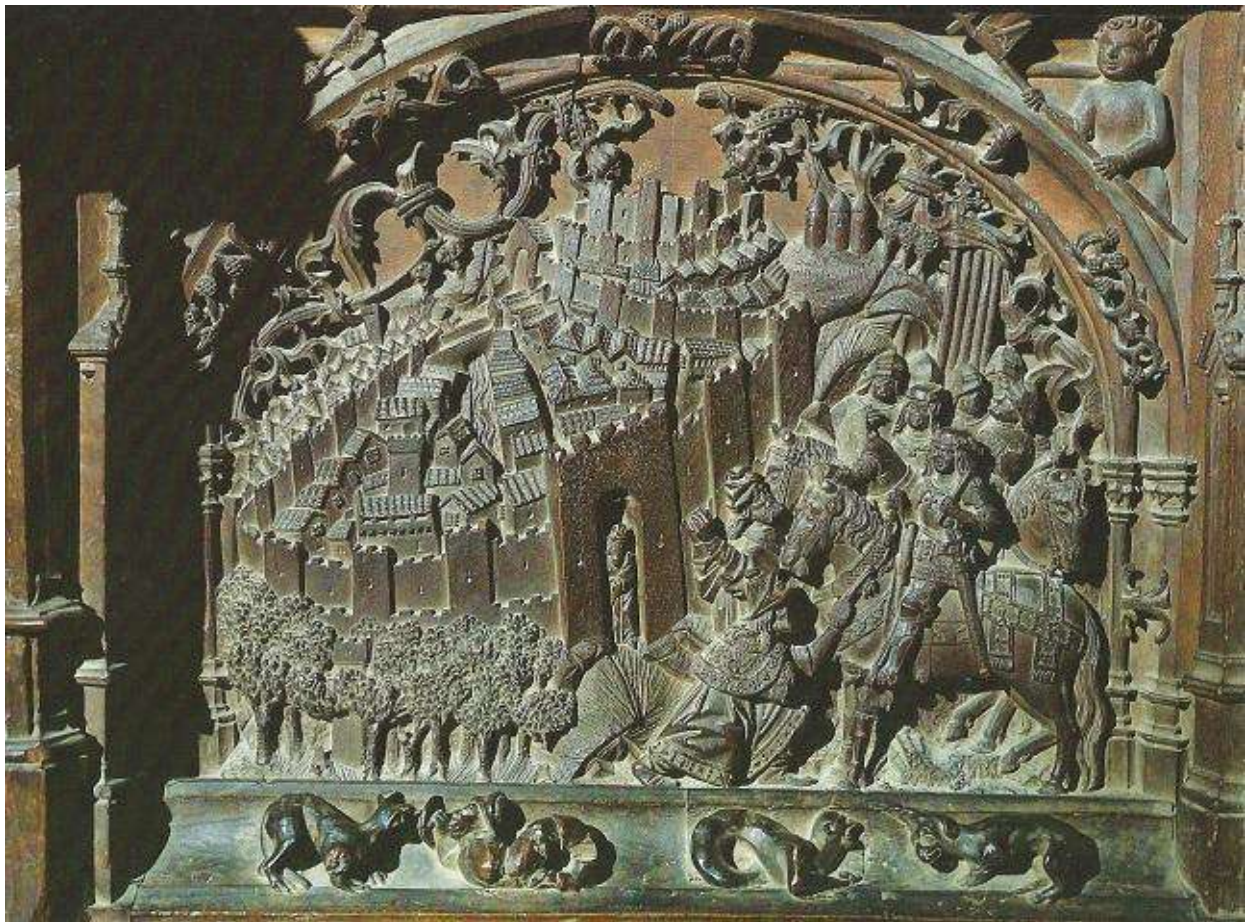


Figure 4.

Relief of the choir of the Cathedral of Toledo: Conquest of Granada; Rodrigo the German; 1495

2.2. The fresco of the Sala de las Batallas

An early depiction of the Alhambra can be found in the Sala de las Batallas (Hall of Battles) of the Escorial Palace, where a fresco started in 1584 and finished in 1591 represents the Battle of Higuera. The episode, which took place in July 1431, marked the victory of king Juan II of Castilla, whose troops, led by Álvaro de Luna, defeated Muhammad IX, thus allowing Ysuf IV to gain power in Granada.

The fresco was created by Niccolò Granello, Fabrizio Castello, Lazzaro Tavarone and Orazio Cambiaso, artists from Genoa who, as explicitly requested in their contract, based their work on a XV century canvas by Nicolas the French, who in turn was inspired by the notes of one of the eyewitnesses of the battle. The representation of the city includes a number of important urbanistic references, such as the fortification of the Alcazaba Antigua and of the medina, Puerta Elvira, the

rivers Darro and Genil, the Alcazar Genil, as well as the Alhambra. The palace is depicted with different levels of fortification and high towers representing the Torre de la Vela, Quebrada and del Homenaje; the surrounding wall offers an opening corresponding to the Puerta de Justicia, while the Generalife remains hidden by the other buildings.



Figure 5.

Sala de las Batallas: Battle of Higuera, detail of the Alhambra; Niccolò Granello, Fabrizio Castello, Lazzaro Tavarone and Orazio Cambiaso; 1591

2.3. The “Virgen de Granada”

An anonymous oil on table of probable Flemish origin, painted in the first half of the XVI century, includes of Granada as part of the background for a religious scene. Tentatively attributed to the son of Petrus Christus, who resided in Granada between 1507 and 1530, and known as “Virgen de Granada” (Figure 6), it depicts the Coronation of the Virgin: in the upper part of the image, two floating angels hold a crown above the head of a Madonna with Child, who is located sitting in a field between two angels playing musical instruments. The middle portion of the table is occupied by a detailed representation of the city (Figure 7) viewed from the vega, although the artist elevated the point of view through refined techniques, as there are no hills that offer such perspective.

Fortifications surround the urban nucleus, while the Alhambra can be seen on the right side of the image, easily recognizable thanks to its towers. The artist offers a trustworthy representation, possibly because of specific interests of the owner. Considering that Isabel the Catholic was a collector of such artworks, it is probable that the painting could have been commissioned by her or by someone in her court, possibly Don Gonzalo Fernández de Aguilar y de Córdoba, known as Gran Capitán, since one of his properties, the *carmen de los Chapiteles*, is especially highlighted. Interestingly, from such perspective, the Alhambra should cover the *carmen*, which is instead placed on higher ground in order to be visible. An accurate image of the city would have been of particular value, since the Catholic Monarchs focused their efforts on improving its defensive system.

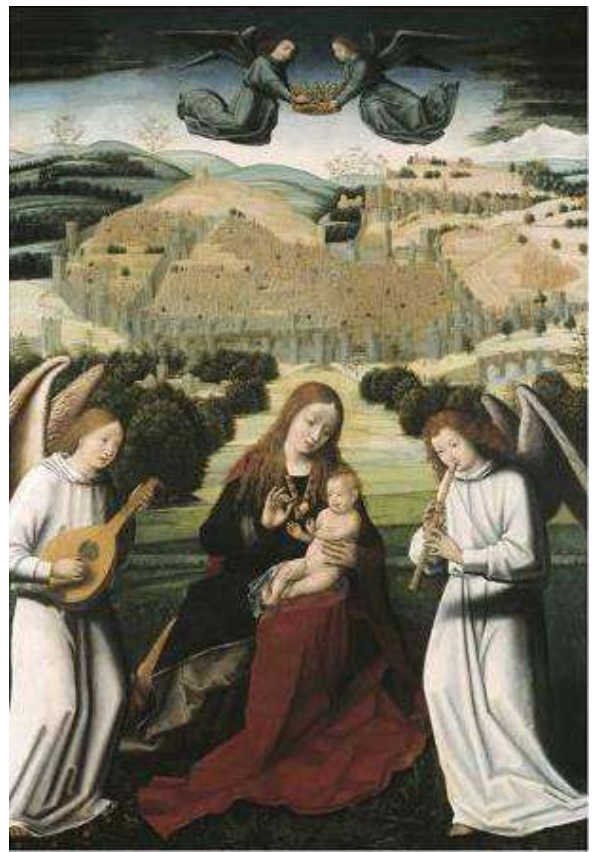


Figure 6.

The Virgen de Granada; Petrus Christus's son; 1507



Figure 7.

The Virgen de Granada: detail of the Alhambra; Petrus Christus's son; 1507

As mentioned, the perspective used in the painting cannot be seen from any point of the vega. It seems probable that the artwork was thus created by taking notes of the real view of the city to later manipulate the point of view, elevating it and offering a better perception of its urban landscape. The Alhambra is clearly recognizable, as the artist depicts the towers of the Alcazaba over the Sabika hill, as well as the monumental entrances known as Puerta de Justicia and Puerta de los Siete Suelos, and, further on, the Generalife. Moreover, the painting includes a bastion in front of the Torre de la Vela, built in the XV century, where the Puerta de la Alcazaba was located. Such entrance, exclusively dedicated to military use, connected the fortress with the castles of the Torres Bermejas and was discovered in 1894 by Manuel Gómez Moreno. A similar bastion of Christian origin can be seen in front of the Puerta de Justicia, while the one corresponding to the Puerta de los Siete Suelos is not represented. Inside the fortress, a notable element is constituted by the minaret of the mosque built by Muhammad III, later replaced by the church of Santa María. Nearby there are three small towers, probably belonging to the Palacio del Príncipe (now the Parador de San Francisco), the Palacio de los Abencerrajes and the Palacio de Yusuf III. Five more towers can be seen near the Nasrid Palaces: two could correspond to the Sala de los Abencerrajes and the Sala de las Dos Hermanas, while another could belong to the vault of the Mexuar, transformed at the time of Charles V, or to the courtyard in front of it. The two towers closer to the Alcazaba, instead, could belong to a mirador south of the Palacio de Comares or maybe to the southern side of the Mexuar.

2.4. The Alhambra as an emblem of Granada

The XVI century saw a number of other representations of Granada, several including the Alhambra as a recognizable symbol of the city.

The Capilla Real of Granada hosts a relief attributed to Felipe de Vigarny and Alonso Berruguete, dated between 1520 and 1522 depicting the surrender of Boabdil in front of the Puerta de Justicia, while in the background the Torre de la Vela and the Alcazaba can be seen (Figure 8). The Torre de Comares can be seen on the coat of arms of the Zafra family (Figure 9), who helped the city government under the Count of Tendillas and the Archbishop. Several prints of Granada and its main monument also appeared in this period, often to accompany their description in books dedicated to the most recent history of the Reconquista, such as “Ad Hispaniarum Principes Ferdinandum et Elisabeth Panegyris de Triumpho Granatensi, metrica, Romae, Eucharius Silber” by Paulus Pompilius, “La Trecelebrable digne de memoire et victorieuse prise de la cite de grenade” and “Das Trachtenbuch Des... Von Seinen Reisen Nach Spanien”, by Christoph Weiditz.



Figure 8.

Capilla Real: the surrender of Boabdil; Felipe de Vigaray and Alonso Berruguete; 1520

The variety of languages represented by these titles offers a glimpse of the interest which the topic sparked, indubitably aided by that fascination for the Orient that would later characterize the Romantic vision of the city; however, the quality of such depictions can be lacking, especially in terms of fidelity to the real aspect of the Alhambra. A similar representation can be found also in the volumes of “Libro de las Grandezas y Cosas Memorables de España” (Figure 10), written by Pedro de Medina, which includes a xylography of the city, symbolically represented by a few of its characteristics, such as the two rivers and the surrounding fortifications; the Alhambra is merely depicted as a small cluster of indistinct buildings surrounded by defensive walls on a hill in the upper right.



Figure 9.

Coat of arms of the Zafra family; 1539

Even more generic is the engraving presented in “Geographia Universalis” and in “Cosmographia” by Hans Holbein, which does not include the Alhambra but which was also a source of inspiration

for other engravers: “Thesoro Chorographico de las Españas” by Diego de Cuelvis¹¹⁷ includes a similar view of the city, in which the main monument is missing, despite the fact that the author specifically describes it during his visit in November 1599. The traveler dedicates a few pages to the Alhambra, recounting the origin of its name, describing its grandeur in terms of dimensions and elegance and detailing some of the main areas, such as the Palacio de los Leones and the Emperor’s Palace.

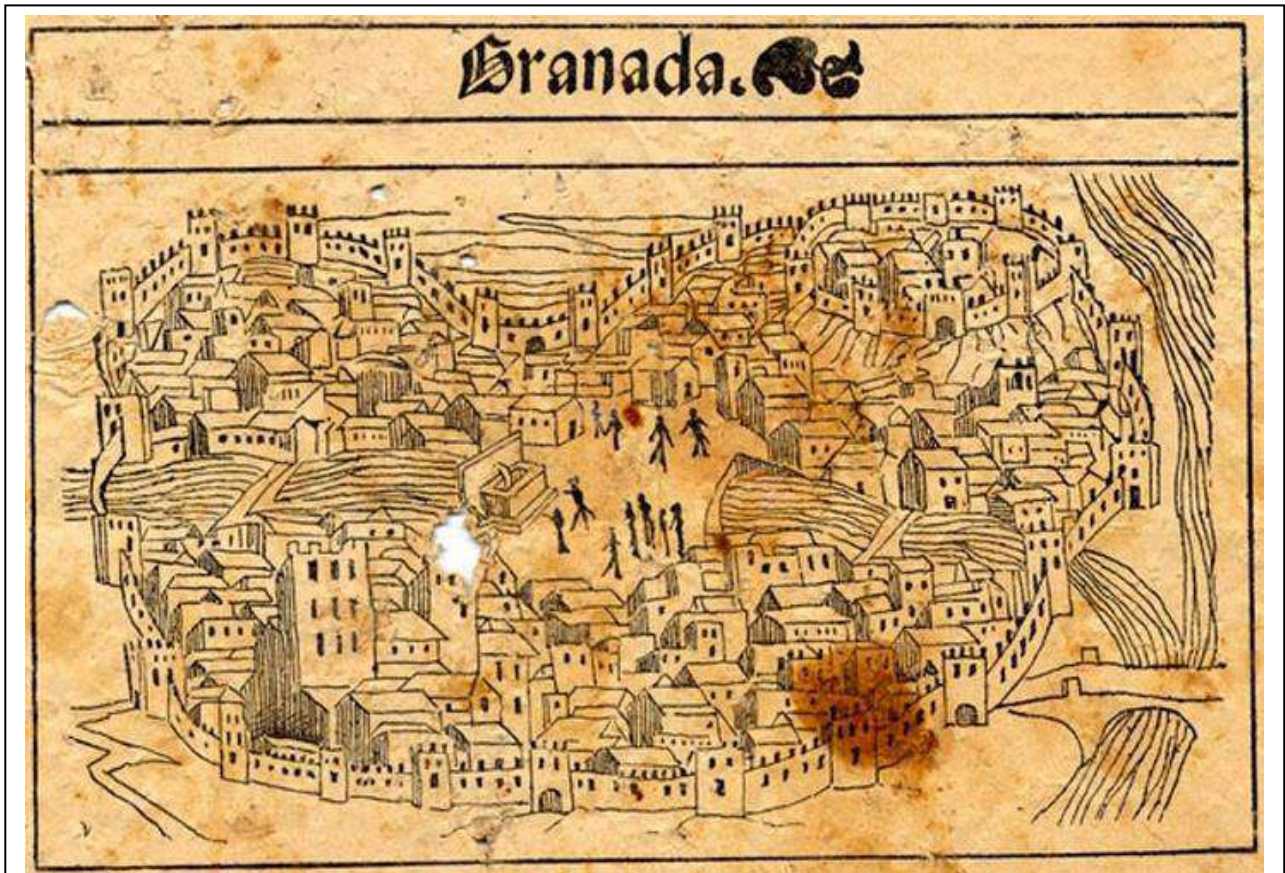


Figure 10.

Libro de las Grandezas y Cosas Memorables de España: Granada; Pedro de Medina; 1548

¹¹⁷ (de Cuelvis, 1600)

3. Atlases and plans of the Alhambra

Since the beginning of the great exploratory voyages of the Modern Age, many European countries started to develop a deep interest in geography and foreign civilizations, albeit usually deeming the latter curiosities rather than the object of serious consideration. The rising trend led the upper classes to collect maps and city views, thus incrementing the request for such artwork, often commissioned by monarchs and popes.

Among them, a few documents in particular offer insights on the aspect of the XVI century Alhambra. The Gran plano, as well as the views contained in the “Civitates Orbis Terrarum” and the depictions by Anton van den Wyngaerde consider the monumental complex as a fundamental part of the urban landscape of Granada and are often accompanied by descriptions of the palace.

3.1. *The first plan of the Alhambra*

The first document mapping the plan of the Alhambra dates back to the first half of the XVI century, probably around 1532. Preserved in the Royal Palace of Madrid, it has gained the name of Gran plano or Planta grande due to its impressive dimension, as it measures 62x132 cm.

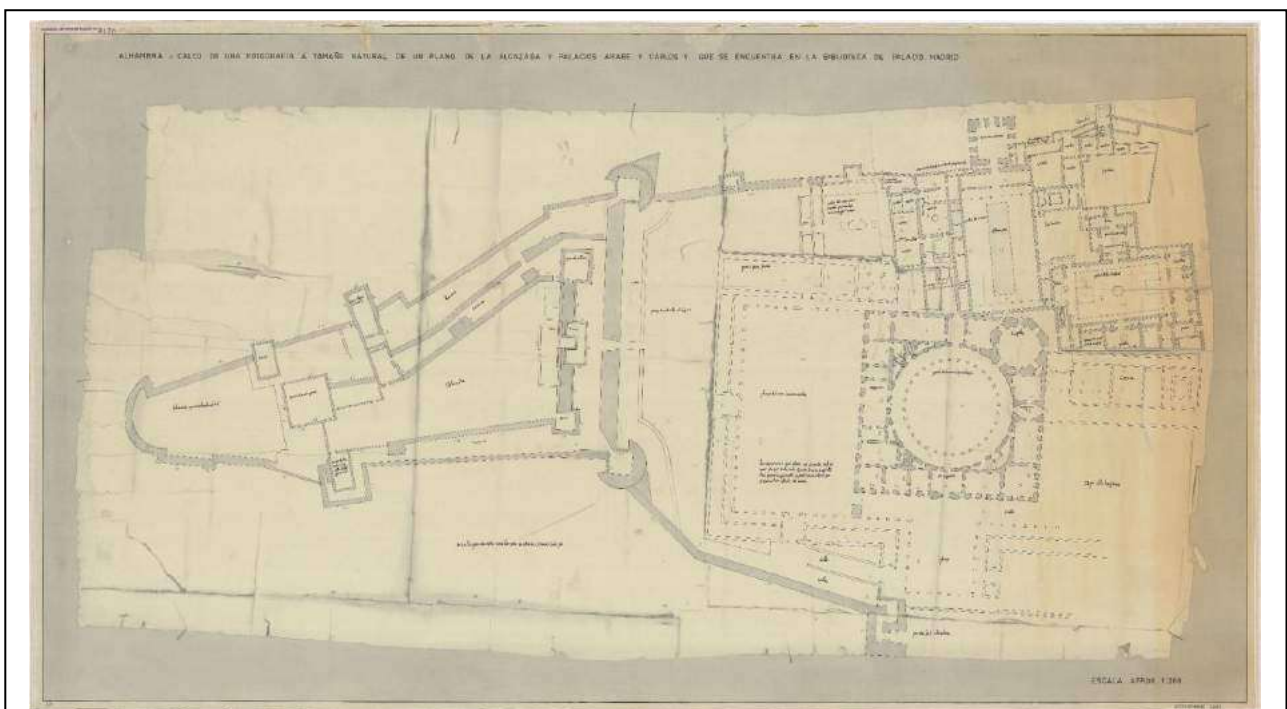


Figure 11.

Gran plano or Planta grande de Granada; Diego de Siloé and Pedro Machuca; 1532

The anonymous drawing, attributed to Diego de Siloé and Pedro Machuca, depicts almost half of the fortress, from the Alcazaba to the Puerta de Justicia in a scale of approximately 1:300, although it includes a number of geometrical irregularities, which suggest that it may have been used as a preliminary study for new proposals on how to change the urban landscape. Such hypothesis can be further expanded: the plan could have been drawn before the ones necessary to the execution of the renovations and additions to the monument, especially the Palace of Charles V, to offer a first glance of its final aspect. As the work proceeded, the plan could also register notes and proposals, thus becoming a summary of different ideas.

In fact, when Granada was conquered in 1492, the Catholic Monarchs commissioned a series of restorations of the Alhambra, the original splendor of which had partially deteriorated. Such works, intended to maintain the Nasrid aesthetics, were later accompanied by the construction of the Palace of Charles V: in 1526, during his honeymoon in Granada, the Emperor gave orders to build a new palace, inspired by the architecture of the Renaissance, inside the monumental complex of the Alhambra, next to the Nasrid palaces. The proposal consisted of a two-story building with a symmetrical, centered plan, meant to host the entire court of about five hundred people: the iterations of the building included transformation of the basic shape and the location, as the idea of eliminating the mosque turned church of Santa María was evaluated, and thus postponed the beginning of the work to 1533, once the available area was determined in 1531. This allows the dating of the Gran plano, which must have been drawn in 1532. Other smaller plans of the same period have been recovered from the Archivo Histórico Nacional de Madrid, further detailing the Palace but overlooking its surroundings.

The works for the Palace of Charles V marked the start of a series of important transformations for the Alhambra, as part of the houses inside the monumental complex and the southern part of the Palacio de Comares were destroyed, thus also changing the surrounding streets.

The Planta grande depicts the Alhambra of the early XVI century. The patio of the Mexuar, now known as Patio de Machuca, is marked as part of the rooms of king Fernand the Catholic's second wife, while the Cuarto Dorado belonged to Isabel the Catholic. The Patio de Comares is represented without any plants and with a circular shape in the center of the pool, which could correspond to a fountain. On the southern side, the Sala de las Helias is missing from the drawing, despite the fact that it would be destroyed only five years later, in 1537. In the whole Palacio de Comares, a number of doors are located in different areas with respect to later documents, as is the main entrance to the

palacio de los Leones. The central fountain in the patio of this part of the Nasrid palaces is depicted as a single basin supported by twenty-one lions. The Sala de los Reyes is marked as a chapel: its religious function was then transferred to the Mexuar until construction terminated in the church of Santa María.

3.2. *The “Civitates Orbis Terrarum”*

The atlas “Civitates Orbis Terrarum”, published in 1572 by George Braun provides a number of views of the Alhambra.

The editor, a German cleric, gathered and edited the works of a number of his international contacts, thus compiling a collection of texts and drawings depicting Europe, the Near East, North Africa and part of the Spanish colonies in the American continent. In order to obtain a certain graphic coherence, the visual materials were reworked by engraver Frans Hogenberg. The atlas was quite successful and spanned six volumes, the last of which was published in 1617.

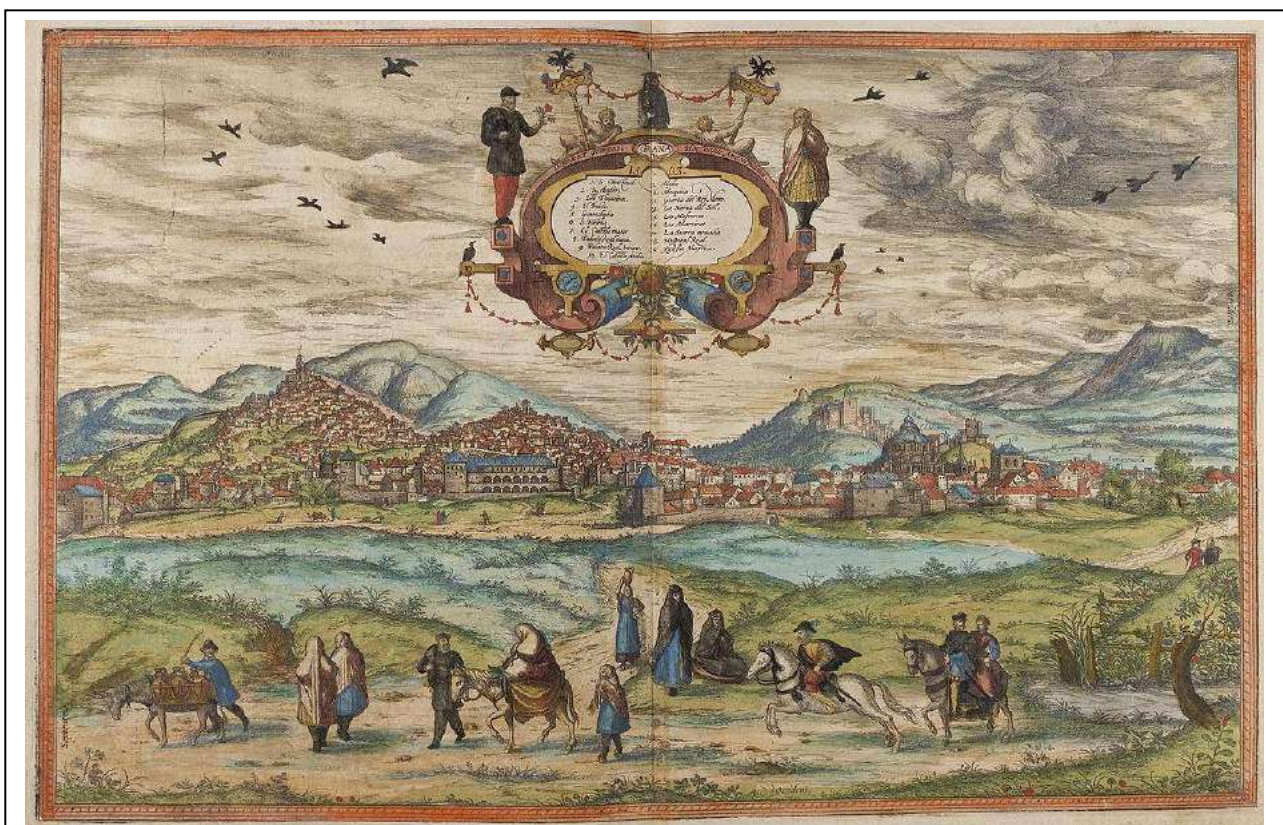


Figure 12.

Civitates Orbis Terrarum: View of Granada from the vega; Georg Hoefnagel; 1565

Views of Granada, based drawings by Georg Hoefnagel created between 1563 and 1565, can be found in the first and fifth volume, the latter including an image focused solely on the Alhambra. Based on the Renaissance principles of perspective, the representations share the elevated point of view to avoid buildings covering each other, the panoramic approach and the tendency to show the entirety of the landscape, thus including any natural feature. The depictions also often modify the actual aspect of the subject in order to highlight some characteristics or facilitate the perception of the whole: narrow roads are widened and the proportions of important buildings are enhanced, so that the fidelity of the drawings is subordinated to their capacity to offer an easily recognizable view of the subject. At the same time, the abundance of details offered in Hogenberg’s engravings convert such artworks in valuable documents, especially with regards to the most notable architectures of the landscape. Within the content of the “Civitates Orbis Terrarum”, Granada seemed to spark great interest, since it is the only city to which four plates are reserved, as mentioned by the authors themselves, who affirm that a single depiction of the city could not have been sufficient to represent the great quantity



Figure 13.

Civitates Orbis Terrarum: Granada from the Genil valley; Georg Hoefnagel; 1565

of beautiful buildings it included, with particular regards to the castle of the Alhambra. The volumes thus offer views of the city from the vega, from the valley of the Genil river and from that of the Darro.

The first of such representations (Figure 12), dated 1563, shows the Alhambra from the south, clearly depicting at the forefront of the complex the Torre de la Vela, topped with an off-center pinnacle with a bell and cross. As the Alcazaba is marked as n.7 under the name of “Castillo Major”, the artwork includes a number of other indications, such as the “Generaliphxa”, marked as n.5 on the left of the monument just above a wooded area, the “Palatio Real Antiquo” as n.9 to mark the Nasrid Palaces de Comares and de los Leones and “Palatio Real nuevo” as n. 8 for the Palace of Charles V.

The panoramic depiction presented in the fifth volume is dated 1565 and shows a view of the city from the east, close to the Genil river (Figure 13). Marked by the letter C is the Alhambra, the



Figure 14.

Civitates Orbis Terrarum: the Alhambra; Georg Hoefnagel; 1565

representation of which results much clearer from this perspective. From left to right, in fact, the main features of the monument can be easily recognized as the Torre de la Vela, the Alcazaba, the Nasrid Palaces, the Palace of Charles V and the tower of the church of Santa María, corresponding to the ancient minaret which would later be destroyed in 1576. At the same time, a few elements appear to have been changed by the author in order to obtain a more aesthetically pleasing depiction: the slope of the hill is exaggerated with respect to the topographical reality, the Emperor's Palace is completed by a roof which had not yet been built and the fortification seems to be missing a number of towers between the Puerta de los Siete Suelos and the Torre del Agua. The corresponding text provide a favorable description of the complex, considered a quarter of the city: a place which only offers pleasure, due to its lovely location and the murmur of the fountains.

Further on within the fifth volume readers can find a plate dedicated exclusively to the Alhambra (Figure 14) seen from the valley of the Darro river and dated 1564. The engraving shows on the left the Generalife, marked as B, and the tower of the church of Santa María, continuing with the "Palatio Real antiguo", of which the Torre de Comares appears at the forefront, in order to finish with the Alcazaba on the right. Partially covered by the Nasrid Palaces, the Palace of Charles V is represented undergoing construction, as the silhouettes of building machinery peek over the top. The plate also includes three smaller views, showing details such as the Puerta de lo Siete Suelos, through which, according to tradition, Boabdil left the city in 1492, of the Mazmorras, dungeons or storages, and a water storage building.

3.3. *Wyngaerde's views*

Similarly to the volumes of "Civitates Orbis Terrarum", another collection of geographical drawings provides precious documentary resources for the study of the Alhambra in the XVI century. The works of Anton van den Wyngaerde, a Flemish traveler, artist and topographer, include several tables dedicated to the cities of the Iberian Peninsula, which possibly could have been destined to an atlas. Arriving in Spain between 1561 and 1562, in fact, he voyaged across the kingdom, creating over sixty urban views, including those of Granada and its principal monument. After a first trip to Andalucía in 1564, he returned to the south in 1567, date of many drawings depicting the urban landscapes of the region.

sketch to organize the levels (Figure 16) and coordinate three other studies from the vega, focused on the forefront, on the right and left halves. The three final depictions offer views from the south (Figure 15), from the valley of the Genil river and of the Alhambra as seen from the Albaicín (Figure 157). Throughout the process, the Alhambra plays a prominent role as one of the main identifying features of the city and as such the evolution of its representation according to Wyngaerde's methodology can be easily traced. In the first sketch, meant to simply locate the levels, the monument is already present, as a quick silhouette marked by the name "El Hambra". The study of the left side of the view includes a simple sketch of the complex, mostly marked by a tall square tower, while in the preparatory drawing for the right side the Alhambra features prominently in the center of the sheet: the Torre de la Vela, topped by the off-center bell pinnacle, is in the forefront of the Alcazaba, represented with the Torre del Homenaje and the Puerta de las Armas; a slanted rooftop and a tower ornated by battlements mark the Nasrid Palaces, while the Torre de la Sultana, the corner of the Palace of Charles V and the tower of the ancient mosque are visible among the fortifications. The view is similar to that of the final drawing (Figure 17), the entire panoramic representation of the Granada, in which the monument is featured slightly to the right, as one of the focal points of the composition. The depiction of the Alhambra highlights the same characteristics as the previous sketch, in particular the prominent position occupied by the Torre de la Vela from such point of view. The complex is also represented in another drawing, centered on the view from the valley of the Genil river, in which the Nasrid Palaces, the Palace of Charles V and the Convent of San Francisco are marked by letters. The latter is erroneously placed over the tower of the mosque: such curious mistake offers an element of similarity with the work of Hoefnagel, thus leading to the hypotheses that the artists may have been working together when drawing the originals, or that Hoefnagel may have based his depiction on that of his colleague.



Figure 17.

Granada from the vega Anton van den Wyngaerde; 1567

Finally, the most detailed depiction of the Alhambra created by Wynagaerde is the view from the Albaicín, near the cuesta de la Victoria, focused solely on the monumental complex. On the forefront of the representation is the fortified wall of the Moorish quarter, followed by the Paseo de los Tristes and the Darro river, while just beyond the slopes of the hills covered in trees lead to the Islamic palatine city. On the left the Generalife is depicted with its elevated mirador (panoramic terrace) and the tower to reach the upper level, as well as the fortified walls leading to the Alhambra. There, the Partal is accompanied by some buildings which later disappeared, similarly to other elements which are depicted in the drawing, such as the mirador between the Peinador de la Reina and the two-story gallery of the Patio de la Reja, or the battlements of the Alcazaba. The preliminary nature of the sketch is betrayed by the lack of precision in the Torre de Comares, which, despite the erroneous number of windows, is easily recognizable as the dominant feature of the complex.

When considered together, the works of Hoefnagel and Wyngaerde offer a collection of documents which not only allows to reconstruct the look of the Alhambra during the XVI century, but also determine the necessary points of view to understand its location and relation to the city of Granada as a whole, namely south or the vega, west or the Genil valley and east or the Darro valley and Albaicín.¹¹⁸

4. XVII century decline and plagiarism

In 1556, Emperor Charles V abdicated in favor of his son Philip II. As the new king was crowned and the capital moved to Madrid in 1561, the image of Granada, which since 1492 and until then had been an emblem of the Empire, transformed into that of a marginal city. The unfinished Palace of Charles V became the symbol of its abandon and failure, furthered by the war of the Alpujarras and the expulsion of the Moors in the early XVII century. Nevertheless, Granada retained a regional importance, thanks to its commercial, religious and academic institutions.

¹¹⁸ (Wynagaerde, 2008)

However, the Alhambra, no longer a strategic location for the monarchy, suffered greatly from the lack of royal attention. Beside the halted construction of the Emperor's Palace, the absence of dedicated financial resources led to worsening conditions with regards to the Nasrid Palaces, damaged by an explosion close to the Darro around 1590. In the XVII century, the monumental complex hosted a population of nearly five hundred inhabitants: some were textile artisans, whose specialized knowledge in silk and trimmings was passed through generations, while other, of lower status, quickly gained an unfortunate reputation.



Figure 18.

El martirio del Obispo de Jaén, D. Gonzalo de Zúñiga; Pedro de Raxis; 1610

During the XVII century, most of the views of Granada were copied from previous ones, a trend that continued in the following century as well, all the same contributing to the diffusion of the image of the Alhambra and to its resonance as a suggestive location. An exemplary case is that of the two plates by David Meisner included in the “Thesaurus Philo-Politicus”, published in 1623, which

plagiarize those of the “Civitates Orbis Terrarum”, as indicated by the ongoing constructions in the Palace of Charles V in the view from the valley of the Darro river.

At the same time, some interesting depictions can be found during this period thanks to both Spanish artists and interested travelers. During this time, the representations of the Alhambra progressively transitioned from plans and views similar to those of the previous century, albeit tinted by political and religious aims, to more accurate and detailed images, reaching a novel approach with Meunier’s interiors.

Besides those mentioned in the following paragraphs, the XVII century offers a few other representations of the monumental complex, which, however is often relegated to the background and as such provides too few details for scholars to evaluate its accuracy or take advantage of its documental value. Fragments of the fortifications appear in “El martirio del Obispo de Jaén, D. Gonzalo de Zúñiga” (Figure 18), an oil on canvas attributed to Pedro de Raxis, in an anonymous Crucifixion from the Convent of Nuestra Señora de la Inmaculada Concepción of Granada, where the Torre de Comares can be noticed on the lower left, and in “El apostol Santiago predicando en el Sacromonte”, an anonymous painting from the Abbey of the Sacromonte of Granada, in which the view from the hill shows the Alhambra on the left, once again highlighting the Torre de Comares as well as the fortifications between the Torre del Homenaje and the Torre Quebrada.

4.1. Vico’s Plataforma de Granada

Between the end of the XVI century and the start of the XVII, despite its decaying splendor, the city of Granada is depicted by the architect Ambrosio de Vico in a drawing known as the Plataforma de Granada (Figure 19), printed by Francisco Heylan in 1612. In 1595, Vico had already represented the church of Santa María, situated within the Alhambra, carefully indicating a number of previous buildings in its vicinity, thus offering a valuable document for the scholars interested in the modifications which transformed the area near the ancient mosque of the monumental complex. As construction works halted and resumed, further drawings were commissioned by the Archbishop in 1607 and in 1610. The latter, in particular, offers a clear view of the Calle Real, one of the main

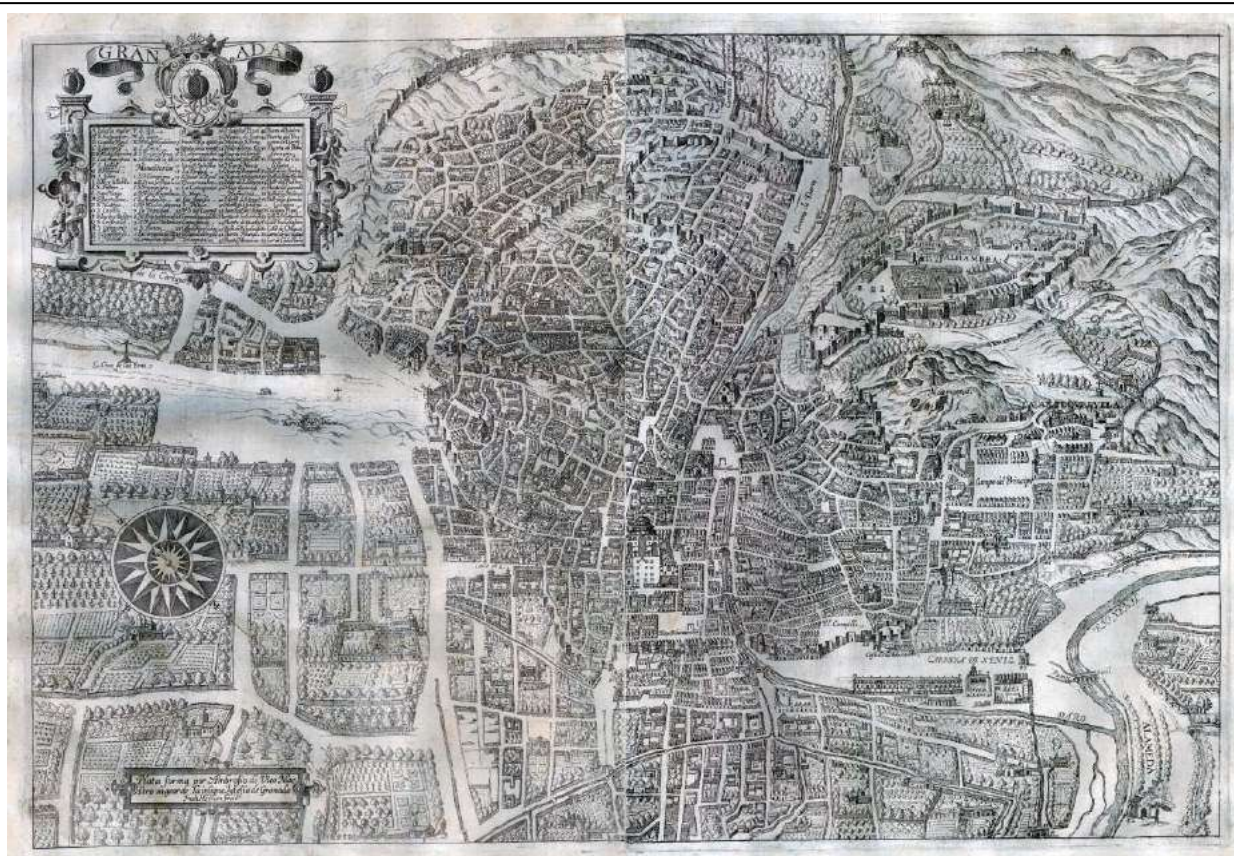


Figure 19.

Plataforma de Granada; Ambrosio de Vico; 1612

streets of the Alhambra, no longer visible, as well as of the door used while building both the church of Santa María and the Palace of Charles V, informally known as Puerta de las carretas.

The request for a general plan of Granada came from Archbishop Pérez de Castro, friend of King Philip II: knowing and trusting Vico for his skill regarding architectural and urban depictions, he commissioned the Plataforma de Granada. One of the main objectives of such task was the desire to remove the Moorish memory of the city, unacceptable in the religious context of the Kingdom of Spain and, on a more global level, of a Catholic Church that had just undergone the Council of Trent. The new representation aimed to show Granada as a ceremonial space, highlighting the presence of the Church and downplaying its Islamic past, taking advantage of the lack of artworks depicting the inner part of the city rather than views from afar. Unfortunately, no preliminary studies have survived, however the Plataforma offers a remarkable document in itself.

The drawing, which uses employs an axonometry known as cavalier perspective, provides a rather accurate representation of the buildings with regards to their location in the urban landscape, while at the same time showing the complex in an easily understandable way, especially since the main

institutional buildings are better detailed. Nevertheless, the artist deliberately changes the orientation of many of them in order to prioritize recognizability over fidelity. The depiction represents the culmination of a long observation of the city in its various parts, drawn as single sketches to be later pieced together in order to complete the *Plataforma* between 1612 and 1616. The beginning of such preliminary work is unclear, however a clue is given by the minaret of the ancient mosque of the Alhambra, which can be found in the drawing despite its demolition in 1576.

Despite the generally high level of quality demonstrated by the drawing, the *Plataforma* provides a less than perfect depiction of the Alhambra, found in the upper right quarter of the plate, as the monumental complex seems to be the most imprecise part of the representation. This might be due to its irregular topography, but also partially caused by political reasons. As previously mentioned, in fact, the recent religious events had led both the monarch and the archbishop to require a drawing centered on the Catholic aspect of Granada, which might therefore have paid less attention to the most prominent Islamic monument in Europe rather than highlighting it.

At any rate, Vico proposes an inexact view of the complex, distorting the proportions as well as the relative locations of the different areas of the fortress. The surrounding wall includes a number of openings that do not correspond to the actual fortification, while a supplementary tower is added to the Alcazaba, the space in front of which is shown as rather more extended than in reality. The *Puerta de las Armas* is missing, as well as the *Puerta del Vino*, while the fortified wall between the *Torre del Cubo* and the *Torre de Comares* is adorned with an excessive number of towers. Close to the *Puerta de Justicia*, the round Christian tower is substituted by a square one. Most notably, the palaces within the fortified walls are represented as mostly disjointed buildings, with several imprecisions regarding both their features and their locations. The *Palace of Charles V* is simplified and therefore shown without the octagonal chapel nor the second story, thus hinting at a possible dating before 1592. Despite being involved in the construction of the church of *Santa María*, Vico chooses to represent the ancient mosque, identified by its minaret: also in this case, a similar depiction could offer a clue as to the date this part of the *Plataforma* was drawn, probably around 1576.

The drawing of the Nasrid Palaces surprises due to their representation as separate buildings rather than a single complex. The extension of the patio of the *Mexuar* is diminished; between this area and the *Palacio de Comares* two towers are visible, while the *Patio de Comares* is unexpectedly depicted with additional arches on the longer sides, decorated with small towers. A façade is added to the *Palacio de los Leones*, opening towards an inexistent courtyard where the caption “Alhambra” is

placed; in the corresponding patio, the proportions of the fountain are exaggerated in order to make it visible. Areas such as the Patio de Lindaraja and the Partal are missing, as the latter is substituted by an imperfect representation of the convent of San Francisco. Finally, the Generalife is depicted with two inflated towers in the northern area.

Due to the lack of precision that has just been detailed, the Plataforma, while offering a somewhat realistic view of the complex, cannot be credited with providing a reliable document from which objective data can be obtained with respect to the features of the Alhambra at the time.

4.2. *De Sabis's "Vista del Darro" and a similar anonymous view*

During the XVII century, Juan de Sabis depicted two views of Granada, known as "Vistas del Genil" and "Vistas del Darro" (Figure 20). While the details of the artist's life are unknown and the original



Figure 20.

Vista del Darro; Juan de Sabis; 1636

works disappeared when the Archbishop's palace burned down, the representations can be studied through the 1930s copies commissioned by Antonio Gallego Burín.

In order to appreciate the documentary value of the depiction with regards to the history of the Alhambra, one must focus on the "Vistas del Darro". Originally dated 1636, the canvas shows an excellent perspective of the monumental complex, which occupies the upper half of the composition, offering a generally faithful to reality and quite detailed view. From the left, it is easy to recognize the Generalife, adorned on the sides of the northern pavilion by towers shorter than those depicted by Vico. The fortifications of the Alhambra also include a number of towers: from the left, the Torre de los Picos and, just after the Partal, an unknown tower close to the Peinador. A simplified gallery passes in front of the bell tower of the church of Santa María, here represented for the first time as its construction finished in 1618, and leads to the Torre de Comares, which can be clearly distinguished for its size and the rhythm of its opening, despite the fact that the artist represents them more elevated than in reality. At the same time, the hip-and-valley roof which would cover it at the end of the XVII century cannot yet be seen in the depiction. The patio of the Mexuar is marked by the Torre de Machuca and a smaller tower, while near the Alcazaba both the Christian fortification and the Torre Quebrada are visible, as well as the Torre de las Armas and the Torre de la Vela, the pinnacle of which is located in the corner.

Another anonymous view of the Alhambra offers details similar to those depicted by Juan de Sabis, as the monument is viewed from the vicinity of the church of San Pedro in the Albaicín. In the only copy available, published in the "Anales de Granada" edited by Antonio Marín Ocete, the unknown tower close to the Peinador is visible, as well as the gallery which connects it to the Torre de Comares, although such passage is poorly depicted. The tower itself, however, shows more accurate proportions of the niches and windows and is still missing the hip-and-valley roof. The least credible part of the representation can be found at the base of the Torre del Homenaje, where a rather large unidentified tower is situated. Curiously, the pinnacle of the Torre de la Vela is located on the corner opposite to the one where it is usually depicted.

4.3. Magalotti's "Relazione del Viaggio di Spagna" and Baldi's view

Between 1668 and 1669, Cosimo III de' Medici, soon to be Grand Duke of Tuscany, travelled throughout Spain and Portugal with part of his court, as requested by the prince's father in order to avoid diplomatic conflicts with Marguerite Louise d'Orléans, Cosimo III's wife. During such voyages, which had already included Germany and the Netherlands, he was accompanied by about

thirty people, among which was Lorenzo Magalotti: it is thanks to him that an illustrated diary of the itinerary, titled “Relazione del Viaggio di Spagna” was compiled.

The document describes how Cosimo III reached Granada and spent three days in the city, paying particular attention to the Alhambra, where he was impressed by the Nasrid Palaces also due to their difference from the Italian artistic tradition. However, the author harshly describes the Patio de los Leones as he considers the lions of the fountain to be badly sculpted and the overall architecture of the marble columns quite imperfect.

Further detailing the prince’s trip are the drawings of Pier Maria Baldi, painter and architect, who offers a depiction of the urban landscape of Granada from the south (Figure 21), from a point of view similar to that of Hoefnagel and Wyngaerde, though less precise. The image, dated December 1668, can be considered rather faithful to reality in terms of proportions, yet the artist rotates some buildings in order to increase their recognizability. Baldi includes a representation of the Alhambra, although the complex is reduced to the main volumes of the monument, mainly focusing on the Palace of Charles V, thus offering no novel elements with respect to other drawings of the same period.



Figure 21.

Southern view of Granada; Pier Maria Baldi; 1668

4.4. Meunier’s new point of view

A significant exception to the general copying tendency of the XVII century is represented by the works of Louis Meunier, drawn and etched between 1665 and 1668, probably during a trip across the Iberian Peninsula as part of an official French committee. The artist dedicated to the city of Granada ten plates representing its interiors, a novelty for the time, and a great panoramic view from the vega (Figure 22). He also offers the first perspective views of the patios of the Alhambra, that of the Palace of Charles V, and those of the Nasrid Palaces, including two plates of the Patio de los Leones.

A first view from the Carmen de los Martires shows the Torres Bermejas on the left and the Alhambra on the right, while the city lays in the valley in between (Figure 23). The monumental complex is

easily recognizable thanks to the Torre de la Vela, with its off-center pinnacle, below which appears the fortification between the Torre del Homenaje and the Torre Quebrada, leading to the Puerta de Justicia.

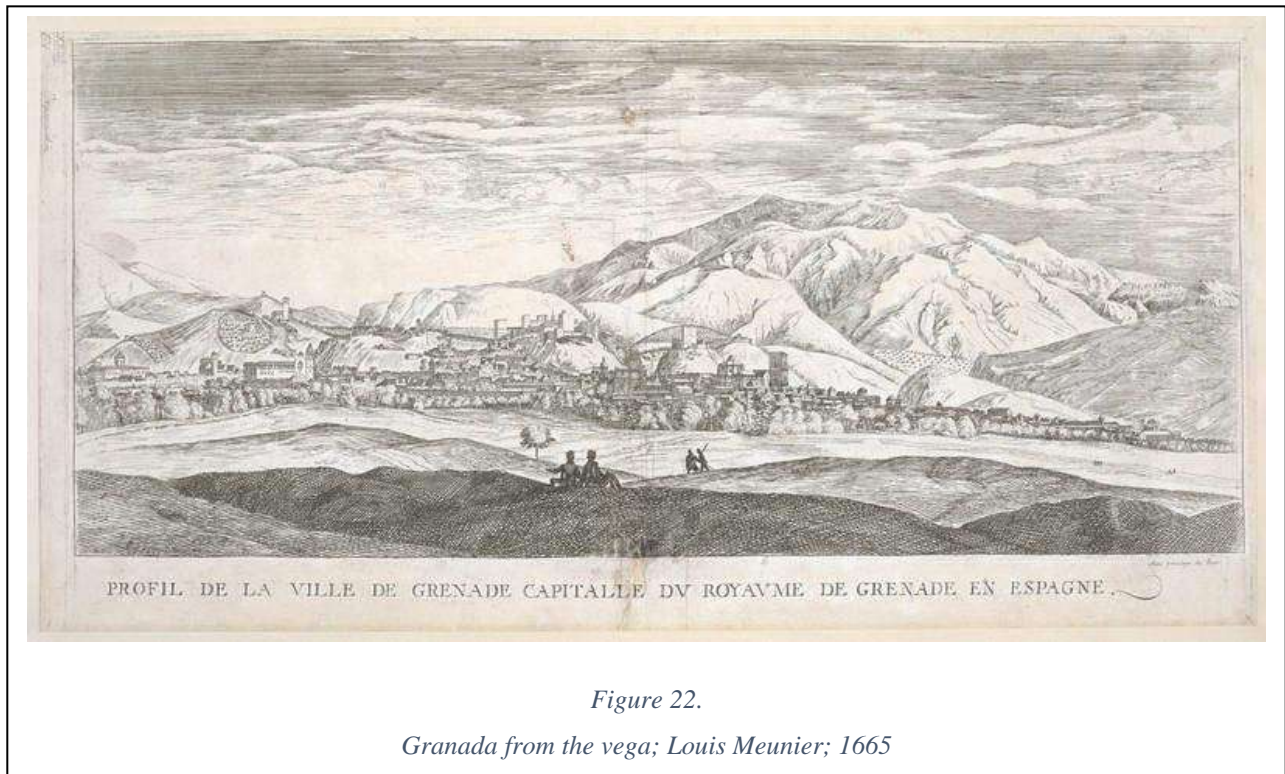


Figure 22.

Granada from the vega; Louis Meunier; 1665

The same constructions are depicted in the following view, which offers the opposite perspective, from above the city, in which the Cathedral is clearly visible. The upper left part of the plate is occupied by the Alcazaba of the Alhambra, faithfully represented with its towers, once again including the Torre de la Vela and the fortified wall between the Torre del Homenaje and the Torre Quebrada, as well as leaving room for a glimpse of the Palace of Charles V.

The Imperial Palace is the subject of another plate, marked as that of the Palace of the Spanish king in the Alhambra. The right half of the view is dedicated to the western façade of such building and the esplanade in front of it, while on the left the Nasrid Palaces are shown. In front of the Mexuar some buildings that are no longer visible today include a small tower similar to that depicted by Sabis, as well as another tower probably initially dedicated to a small mosque, while just behind it appear the Torre de Comares and, further back, the outline of the Generalife. The latter is better detailed in another of Meunier's works, titled "View of the Generalife of Granada", in which the building is represented on the upper right, overseeing the valley of the Darro.

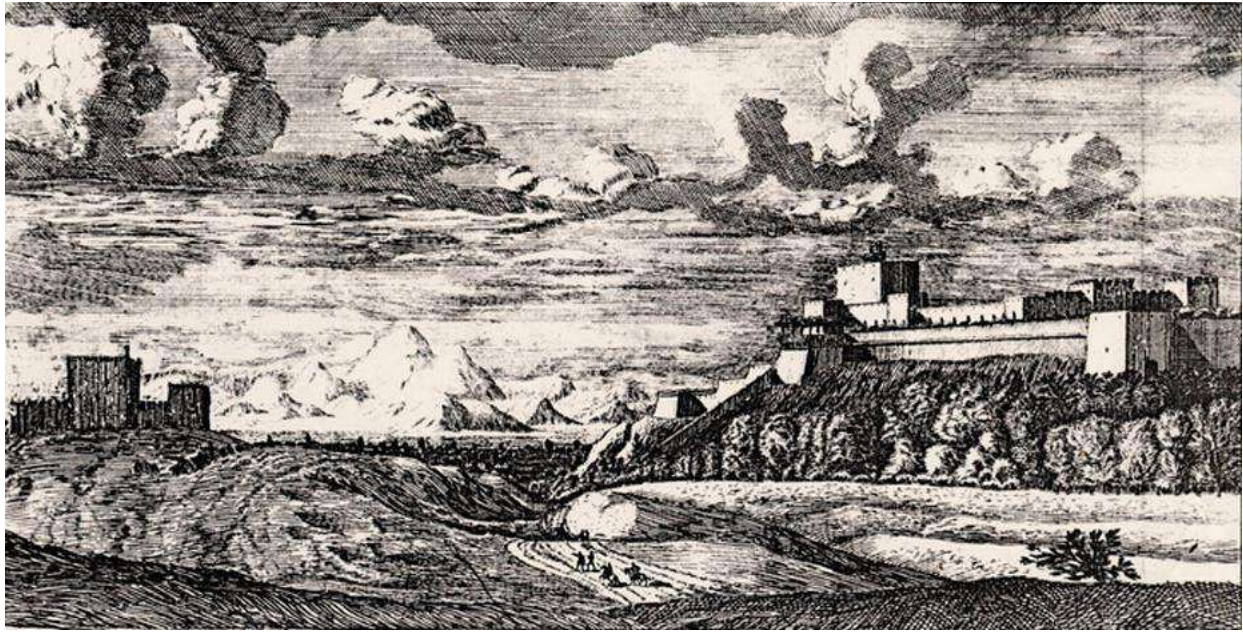


Figure 23.

The Alhambra and the Torres Bermejas; Louis Meunier; 1665

Finally, among seven panoramic views of the Spanish and Portuguese cities attributed to Meunier, Granada is once again depicted from the vega, from a point of view slightly more northern than that chosen by Hoefnagel and Wyngaerde. Thanks to this perspective, the Alhambra appears clearer, showing not only the Alcazaba, marked as usual by the Torre del Homenaje and Quebrada as well as the Torre de la Vela, but also the Torre de Comares and, further back, the bell tower of the church of Santa María.

As mentioned, however, Meunier's main innovation is represented by the depiction of some of the interiors of the Nasrid Palaces, in particular the Patio de los Arrayanes (Figure 24) and the Patio de los Leones (Figure 25). Both plates employ a composition chosen to highlight the symmetry of the courtyards and greatly exaggerate the proportions by including extremely small human figures.

The Patio de los Leones is shown from the center of one of the longer sides, as the pavilions of the shorter ones protrude from both the left and right margin of the plate. The central area of the image is occupied by the fountain, which is composed of two basins, the lower of which bigger and decorated with festoons and supported by slightly irregular lions. The water canals extending towards the colonnade are correctly represented, however the courtyard is populated by figures shorter than the lions, thus appearing much vaster than in reality.

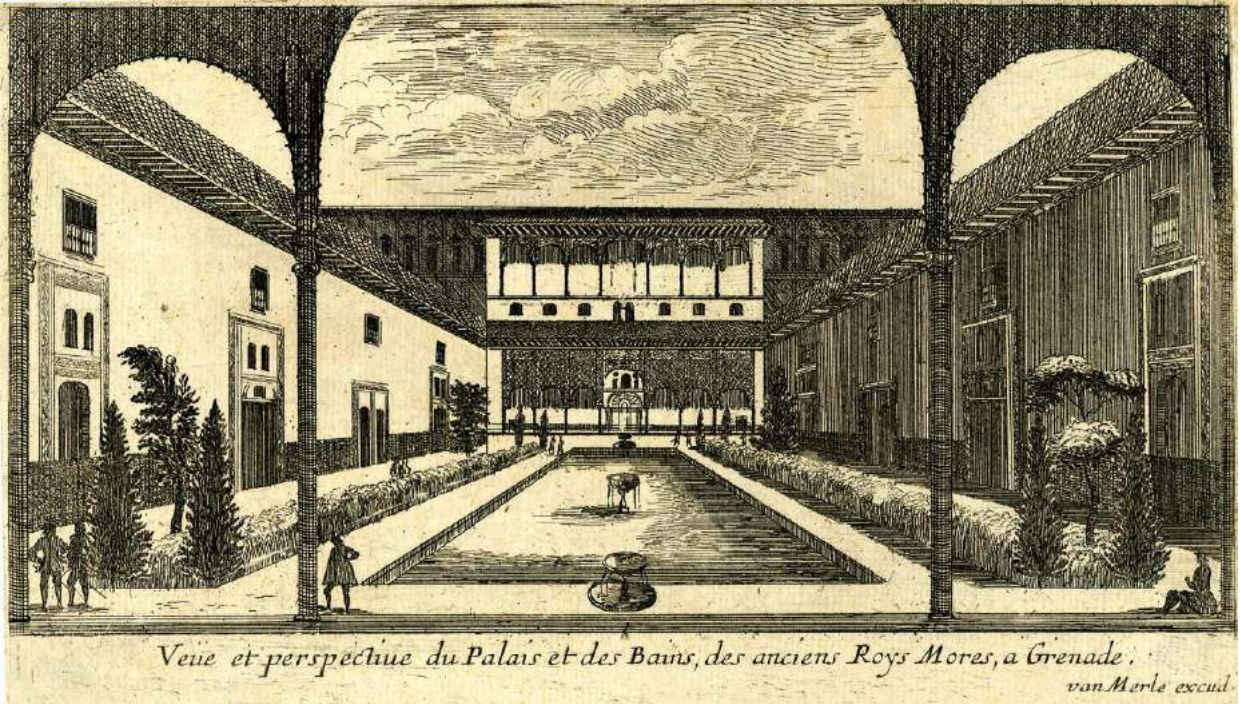


Figure 24.

Patio de los Arrayanes; Louis Meunier; 1665

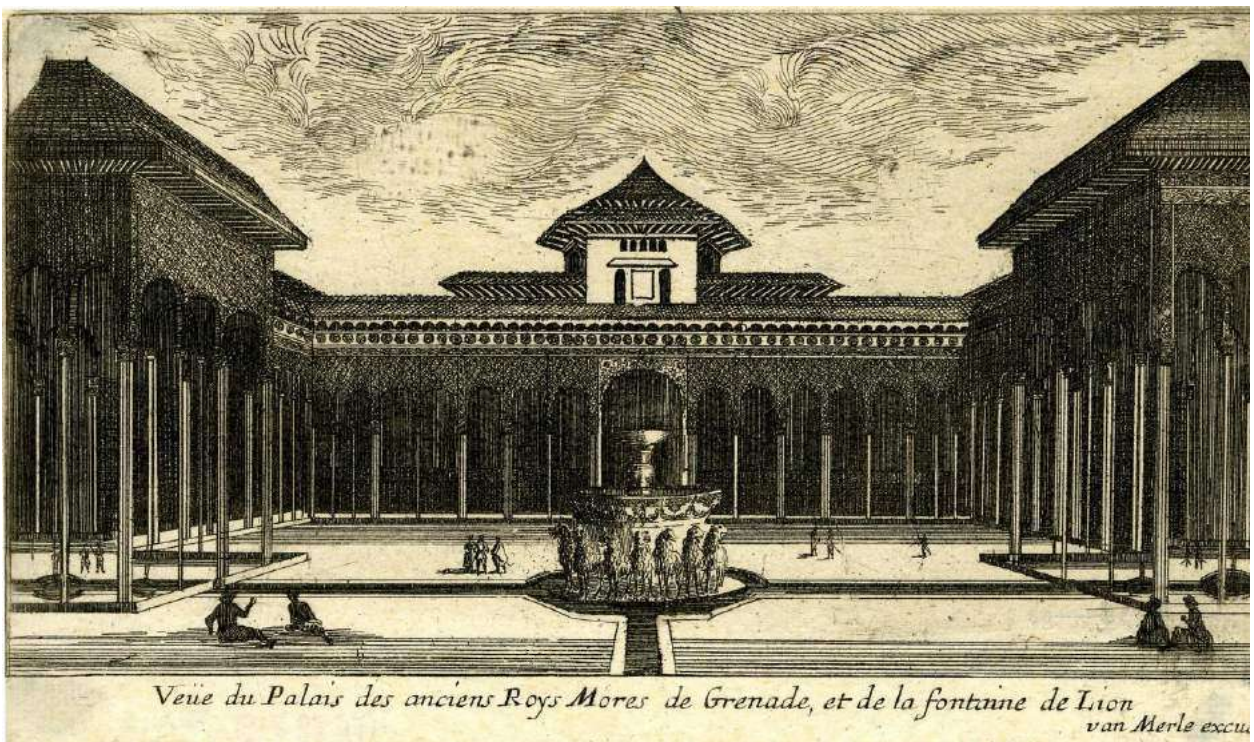


Figure 25.

Patio de los Leones; Louis Meunier; 1665

A similar effect is achieved with the plate showing the Patio de los Arrayanes, where a handful of disproportionately small people magnify the courtyard. Once again, the composition is highly symmetric, as the pool and southern façade of the patio are framed by the central arch of the opposite side. The area is further elongated by the accentuated panoramic point of view and by the deep shadowing of the Palace of Charles V just beyond the southern gallery. In contrast with today, the fountains at either side of the pool include a second basin and are accompanied by a third one in the center.

4.5. *Copies and reproductions of successful views*

Meunier’s plates, while generally less detailed and graphically defined than those of his most illustrious predecessors, offer an array of new points of view, thus becoming the inspiration for a number of copies. In fact, the Flemish engraver Pieter van der Berge included ten of such depictions of Granada in “Teatrum Hispaniae. Exhibens Regni Urbes, Villas ac Viridaria magis illustrata Tot

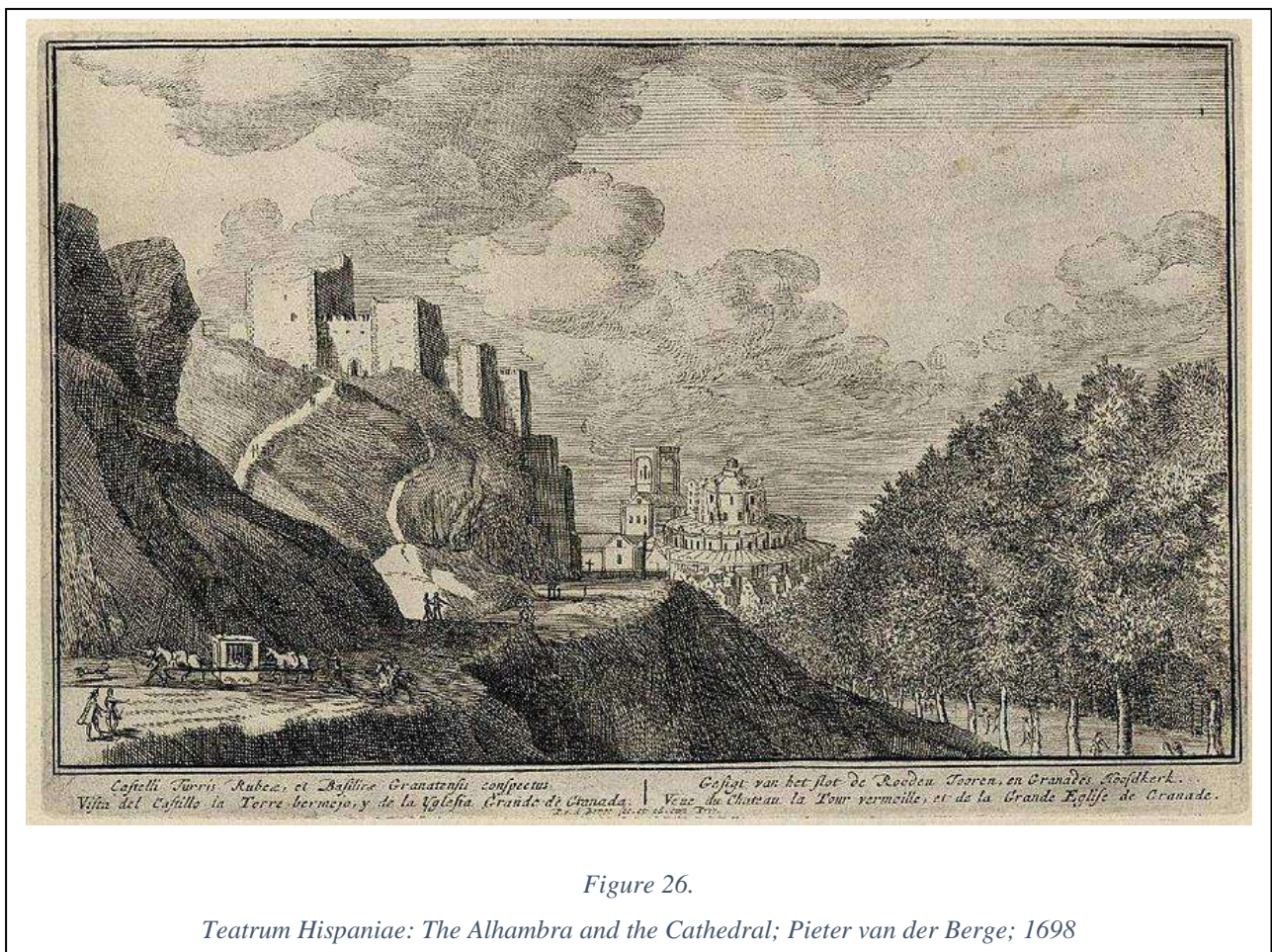
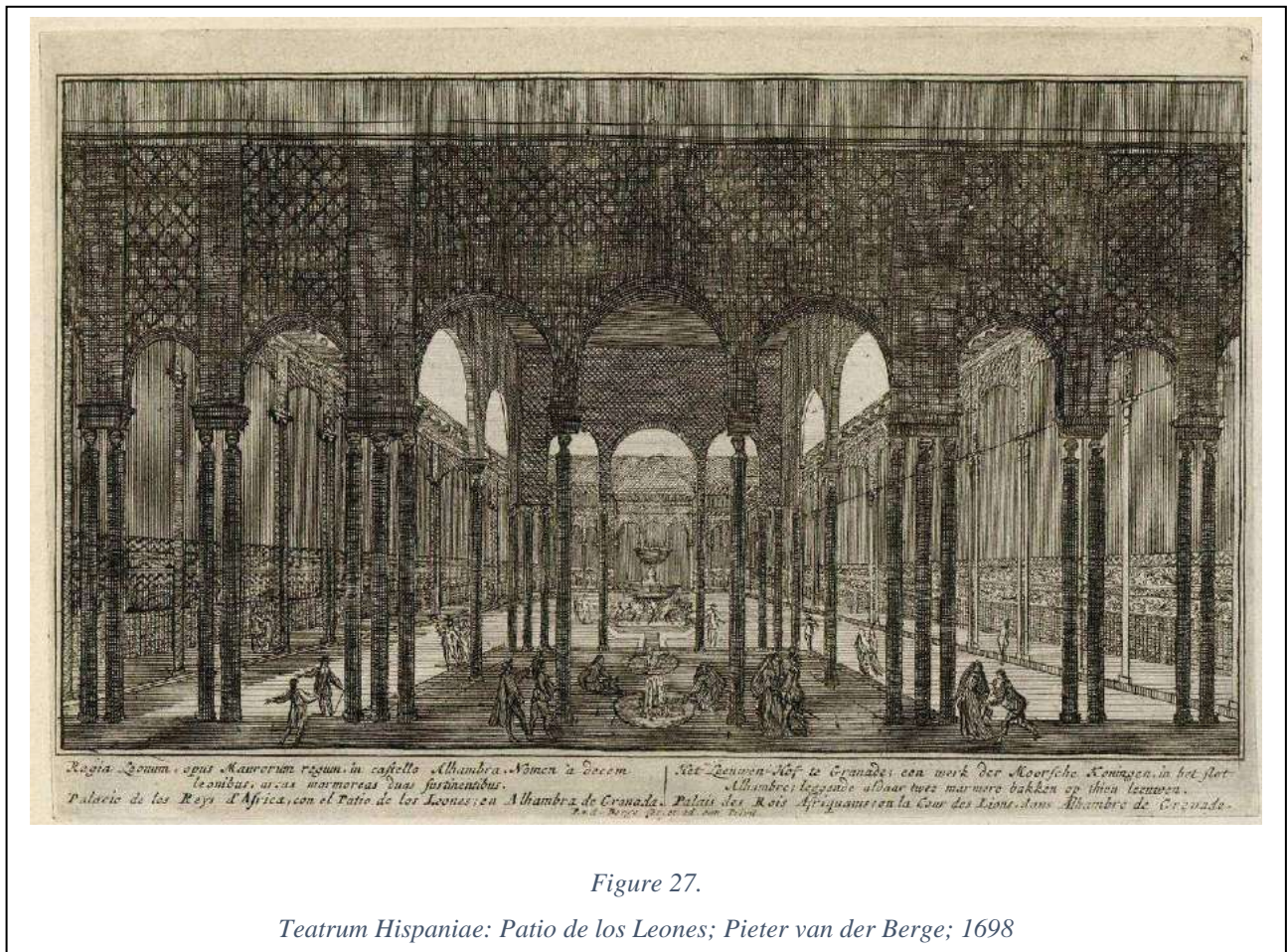


Figure 26.

Teatrum Hispaniae: The Alhambra and the Cathedral; Pieter van der Berge; 1698

Amsterdam, Met Privilegi van de Heeren Staten van Holland en West-Vriesland”,¹¹⁹ published in Amsterdam between 1698 and 1700 (Figure 26 and Figure 27); while the Italian cosmographer and globe-constructor Vincenzo Maria Coronelli plagiarized them in 1706 for the volumes of “Teatro della guerra”, the second of which is dedicated to Spain and Portugal and provides fourteen etchings of Granada. Ten similar plates appear the following year in the third volume of “Beschirywing van Spanjen en Portugal” by Flemish publisher Pieter van der Aa, who reused them in “La Galerie Agreeable du Monde” in 1720.¹²⁰



Plagiarism was, as mentioned, a general trend of the period, and did not affect exclusively Meunier’s work. Voyager Martin Zeiller added copies from “Civitates Orbis Terrarum” to “Hispaniae et Lusitaniae Itinerarium”,¹²¹ published in 1656; in 1735 French merchant Antoine Aveline published

¹¹⁹ (van der Berge)

¹²⁰ (van der Aa, 1707)

¹²¹ (Zeiller, 1656)

and sold a modified version of Hoefnagel's view of Granada from the vega. Moreover, the XVIII century saw the rise of a new market for such plates, that of optical views, which were meant to be enjoyed through cosmoramas, also known as optical boxes or magic lanterns. The projections, predecessors of dioramas and cinematographers, were mostly used to satisfy the encyclopedic interest of the time, showing city views, often adapted by previous publications. Most of those depicting Spanish landscapes were copied by Meunier's work or that of its plagiarizers.

While such copies offer little in terms of documentary value, acknowledging their existence proves important for the key role they played in spreading the image of the city of Granada and, in particular, of the Alhambra, sparking and cultivating the interest in the monumental complex, which would soon become akin to a mythological destination for Romantic voyagers.

5. The Illuminist Alhambra

Between the end of the XVII century and the beginning of the following one, Spain was plagued by a number of natural disasters as well as political and conflict-related crises, which reverberated in several other areas, with economical, demographical and socio-cultural effects. In this unstable climate, in 1717 the Marquis of Mondéjar abandoned his position as alcalde (mayor) of the Alhambra, which determined the ruin of part of the palatine complex. The restorations that were supposed to take place were neglected, as the only intervention was the vaulting of the ceiling in the Sala delos Mocarabes. In the same period, a violent earthquake destroyed almost all of the existing colored glass windows, with the exception of that of the Mirador de Lindaraja.

The funds which should have been destined to the reparation of the palatine complex were severely undercut and its military value diminished when the garrison was substituted by the eighty men from the Cuerpo de Inválidos. Thus, the Alhambra transformed into a refuge for the poorer and most marginalized parts of the population, a change further instigated by the progressive architectonic ruin of the monument. A single moment of interest towards the state of the complex was determined by the visit of King Philip V, around 1730: in this occasion a partial and superficial restoration took place, in order to remove from the Nasrid Palaces the impression of an abandoned and spoiled ruin.

During the first half of the XVIII century the general decay of the Alhambra, as well as the aforementioned proliferation of copies of existing views, determined a decline in interest towards the monument, as artists mainly relied on previous depiction to represent the palace. It was only with the

Age of Enlightenment that the interest in the Alhambra and its accurate representation was renewed, as the systematic documentation of national cultural heritage became a pressing concern for scholars of a number of European countries.

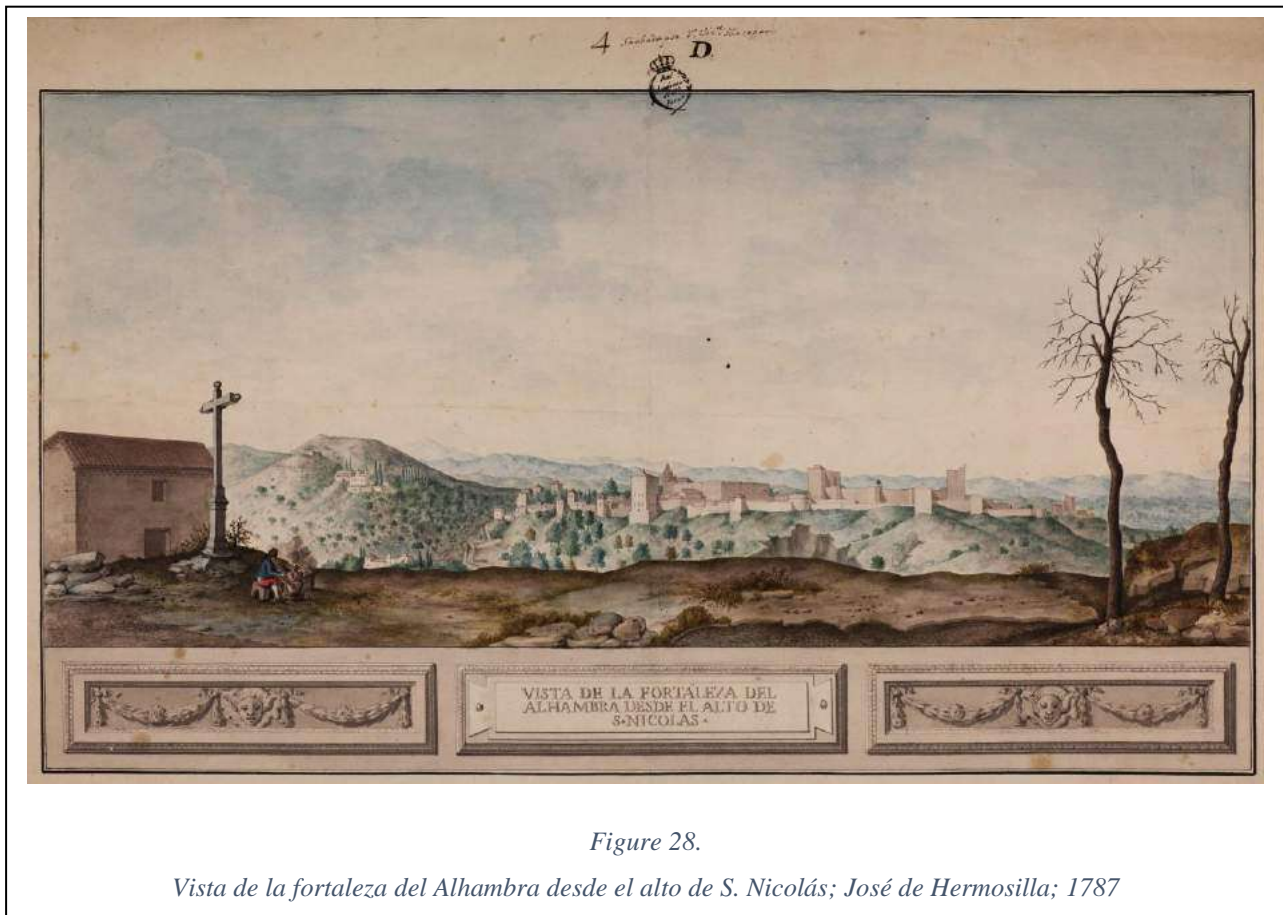
5.1. *The Real Academia de Bellas Artes and “Las Antigüedades Árabes de España”*

During the second half of the XVIII century, the Real Academia de Bellas Artes de San Fernando of Madrid, encouraged by King Charles III, aimed to compile an exhaustive catalogue of Islamic monuments in Spain, which clearly included the Alhambra. The complex was by then in a state of near-ruin, as the scholars of the Academia who resided there notice in their letters: they painfully describe collapsing stairways and crumbling vaults, indicating how it would soon be necessary to build the palace anew. Their studies, however, were not meant to provide a basis for any future restoration of the Alhambra, but rather to offer a way to conserve and communicate its image, considered a fundamental yet mostly undocumented part of the architectural history of the Iberian Peninsula. The resulting publication, “Las Antigüedades Árabes de España”,¹²² appeared in 1787 and dedicated several plates to the Alhambra, while also illustrating the Mezquita of Córdoba and two non-Islamic buildings, the Palace of Charles V and the Cathedral of Granada. Such volume finds its place within a wider trend of XVIII century Europe, which saw many nations documenting their architectural histories through similar catalogues, as was the case for Britain, France and Italy.

The plates of “Las Antigüedades Árabes de España” were first commissioned to Diego Sánchez Sarabia, soon to become professor of painting at the School of Fine Arts of Granada. Charged with the task in 1760, within the following year the artist had already copied the paintings of the Sala de los Reyes, as well as compiled a catalogue of inscriptions, and by 1762 he delivered a view of the Alhambra and detailed elevations of the Islamic buildings, reaching a total of six canvases and sixty-four drawings, eleven of which dedicated to the architecture. Despite initially praising his work and conferring him the title of Académico de Mérito, the Academia soon refused Diego Sánchez Sarabia’s plates due to a lack of refinement, especially with regards to measurements and perspectives.

In 1766, therefore, the same task fell upon José de Hermosilla, who, aided by Juan de Villanueva and Juan Pedro Arnal, would also have had to draw a plan of the Alhambra and one of the main façades of the Palace of Charles V. Within a month from the appointment, in October 1766, the artists reached

¹²² (Lozano y Casela, 1780-1804)

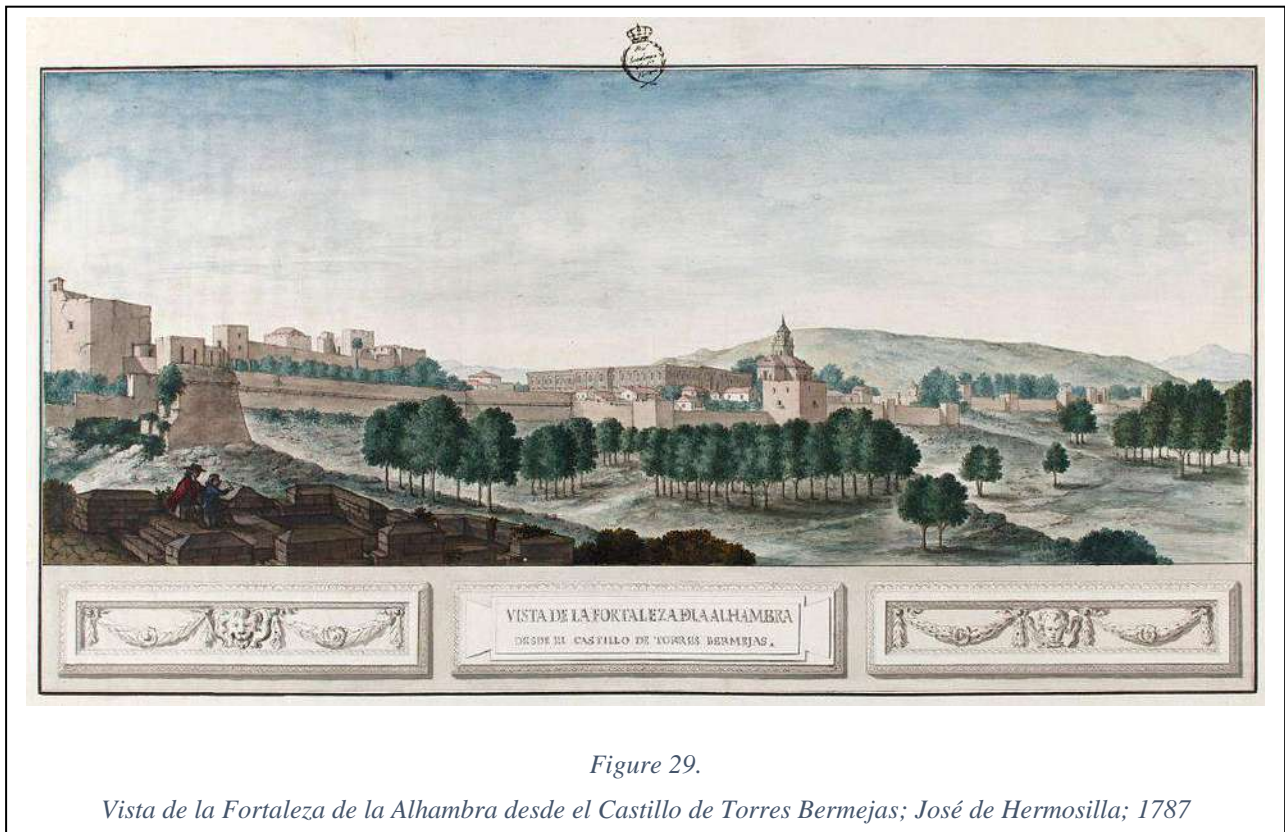


Granada and, by February of the following year, they had produced an array of precise drawings based on geometrical rules. In 1787, the published volume included a total of thirty plates, twenty of which focused on the Alhambra. In 1804, a second volume of “Las Antigüedades Árabes de España” was printed, completing the catalogue with twenty-five additional plates, dedicated to ornaments and inscriptions.¹²³

José de Hermosilla drew two main views of the monumental complex, the “Vista de la fortaleza del Alhambra desde el alto de S. Nicolás” (Figure 28) and the “Vista de la Fortaleza de la Alhambra desde el Castillo de Torres Bermejas” (Figure 29).

The first one was etched by Vicente Galcerán and included as the fifth plate of the first volume. The view from the Albaicín is organized according to three levels, each further away from the viewer. At the forefront, a small building, a cross and a human figure on left and two leafless trees on the right

¹²³ (Gámiz Gordo, 2008), (Galera Andreu, 1992)



frame the image on the following level, which shows the Cerro del Sol and the Sabika hill, where the Alhambra stands, displaying its northern side. On the left, the Generalife is easily recognizable, while the monumental complex is marked by its characteristic towers, such as the Torre de Comares, the three towers of the Alcazaba and the Torre de la Vela on the right. A few details represent important novel elements, such as the building near the Torre de los Picos, the Torre de las Infantas and de la Cautiva. Finally, the Sierra Nevada provides the background for the landscape.

The “Vista urbana es la Fortaleza de la Alhambra desde el Castillo de Torres Bermejas”, the fourth plate of the book, engraved by Francisco Mutaner, represents the southern side of the monument, as shown from an original point of view. The Alcazaba occupies the left part of the image, starting with the Torre de la Vela, as usual recognizable by the off-center pinnacle, close to the margin of the frame. Further back, the Torre del Homenaje, the Torre Quebrada and the Torre de la Pólvara stand above the Jardín de los Adarves, shown as a line of vegetation between the external wall and the inner fortification. In the center of the plate, the Palace of Charles V and the church of Santa María are depicted with a few smaller buildings in front.

Moreover, among the preliminary drawings produced by Hermosilla there is a study for the cover of the volume, a framed view of the Alhambra from southeast, where the Torres Bermejas and the Puerta de las Granadas are also visible, as well as the Torre de la Vela, the Palace of Charles V and the

church of Santa María. The cover was then substituted by a perspective view of the Puerta de los Siete Suelos which includes several artistic licenses, such as the fortified wall and the out-of-scale characters.

The publication also includes a great and precise plan of the monumental complex, titled “Plano general de la fortaleza del Alhambra, sus contornos, y parte de la jurisdicción”, in which Islamic and Christian constructions are marked by different strokes. The high level of fidelity with regards to the measurements provides scholars with a source of great documental value, especially when analyzing buildings that are no longer visible or that have been deeply transformed. Among the many noteworthy details, the Alcazaba is marked with wall walks dating back to the Emperor’s time, as well as baths at the base of the Torre de la Vela. A number of smaller buildings are drawn near the Puerta del Vino and the Palace of Charles V, while the Puerta de las Carretas is still visible in the same area. The Calle Real, the alignment of which is easily noticed, hosts the Palacio de los Abencerrajes, the third largest building of the monumental complex. While both the Palace of Charles V and the church of Santa María are depicted as sectioned to allow the representation of the organization of their inner space, the Nasrid Palaces are only marked by their exteriors and by the patios.

The following illustration, titled “Perfiles que demuestran el desnivel del terreno y sus alturas”, focuses on the elevation of the Alhambra providing views of the northern and southern sides as rather precise sections. The latter, depicted in the uppermost part of the plate, also documents of the aspect of the eastern part of the fortifications, with tall towers and rooks and no longer visible nowadays because of their destruction during the Napoleonic occupation.

Anotehr plate is dedicated to the Nasrid Palaces, as indicated by the title “Plano de la Casa Real Arabe que demuestra su principal piso. Está al de los subterráneos del palacio del Sr. Emperador Carlos V, con los que se une.” Once again, elements from Islamic and Christian times are marked differently in order to differentiate them, especially since the Palace of Charles V is included to show the buildings as a single complex. This depiction shows a number of characteristics that were later changed when the monument underwent accidents and restorations, therefore proving important for the reconstruction of the aspect of the Alhambra in the XVIII century. While the patio of the Mexuar, known as Patio de Machuca is depicted without the surrounding architectural remains, the wall of the façade continues towards the imperial palace, allowing access to the Cuarto Dorado. From the western side of its courtyard a door opens towards the Mexuar, transformed into a chapel as denoted by the

altar marked on the southern side. In the Palacio de Comares, the entrance of the Sala de la Barca is flanked by a window on each side, while the Salón de Comares seems adorned by a balcony for each window. In the description of the Palacio de los Leones, the artist marks some rooms as the living quarters corresponding to the Sala de los Abencerrajes, and the Sala de los Reyes is shown with a great opening facing east in the southernmost room.

José de Hermosilla also theorizes a hypothesis regarding the original aspect of the Nasrid Palaces, which he illustrates in the tenth plate of the publication, the “Reconstrucción en Planta del Palacio Nazarí” (Figure 30).

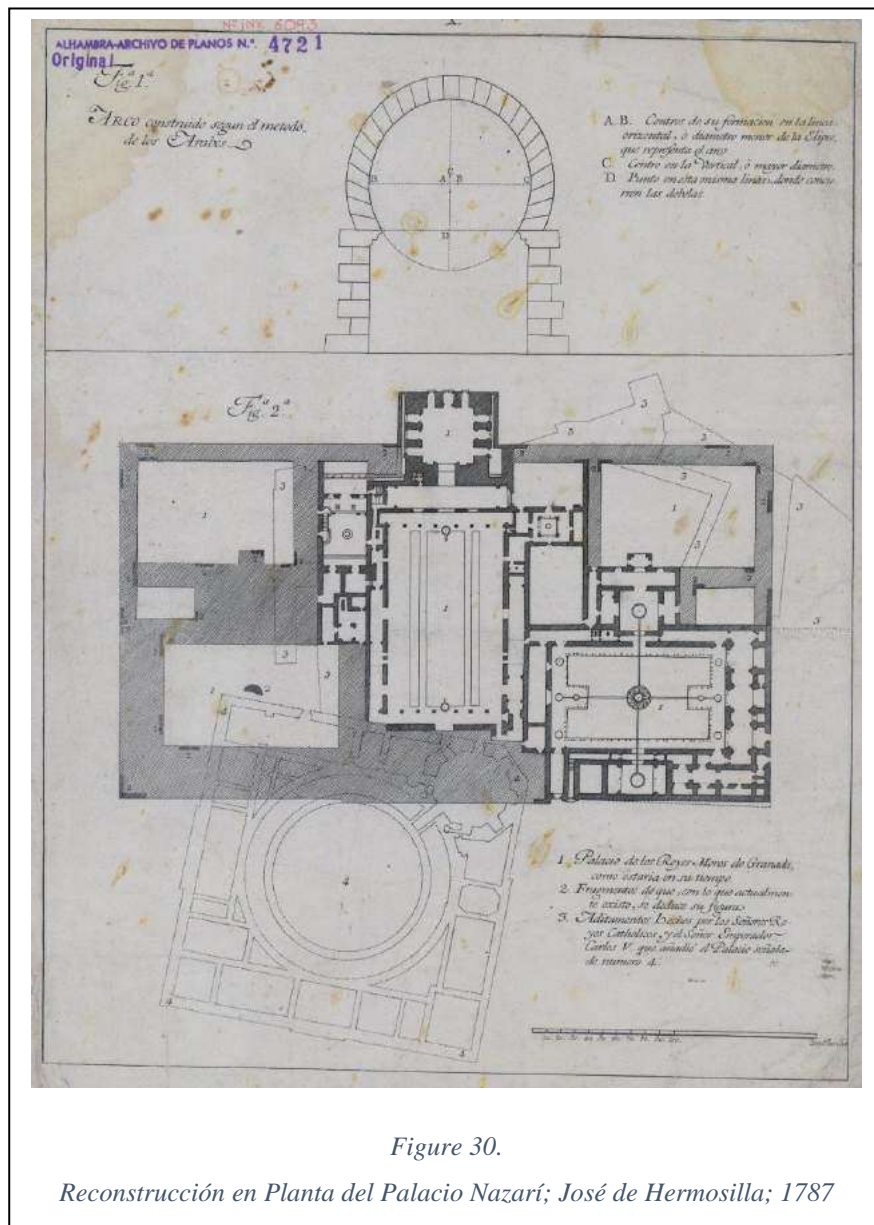


Figure 30.

Reconstrucción en Planta del Palacio Nazarí; José de Hermosilla; 1787

Nazarí” (Figure 30).

In this depiction, he frames the existing buildings in a regular and symmetrical rectangular shape, partly overlapping with the Palace of Charles V, basing his suggestion on small archaeological remains west of the Mexuar. Such an idea could have been influenced by the principles of Western architecture, in which symmetry plays a fundamental role. The plans of the monumental complex are further explored with the “Plano del sitio de Generalife”, which despite its many inaccuracies, provides the first such illustration of the palace.

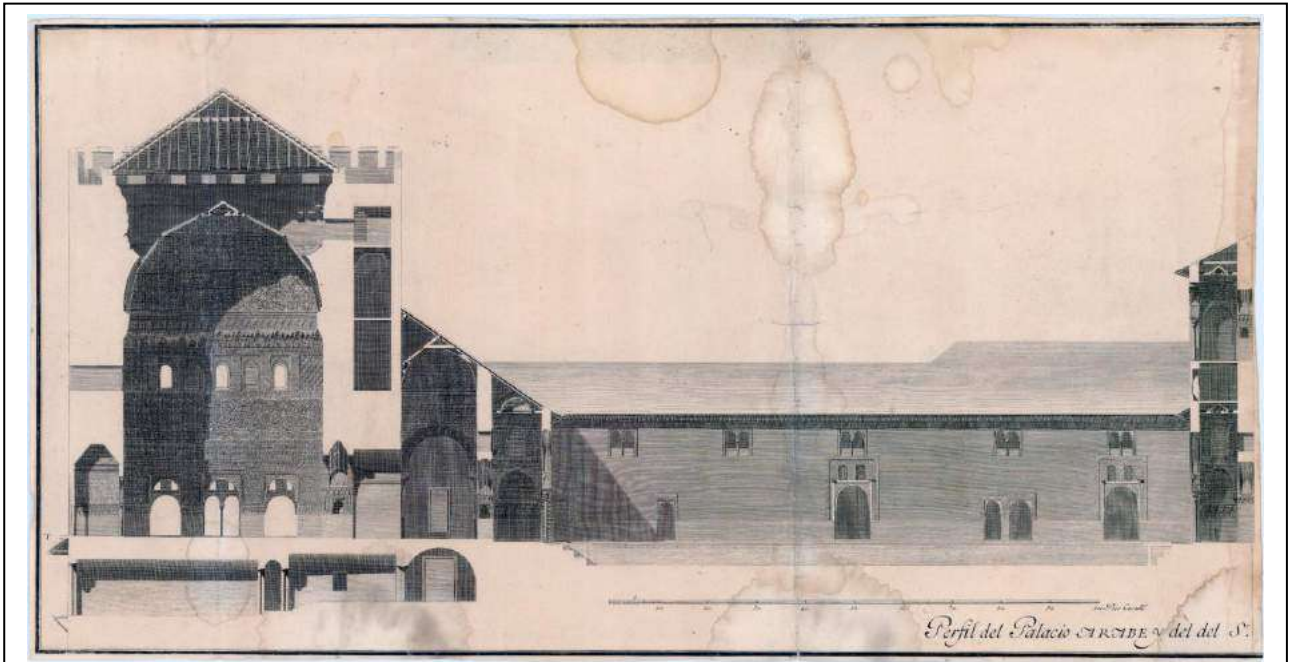


Figure 32.

Perfil del Palacio Arabe y del Sr. Emperador Carlos V; José de Hermosilla; 1787

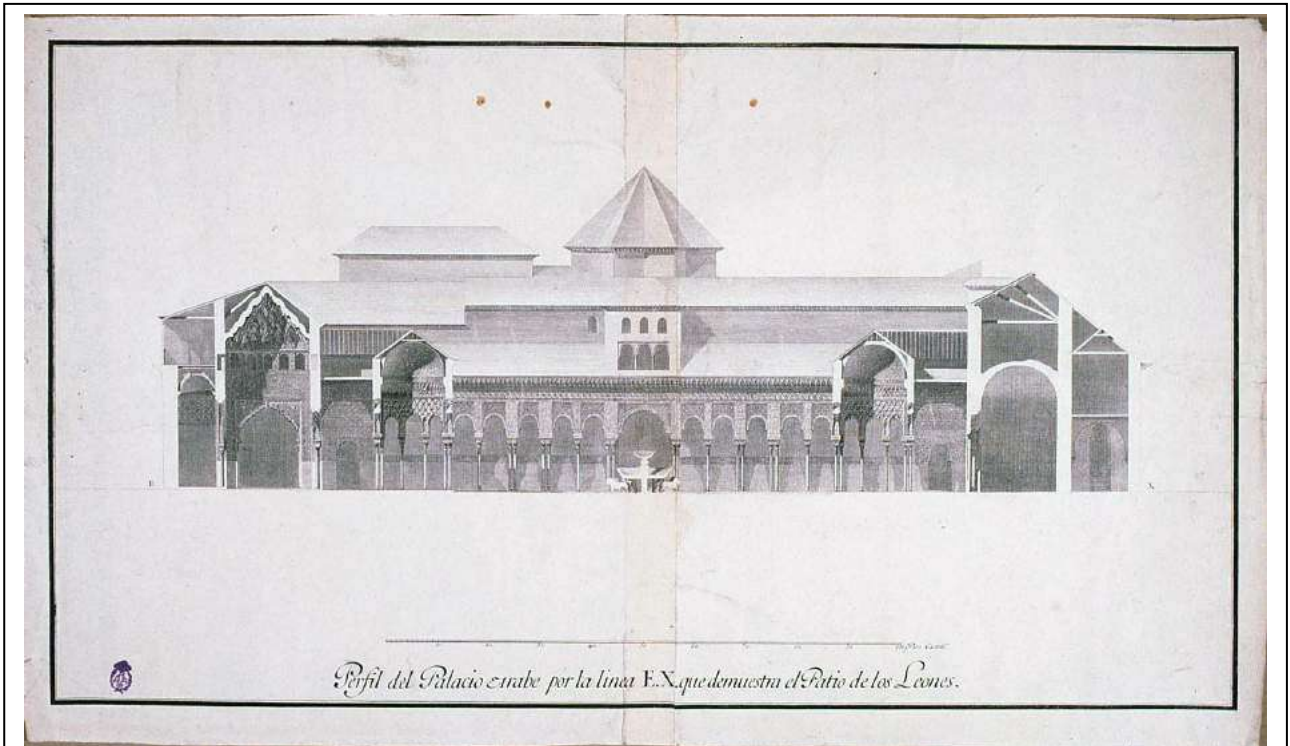


Figure 31.

Perfil del Palacio Arabe; José de Hermosilla; 1787

Within “Las Antigüedades Árabes de España”, several plates offer more detailed views of the buildings, showing the Nasrid Palaces and the Palace of Charles V both together, and by themselves. In the “Perfil del Palacio Arabe y del Sr. Emperador Carlos V” (Figure 32), the plate illustrates the section along the north-south axis of the Patio de los Arrayanes. The leftmost area of the image is occupied by the Torre de Comares, the interior of which is faithfully decorated, followed by the Sala de la Barca and the northern gallery of the courtyard. On the opposite side, the Palace of Charles V is depicted in its entirety, showcasing the two-story circular colonnade and the adjacent rooms. The “Perfil del Palacio Arabe” (Figure 31), instead, concentrates on the Patio de los Leones, cut along the east-west axis: on the left, the Sala de los Reyes is followed by the gallery and the eastern pavilion, mirrored across the courtyard before the Sala de los Mocarabes. The plate is followed by a detail of the profile and upper view of the Fuente de los Leones, which underlined the presence of a smaller basin above the original one. The authors also focus on a number of smaller architectural details, such as columns and capitals, highlighting the different designs and contrasting them with those of the Imperial Palace.

5.2. *Fernández Navarrete’s and Dalmau’s plans*

During the XVIII century, the city of Granada also continued to be the subject of plans, albeit in smaller number and with varying results.

In 1732, Francisco Fernández Navarrete, includes the Alhambra in a map titled “Plan de la ciudad de Granada” (Figure 33), published in the second volume of “Cielo y Suelo granadino”. In the upper part of the map, the monumental complex is clearly visible, surrounded by its fortified perimetral wall. The inclusion of a number of inexistent towers which adorn such fortification immediately offers an idea of the level of fidelity of such map, which nevertheless provides interesting details. For the first time, the Cuesta Gomérez is shown with vegetation, which had hitherto been absent due to military reasons. The



Figure 33.

*Plan de la ciudad de Granada: detail of the Alhambra;
Francisco Fernández Navarrete; 1732*

Alcazaba appears as a simplified version of the building, while the Palace of Charles V is represented with a perspective view of the two-story circular courtyard and both the Patio de Comares and the Patio de los Leones can be recognized.

More notable is the “Mapa topográfico de la ciudad de Granada” (Figure 34) by Francisco Dalmau, produced between 1795 and 1796. According to his letter to the Cabildo (the municipal council), the author felt it was necessary to provide the city with an accurate and precise depiction of its environment, as the existing ones were lacking. While in general the results of Dalmau’s work appear to be rather faithful to reality, with respect to the Alhambra his measurements seem slightly more inaccurate, especially considering the external fortified wall and the imprecise location of the Puerta de los Siete Suelos, as well as the lack of alignment between the Torre de Comares and the corresponding courtyard.



Figure 34.

Mapa topográfico de la ciudad de Granada; Francisco Dalmau; 1796

6. Granada and the Gran Tour

During the XVIII century, the Alhambra was the destination not only of the journeys of scholars from the Real Academia de Bellas Artes de San Fernando of Madrid, but also of international travelers. Since the XVII century, the Gran Tour, a coming-of-age voyage considered an integral part of the educational process for European young aristocratic men, usually led them to Italy and France. There, besides enjoying the culture and scenery, travelers would typically keep a diary, which would often turn into a publication once they returned to their homeland. By the end of the following century, partly due to the influence of the various atlases mentioned above, Spain started being considered to extend the tour and further expand the knowledge of young noblemen. Granada, especially, was considered the gateway to the Near East, the entrance to a magic, exotic world which enticed and fascinated those who would later be known as Romantic travelers.

With such premises, the detailed, precise and faithful descriptions of reality were gradually replaced by quicker sketches that provided viewers with the impressions and emotions sparked by the landscapes and cities visited by the author. In the context of the Alhambra, such depiction further transformed to become, by the XIX century, strongly influenced by artistic ideals of its Islamic past and of the Orientalism trend.

British voyagers in particular were among the first to demonstrate a fascination with the Alhambra, as testified by diaries and drawings by Joseph Townsend and Henry Swinburne. Such interest could be partly caused by the fact that architect sir William Chambers had already popularized Moorish architecture by including a greatly simplified and deeply transformed replica of the Alhambra as one of the features of the “Oriental gardens” which he designed in the Kew Gardens, commissioned by the prince of Wales in 1758. Although sir Chambers had never traveled to Spain, one of his coworkers, Swiss artist Johann Henry Müntz, had visited the Iberian Peninsula in 1748 and could therefore had been the source for the reinterpretation of the monument provided by sir Chambers. While the building is no longer visible, since it was destroyed in 1820, its cultural impact was one of the factors that encouraged British nobility to take an interest in Andalusian architecture.¹²⁴

¹²⁴ (Galera Andreu, 1992), (López-Burgos, 2000), (Montejo Palacios, 2015), (Raqujo, 1990)

6.1. Twiss's "Voyage en Portugal et en Espagne, fait 1772 & 1773"

Among the first travelers to include Granada in their tour, Richard Twiss and Henry Swinburne offer interesting documental evidence of their journey. The first was in Granada during his ten-month voyage in the Iberian Peninsula, the memories of which were published as "Voyage en Portugal et en Espagne, fait 1772 & 1773" a few years later. Twiss describes the Nasrid Palaces, remarking on the marble floor of the Patio de los Leones, and the Palace of Charles V, as well as the view from the Generalife, noting how the location of the buildings overseeing the fertile vega and, at the same, facing the Sierra Nevada contributes to its charm.

He also includes a number of illustrations, like the "Vista de Granada desde San Nicolás" (Figure 35), drawn by Hieronimus Grimm and engraved by V. M. Picot, but, by Twiss's own admission, copied from that of Diego Sánchez Sarabia. Such view from the Albaicín, decorated with architectural details on the lower left corner and the Puerta del Vino on the lower right one, shows distorted proportions which give the monument a greater verticality. However, the buildings are still recognizable, as from left to right, after the Generalife, the Torre de la Cautiva and del Candil are depicted, followed by the Torre de los Picos, the Partal and the Torre de las Damas, connected to the Peinador by a fortified wall. The Torre de Comares, disproportionately tall, is depicted with a deeply sloped hip-and-valley roof topped by a cross and with balconies. Behind, the church of Santa María and the Palace of Charles V appear, while on the right, in the Alcazaba, the Torre del Homenaje is elongated and adorned by a pointy roof, thus seeming taller than the Torre de la Vela.¹²⁵

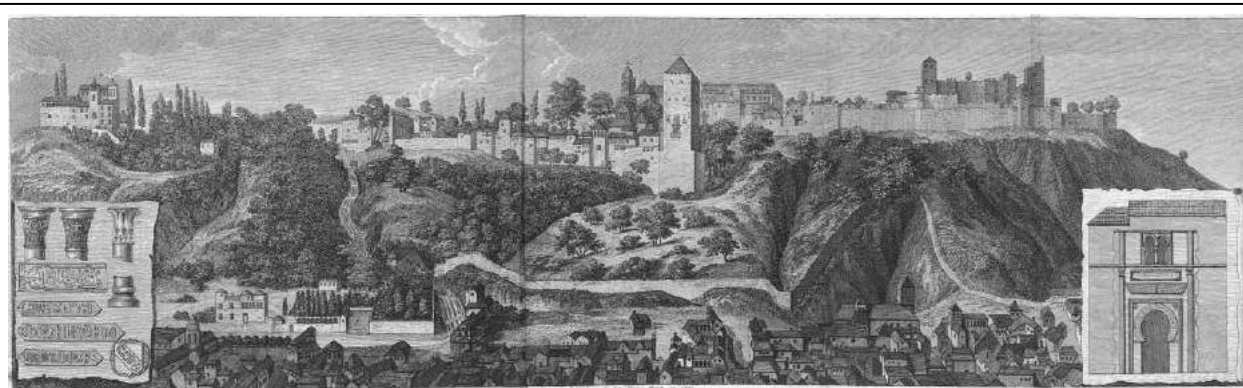


Figure 35.

Vista de Granada desde San Nicolás; Richard Twiss; 1775

¹²⁵ (Gámiz Gordo, 2008), (Galera Andreu, 1992)

6.2. Swinburne's "Travels through Spain"

The British nobleman Henry Swinburne toured Spain a few years later, between 1775 and 1776, writing about the journey and later publishing a volume titled "Travels through Spain in the years 1775 and 1776, in which several monuments of Roman and Moorish architecture are illustrated by accurate drawings taken on the spot", a book that would lead many European readers to discover the monuments of the Iberian Peninsula.

The author was deeply impressed by the Alhambra, describing it as the most curious place of all of Spain, where everything seems to have been calculated to make the palace the most luxurious residence and a magical place. He also takes note of the measurements of the columns from the Patio de los Leones and copied the translations of many inscriptions, albeit as incorrectly reported in "Paseos por Granada y sus contornos", by Padre Juan Velázquez de Echevarria. Swinburne's publication includes seven plates dedicated to Granada, four of which are landscape views, while three represent the Palacio de los Leones.



Figure 36.

Vista de Granada desde el valle del Genil; Henry Swinburne; 1775

One of the general depictions of the monumental complex can be found in the engraving "Vista de Granada desde el valle del Genil" (Figure 36), in which the artist adopted a point of view similar to that of Hoefnagel and Wyngaerde. The Alhambra appears on the right, showing its southern side. On the far left of the monument, the Torre de la Vela is marked by its off-center pinnacle and denotes the Alcazaba, which ends with the Torre Quebrada and the shorter Torre del Adarguero in front of it, partially covering the Torre del Homenaje. The Palace of Charles V is easily recognizable and

followed by the church of Santa María with its bell tower. The vegetation hides the rest of the fortifications and buildings to give way, almost at the margin of the image, to the Generalife.

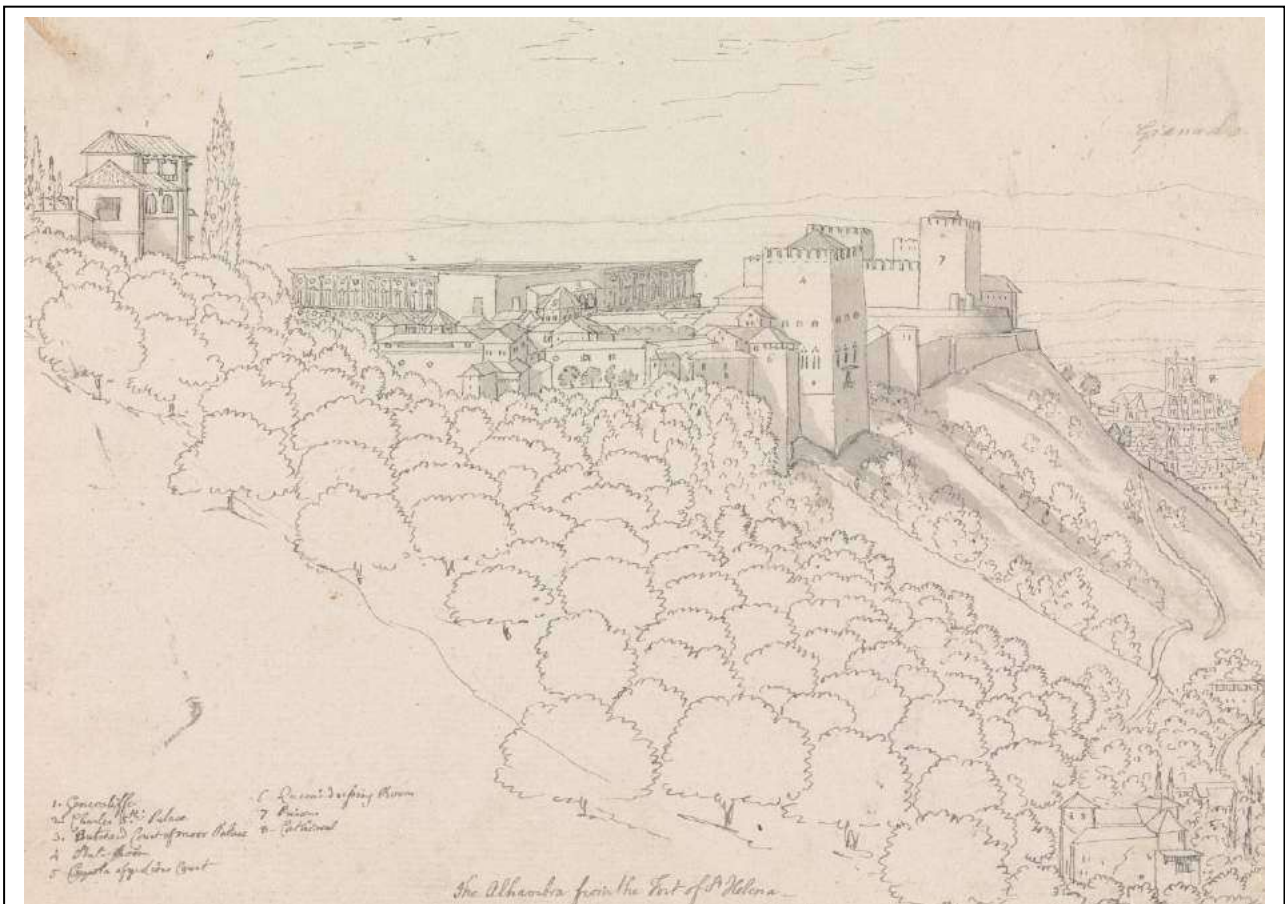


Figure 37.

View of the Alhambra of Granada from the Sierra del Sol or of S. Helen; Henry Swinburne; 1775

In the plate “View of the Alhambra of Granada from the Sierra del Sol or of S. Helen” (Figure 37), Swinburne offers a more unusual and soon to be copied perspective, high on the northern side of the Cerro del Sol. On the left, close to the edge of the image, the Generalife appears among the vegetation, soon followed by a view of the Palace of Charles V which manages to offer a peek from above onto its circular patio. In front of it, the irregular and slightly imprecisely drawn shapes of the Nasrid Palaces are marked by their inclined roofs, while on the right the Torre de Comares appears, devoid of any balconies. Just behind its slanted hip-and-valley rooftop, the Torre Quebrada appears, connected to the Torre del Homenaje, which hides the Torre de la Vela.

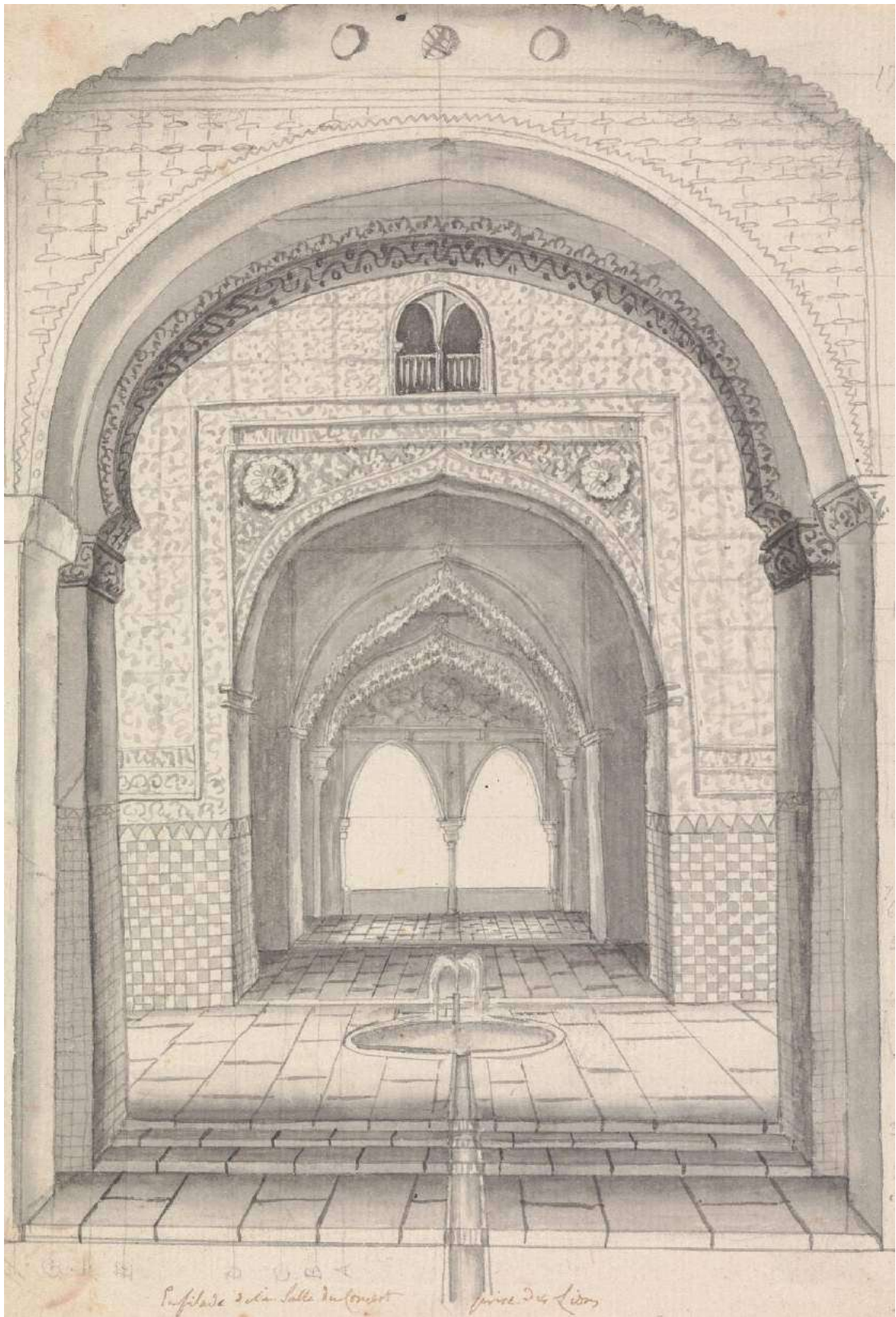


Figure 38.

Sala de las Dos Hermanas; Henry Swinburne; 1775

One of the main characteristics of Swinburne’s images, however, is their capacity to capture the essence of the sublime and uniting it with the Islamic aesthetic. In the engraving “Sala de las Dos Hermanas” (Figure 38), he opts for a point of view close to the Fuente de los Leones, thus offering a perspective of arches form the doorway to the Mirador de Lindaraja. The symmetric composition, highlighted by the water canal leading from the central fountain of the patio to that of the Sala de las Dos Hermanas, marks a plate far from exact in the detail of its ornaments, but which, nevertheless, encapsulates Swinburne’s intention of evoking the abundance of the decorations and beauty of the perspective.

Correspondingly, his view of the Patio de los Leones (Figure 39), shows a similar interest for specific points of view: as the courtyard is depicted from one of the corners, it appears much bigger than its actual dimensions, an effect accentuated by the distorted proportions, also visible in the previous plate. The image imperfectly aligns the eastern and western pavilions with the fountain, omitting the



Figure 39.

Patio de los Leones; Henry Swinburne; 1775

water canal that would lead to them, and deviates from reality with regards to a number of details, such as the capitals and the decorations. However, it also provides details such as the pattern of alternating floor tiles and the presence of a ceramic baseboard along the walls, while in the focal point of the composition, the Fuente de los Leones is depicted with a double basin and a tall water jet much different from nowadays.

6.3. *“Vista de Granada desde el Camino de la Fuente del Avellano, mirando a Poniente”*

An exceptional view of the city of Granada is presented in the oil on canvas titled “Vista de Granada desde el Camino de la Fuente del Avellano, mirando a Poniente” (Figure 40), by an unknown author. Probably commissioned by Nicolás de la Cruz y Bahamonde, first count of Maule, as it was part of his collection, the artwork is to be the result of the patron’s interest in both the arts and the city of Granada, where he stayed for three months in 1798 and which he described in “Viaje de España,



Figure 40.

Vista de Granada desde el Camino de la Fuente del Avellano, mirando a Poniente; Anonymous; 1798

Francia e Italia”, published between 1806 and 1813. The volume offers valuable information about the artist, naming him as Marín and thus referring to Fernando Marín Chaves, director of the Department of Painting of the Academia de Bellas Artes of Granada. The painting could presumably date back to the same year of the count of Maule’s journey, 1798.

The image shows a perspective of both the Alhambra, on the left, and the Albaicín, on the right, with the Darro river flowing between them and the whole city of Granada in the background. At the forefront of the painting two male figures appear, identified as the count and Brother Sebastián Sánchez Sobrino, author of “Viage topográfico desde Granada a Lisboa”, published in 1793. The point of view is that of a curve along the Camino de la Fuente del Avellano, a path situated north-east of the Alhambra, now far more sheltered by trees than during the XVIII century. The monumental complex is depicted on the left, rather far from the observer. The flat, regular building of the Palace of Charles V is easily recognizable, as is the Torre de Comares marked by its dimensions and its hip-and-valley roof. Behind, the Alcazaba appears, represented by the Torre Quebrada and the Torre del Homenaje, partly covering the Torre de la Vela. This somewhat simplified depiction of the Alhambra is surrounded by a detailed view of the city, especially showcasing the monument’s relationship with the Albaicín. A similar, albeit lower, point of view was later adopted by a number of artists, such as Richard Ford and Girault de Prangey.

7. The Picturesque Alhambra

During the first two decades of the XIX century, Spain underwent a period of crisis as the kingdom was caught in the Napoleonic conflict and, few years later, in 1823, raided by the Hundred Thousand Sons of Saint Louis, a branch of the French Army sent to restore King Ferdinand VII.

This also represented a period of ruin for the Alhambra, as it was occupied by the French army and consequently sacked. Moreover, the following abandon of the fortress left it to be inhabited once again by the destitute, who sometimes resorted to selling archaeological remains of the monument to rich tourists: most of the original tiles of the Mexuar were lost and part of the Puerta de los Siete Suelos was destroyed.

Nevertheless, as Granada gradually became an essential completion of the Gran Tour, more and more young Europeans arrived in the city and captured its peculiarity on paper. Voyagers’ depictions of

the monuments and, most of all, of the Alhambra, were influenced by aesthetic ideals, which led to the production of a series of modified images. The Picturesque style, a prelude to Romanticism, offered a compromise between the beautiful and the sublime: while the first had been connected with the celebration of logic practiced during the Age of Enlightenment. the latter was linked to the rejection of rationality and the acceptance of a more emotional mentality.

Thus, at the beginning of the XIX century, the previous concern with accurate depictions aided by measurement was gradually set aside to favor images that would convey the artist's feelings. In the representations of the Alhambra, this attitude would often translate into a greater concern for unusual perspectives, in which nature played a key role. Moreover, the fascination with the Orient progressively infused the depictions and soon ushered in the more famous Romantic images, The vast production of both texts and depictions of the Alhambra during the XIX century has been the subject of several scholars, who have often focused on specific decades or national groups of artists and writers. A general yet exhaustive outline of the topic is provided by Pedro Galera Andreu's text,¹²⁶ while the volume by Barrio Marco and Fernández Bahillo¹²⁷ offers an analysis of the relationship between British travelers and the Alhambra, which became particularly intense during the Romanticism.

7.1. Murphy's "*The Arabian Antiquities of Spain*"

The popularity gained by the works of British travelers such as Twiss and Swinburne led, at the beginning of the XIX century, to the volume created by James Cavanah Murphy, titled "*The Arabian Antiquities of Spain*",¹²⁸ incomplete and published posthumously in 1816.

Appointed by the Count of Bristol, the author arrived in Andalusia in 1802, aiming to correct the mistakes of his predecessors and spending there seven years, mainly focusing on the Alhambra. Despite facing harsh criticism, Murphy approached his task in a rather systematic way and his work was greatly responsible for spreading knowledge about the Nasrid Palaces. The publication includes eighty-eight plates dedicated to the Alhambra and Generalife, of which nine, mostly plans, were taken from other authors. Focused on great and emotional views, sometimes exaggerated through distorted

¹²⁶ (Galera Andreu, 1992)

¹²⁷ (Barrio Marco & Fernández Bahillo, 2014)

¹²⁸ (Murphy, 1813-16)

proportions, Murphy's artworks aim to transmit a sense of surprise and admiration, combined with an interest for architectural details such as tile patterns and plaster ornaments.

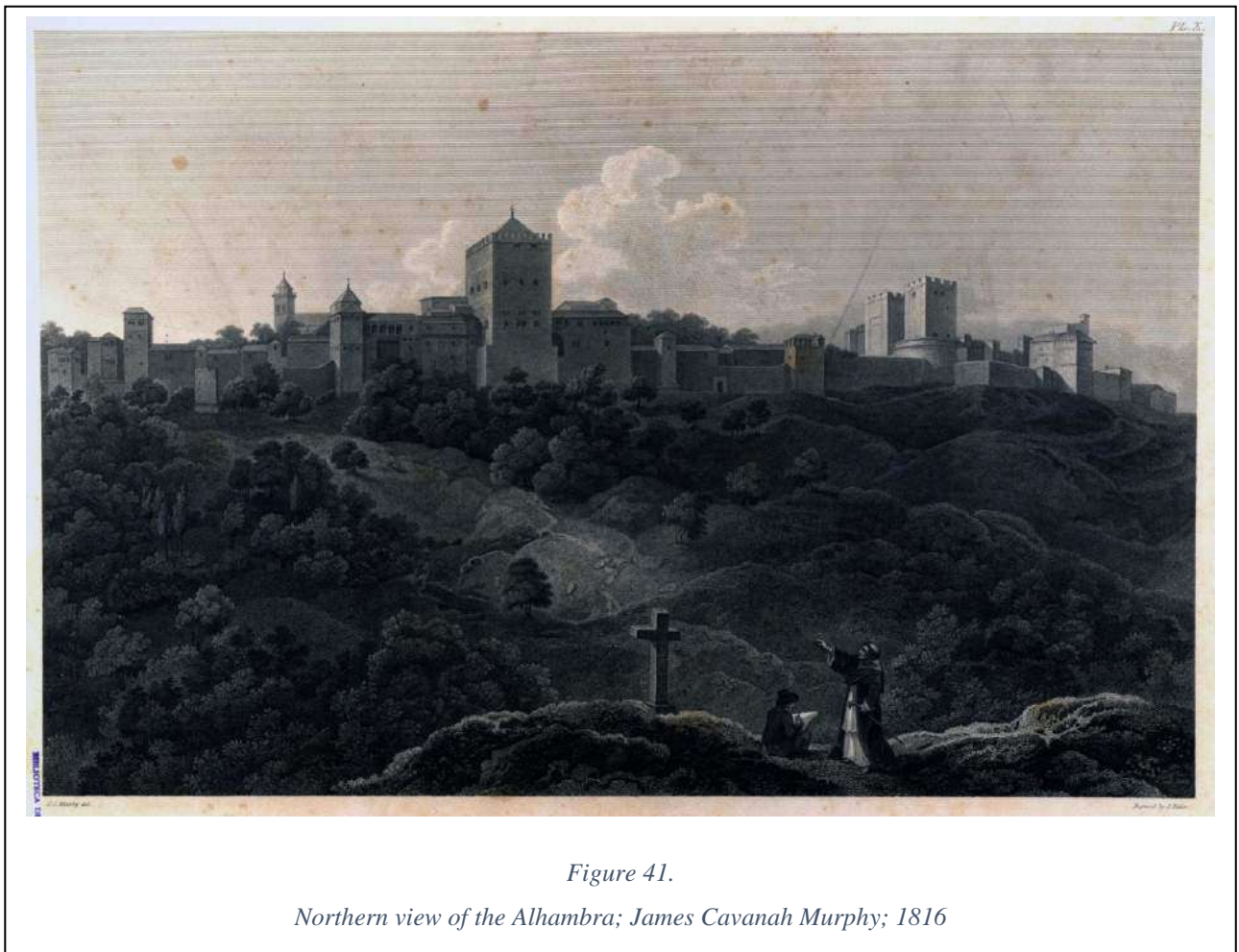


Figure 41.

Northern view of the Alhambra; James Cavanah Murphy; 1816

The first of the plates dedicated to the Alhambra shows a perspective of its northern side (Figure 41), from a point of view closer than the usual location near San Nicolás on the Albaicín, probably near the Cuesta del Chapiz. While in the foreground an artist sits by a cross accompanied by a monk, the monumental complex is placed at about two thirds from the base of the composition. On the left, a few towers, the tallest of them can be identified as the Torre de las Damas, are linked with a fortified wall to the Peinador de la Reina, followed by the arched gallery connecting it to the Torre de Comares. The tower, the impressive volume of which easily constitutes the focus of the image, shows a faithfully realistic number of openings and windows, and is topped by rooks and, above the hip-and-valley roof, by a cross. The side of the Mexuar and its gallery are followed by a fortification that leads to the Alcazaba, clearly marked by the Torre del Homenaje and the Torre Quebrada, while further on the Torre de la Vela, recognizable due to the off-center pinnacle, appears slightly shorter than usual.

Following such general view there are a plan of the entire hill and one focused solely on the Nasrid Palaces, both of them probably copied by those of the Real Academia de San Fernando. Murphy then concentrates the gates of the Alhambra, particularly the Puerta de la Justicia, represented in perspective, in two elevations and a plan, then dedicating eight plates to the Royal Baths before focusing on the Nasrid Palaces.



Figure 42.

North side of the Pateo [sic] del Agua, or great fountain; James Cavanah Murphy; 1816

In the plate titles “North side of the Pateo [sic] del Agua, or great fountain” (Figure 42), the artist depicts the southern side of the Patio de Comares choosing a symmetrical composition and a point of view from inside the northern colonnade, thus highlighting the play of light and shadow. A tall water jet from the small round fountain in the center of the northern side of the pool marks the exact center of the plate, which develops as almost perfectly symmetrical. The second story of the Palace of Charles V does not appear behind the double gallery on the southern side, while the first arch on the left of the northern colonnade frames the bell tower of the church of Santa María, topped by a cross.

A companion piece to the plate is the “View of the South side of the Pateo [sic] del Agua” (Figure 43), a perspective from the opposite side of the Patio de Comares. It shows a slightly different composition, as, while the image is once again strongly symmetrical, only the central three of the seven arches of the southern gallery are depicted. The middle one frames the Torre de Comares, which, compared to nowadays, lacks the shorter towers on either side, thus seeming taller. It must be noted that it also lacks the slanted cross-topped roof with which it had been represented up to that time.



Figure 43.

View of the South side of the Pateo [sic] del Agua; James Cavanah Murphy; 1816

Symmetrical composition also dominates the engravings depicting the Patio de los Leones, such as “A perspective View of the Court and Fountain of Lions” (Figure 44). The point of view is from underneath one of the small pavilions on the shorter sides of the courtyard, framing the fountain within its middle arch, while the water canal that flows from the center of the patio toward the viewer is slightly off-center. The most notable characteristic of the representation, however, is the extreme distortion of the proportions, which gives the illusion of a much greater space. The impression is

further amplified by the contrast with several small human figures placed near the towering columns. Part of the reason for such verticality could be attributed to the widespread XIX century theory according to which Islamic art was considered the most probable predecessor for Gothic architecture.



Figure 44.

A perspective View of the Court and Fountain of Lions; James Cavanah Murphy; 1816

The same hypothesis led Murphy to elongate the proportions of the Alhambra in other illustrations, such as in “Hall of the Two Sisters” (Figure 45) and “Hall of the Abencerrages” (Figure 46), where, once again, the interior space of the halls is distorted and expanded, partly with the help of strategically minute human figures, to increase the sense of opulence. Framed by great archways, the halls are represented through an impossible perspective, as the actual conformation of the building forbids the eye from capturing such view in a single glance. Similarly, in “A Perspective View of the Golden Saloon, or Hall of Ambassadors” (Figure 47), the square plan of the Sala de Comares is stretched into a rectangle, elongating the Islamic qubba to extend its space, adding to its luxury and exoticism.

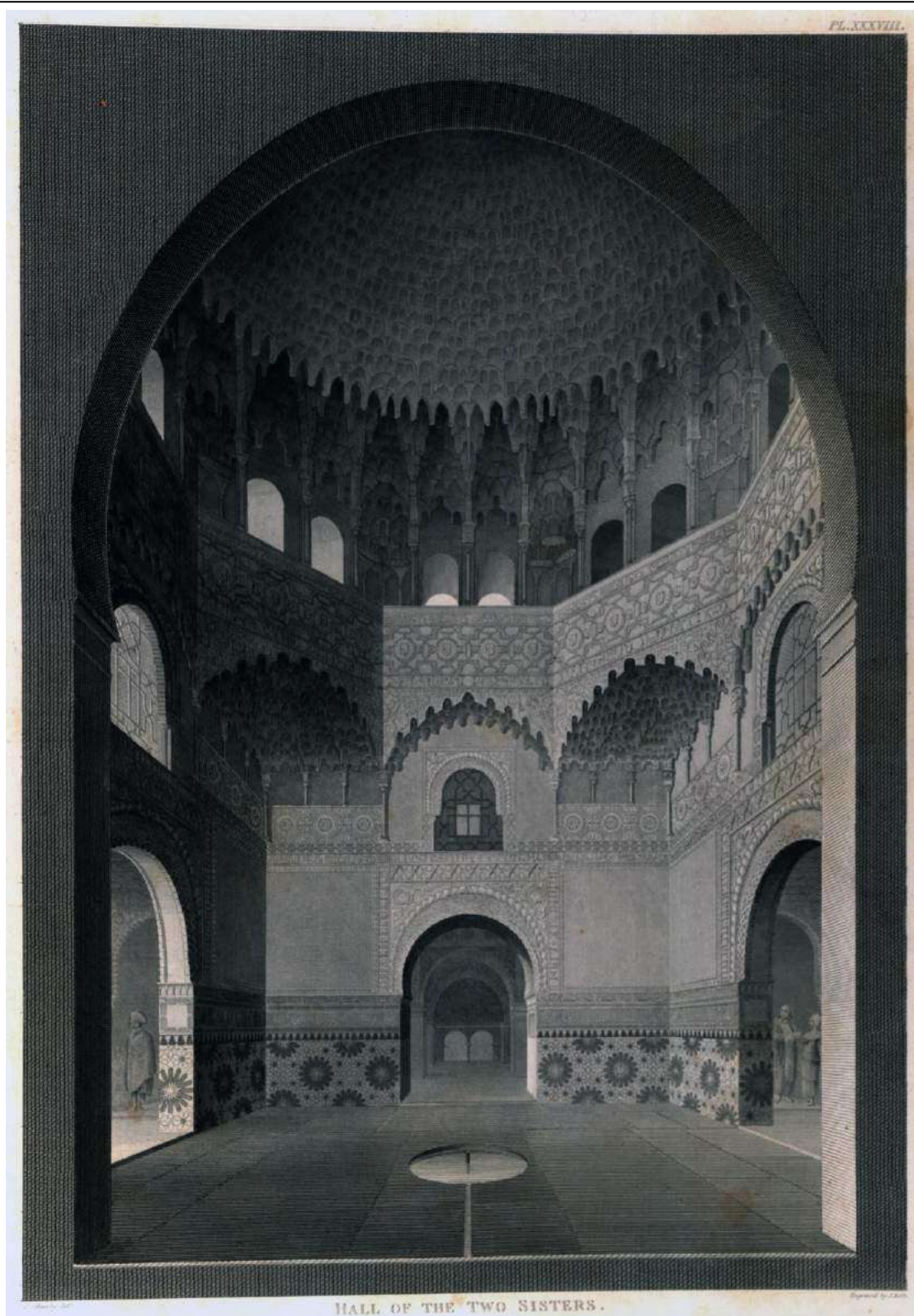


Figure 45.
Hall of the Two Sisters; James Cavanah Murphy; 1816

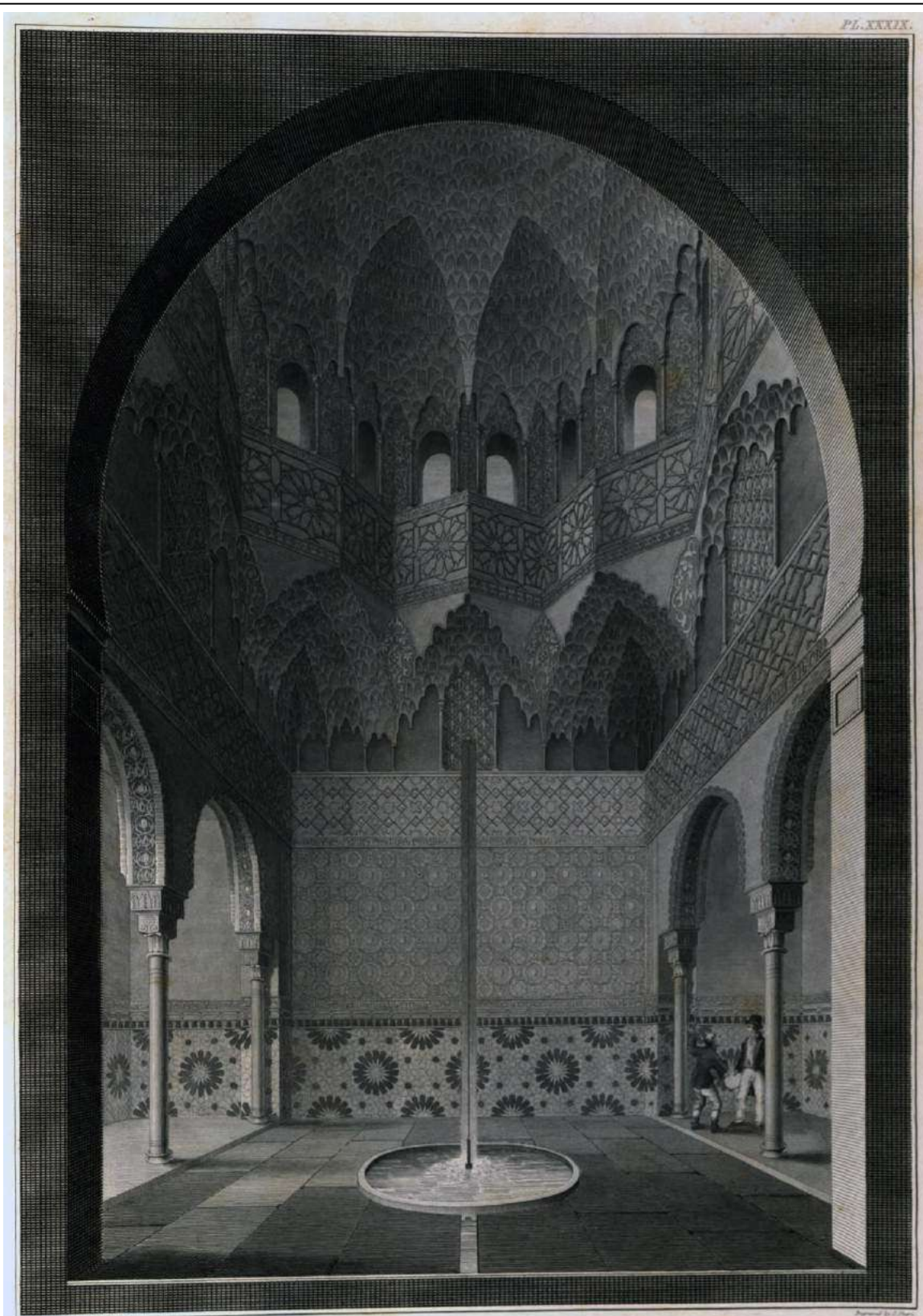


Figure 46.

Hall of the Abencerrages; James Cavanah Murphy; 1816

Despite the many artistic licenses that the artist allows himself when representing perspective views of the Nasrid Palaces, Murphy also includes in his volume a number of elevations that do not suffer from such distortions. Moreover, he focuses on the paintings of the Sala de los Reyes, as well as on architectural details, providing a catalogue of about twenty tile mosaic patterns, almost thirty inscriptions and several plaster ornaments, columns and capitols.

The more precise and scrupulous execution of such plates offers further insight on the cause for rather unrealistic views of the halls and courtyards: unlike those concentrated on the exact details of palatial decoration, these illustrations aim to evoke in the observer the same sensations of surprise and fascination that travelers could feel in front of their physical counterparts.¹²⁹

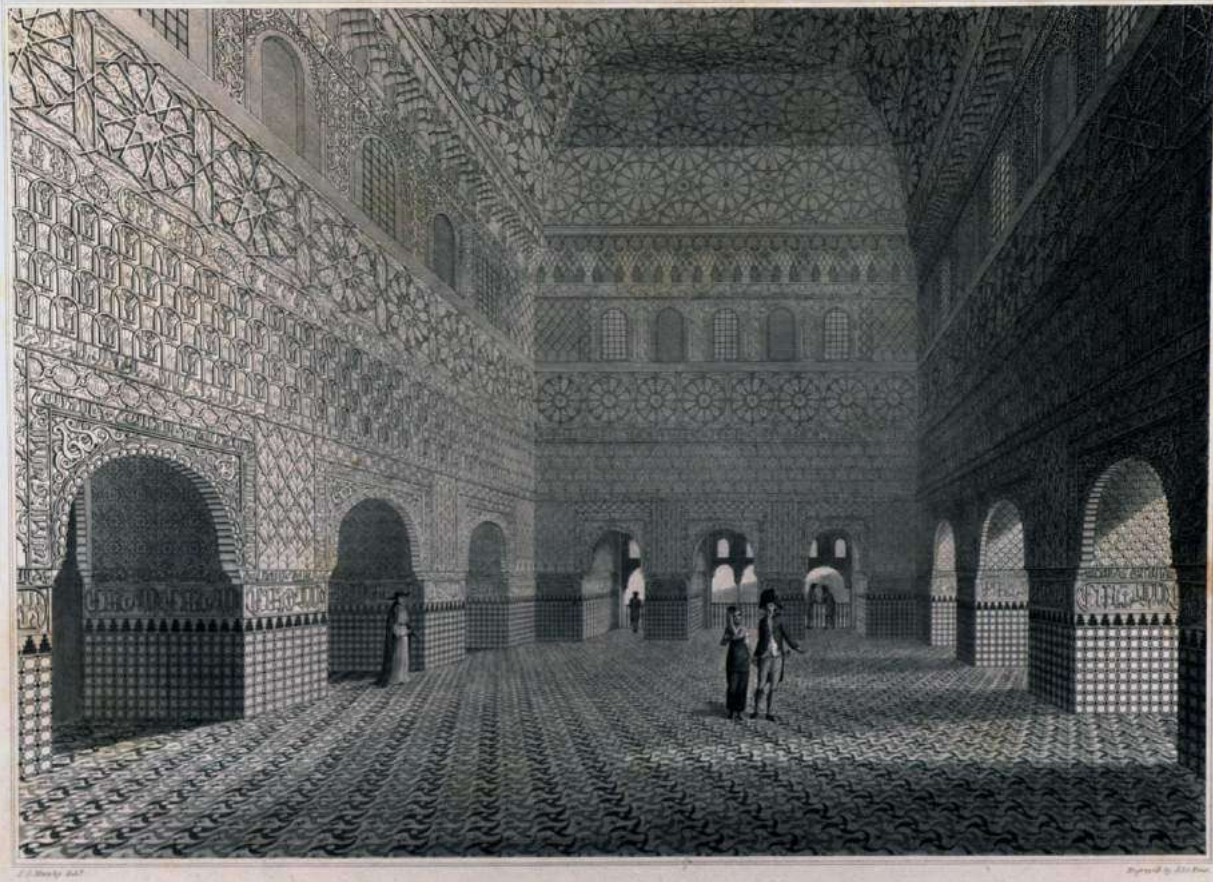


Figure 47.

A Perspective View of the Golden Saloon, or Hall of Ambassadors; James Cavanah Murphy; 1816

¹²⁹ (Galera Andreu, 1992), (Murphy, 1813-16)

7.2. *De Laborde's "Voyage pittoresque et historique de l'Espagne"*

At the same time that Murphy was working on his volume, Alexandre L. J. de Laborde was creating an analogous and parallel book, started in 1806 and published in 1820. Similarly influenced by the Real Academia de Bellas Artes's "Las Antigüedades Árabes de España", the French author asked for the patronage of the Spanish monarch Charles IV through the French ambassador, considering how his work would be a monument to the kingdom and correctly guessing its importance as an introduction to Iberian archaeological and scenic attraction for the French. The publication, titled "Voyage pittoresque et historique de l'Espagne"¹³⁰ and best described as an artist's album, as it contains over three hundred illustrations, encountered a great success, marking the origin of the genre of travel literature for French writers. Out of the four volumes, the third is entirely dedicated to Andalusia and mainly focused on Cordoba and Granada, illustrating the latter with fifty plates based on drawings by Dutailly and Jean-Lubin Vauzelle.

In his text, de Laborde acknowledges how a number of the plans, elevations and inscriptions are copied from those of "Las Antigüedades Árabes de España", which constitute about half of the engravings regarding the Alhambra. In fact, de Laborde usually appears rather concerned with the scientific accuracy of his drawings, considering fidelity to reality a fundamental aspect of his work. Moreover, his thesis regarding the relationship between Islamic and Gothic architecture deviates from the British one, as he notices that, while the latter derives its elegance from the use of ogival arches and vaults, the other never incorporates such element, thus strongly differentiating the two styles. The author also notices how the Alhambra derives its structure, articulated around courtyards, from the roman domus as described by Plinius and, further back in time, from the biblical house of Salomon.

¹³⁰ (de Laborde, 1820)

The plate focused on the Patio de los Leones (Figure 48) shows an off-centered point of view, concentrated on the details of the northern gallery and western pavilion. Compared to Murphy's illustration, it is easy to see how the proportions appear far more realistic and how the disappointing state of conservation is faithfully depicted, with an uneven and untiled floor, roofs overgrown with plants and walls from which the stucco is falling. Moreover, the realistic representation of the northern pavilion would later play a fundamental role for Leopoldo Torres Balbás's restoration. The engraving dedicated to the Sala de las Dos Hermanas (Figure 48) shows a side view of the hall, highlighting its square module and cutting the image just below the vault: it is a refusal of the vertical vision proposed by Murphy, rather focusing on how the hall derives from the desert tent, with its conic roof and the door as the only opening through which light could pass.



Figure 48.

Patio de los Leones; Alexandre L. J. de Laborde; 1820

For de Laborde, doors acquire great importance as liminal spaces between the enclosed interiors and the natural landscape outside. Such transition, a focus of Picturesque culture, is most evident in the fortieth plate (Figure 50), where the perspective view from the Sala de las Dos Hermanas across the Patio de los Leones is highlighted by a succession of five arches that frame the fountain. Similarly, a companion view (Figure 50) from the courtyard across the hall toward the Mirador de Lindaraja shows a sequence of three arches framing the bifora at the end. In both cases, the perspective is slightly oblique rather than frontal, offering more depth and dynamism to the composition, further highlighted by the chiaroscuro of different levels of light.

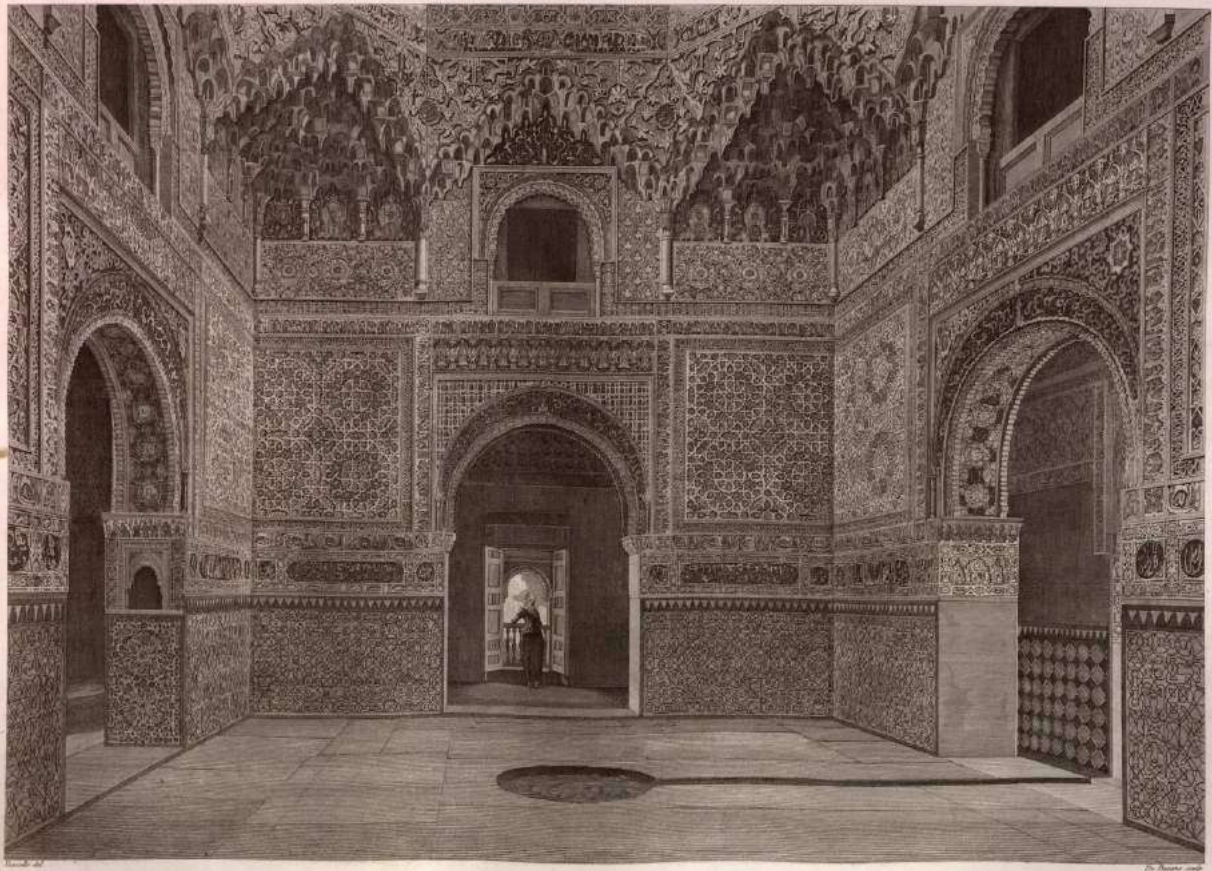


Figure 49.

Sala de las Dos Hermanas; Alexandre L. J. de Laborde; 1820

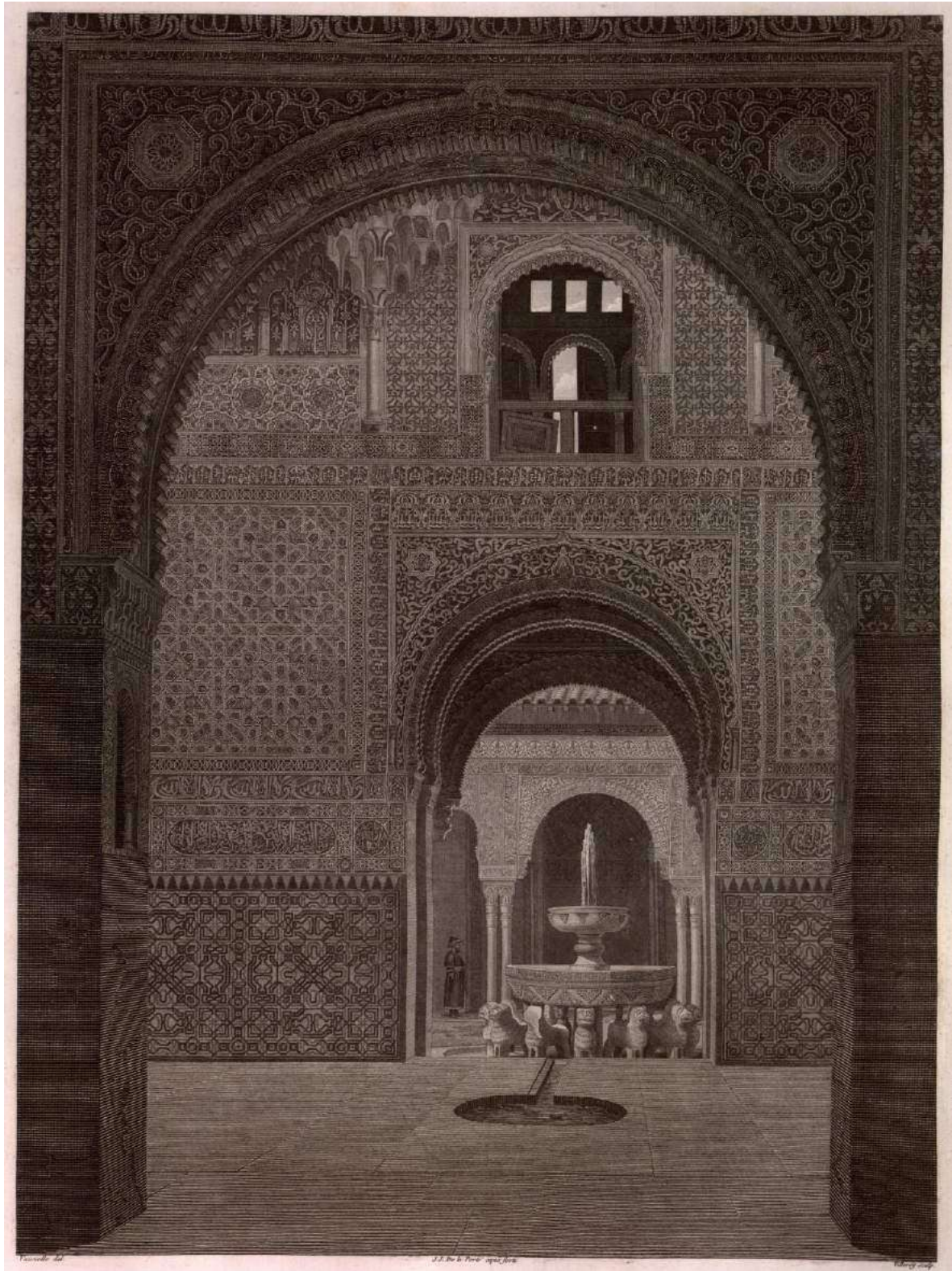


Figure 50.

View from the Sala de las Dos Hermanas across the Patio de los Leones; Alexandre L. J. de Laborde; 1820

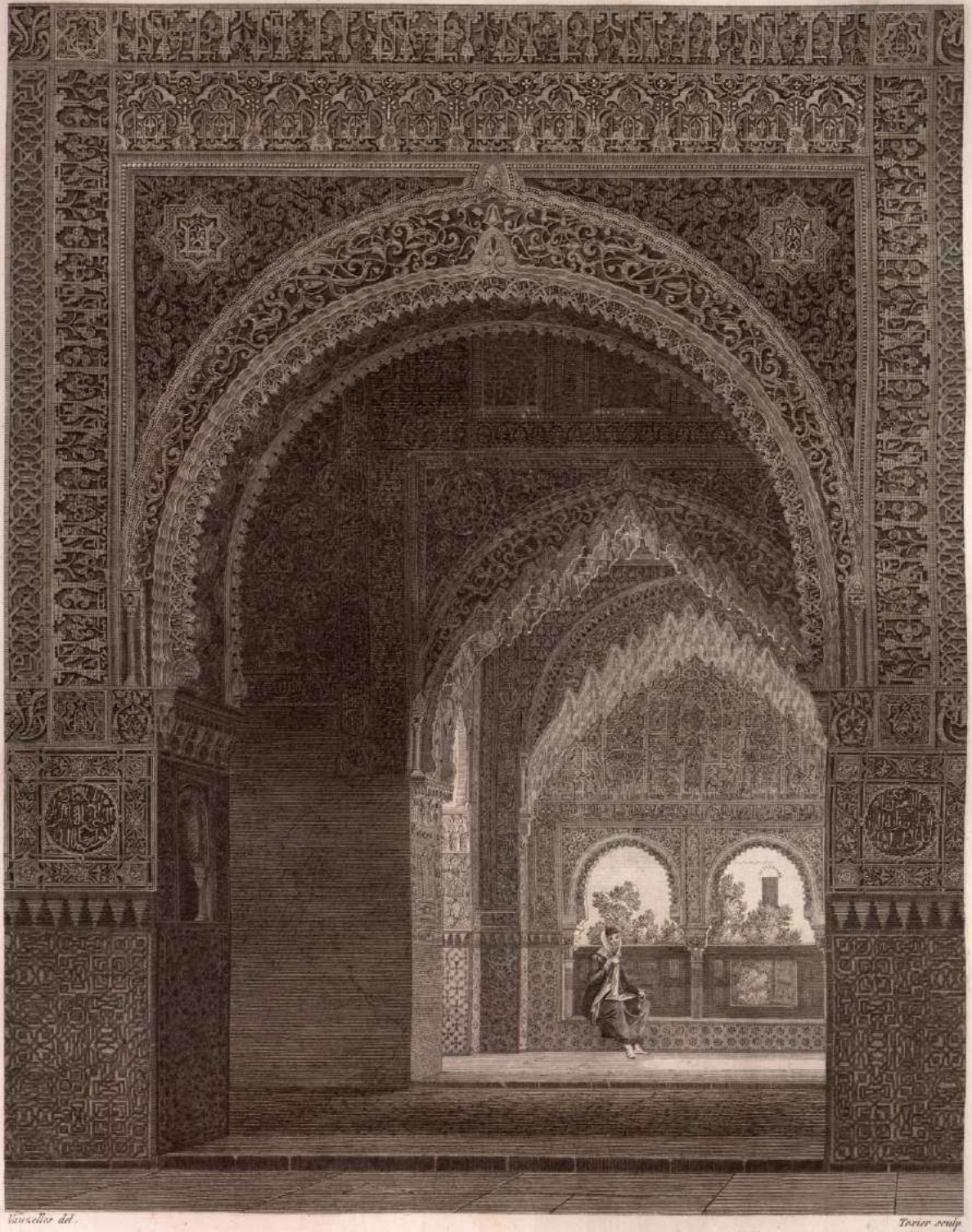


Figure 51.

Mirador de Lindaraja; Alexandre L. J. de Laborde; 1820

According to the author, any hall of the Alhambra offers a view on a courtyard or other outdoor space, thus conveying a sense of splendor and expansion to the interiors. Such peculiarity is encapsulated in the various plates depicting the monumental complex, as the perspective chosen to represent them always includes views on courtyards or outdoor spaces, through doors and windows. When examining plates such as those dedicated to the Sala de los Abencerrajes (Figure 52) or the gallery between the Sala de las Dos Hermanas and the Mirador (Figure 53), this peculiarity of the monument as seen by de Laborde becomes apparent: the engravings never focus on a single hall, rather, they include openings on other spaces, usually distinguished by different lighting conditions.

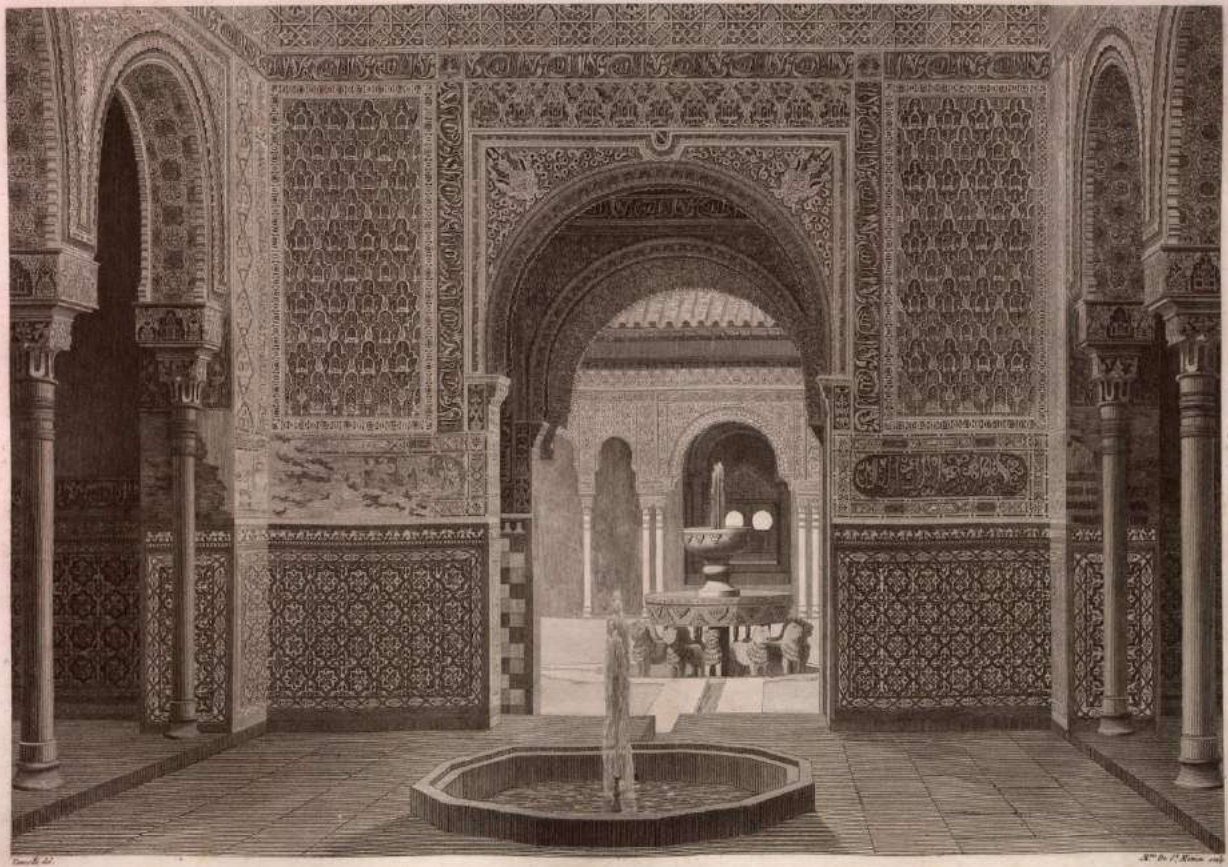


Figure 52.

Sala de los Abencerrajes; Alexandre L. J. de Laborde; 1820

In the plate centered on the Sala de los Abencerrajes, for example, the hall is depicted using a medium tone of gray, while the side galleries, especially the left one, are shown as darker. By contrast, the central element of the image, a view on the Patio de los Leones, is inundated by light, while, further back, the Sala de las Dos Hermanas is once again a darker shade of gray. Indeed, a total of eight different spaces can be counted in such perspective, each underlined by a different chromatic tonality.

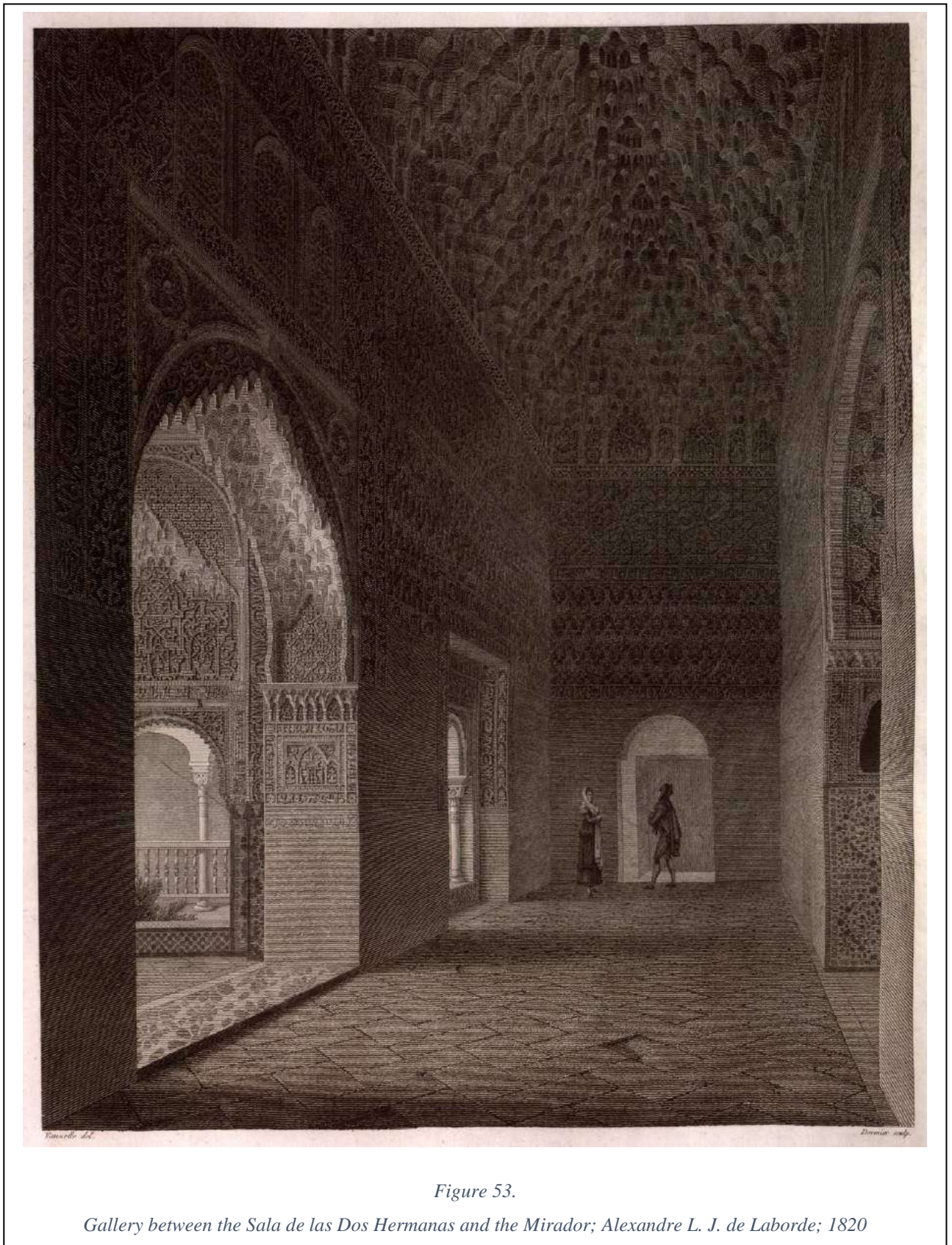


Figure 53.

Gallery between the Sala de las Dos Hermanas and the Mirador; Alexandre L. J. de Laborde; 1820

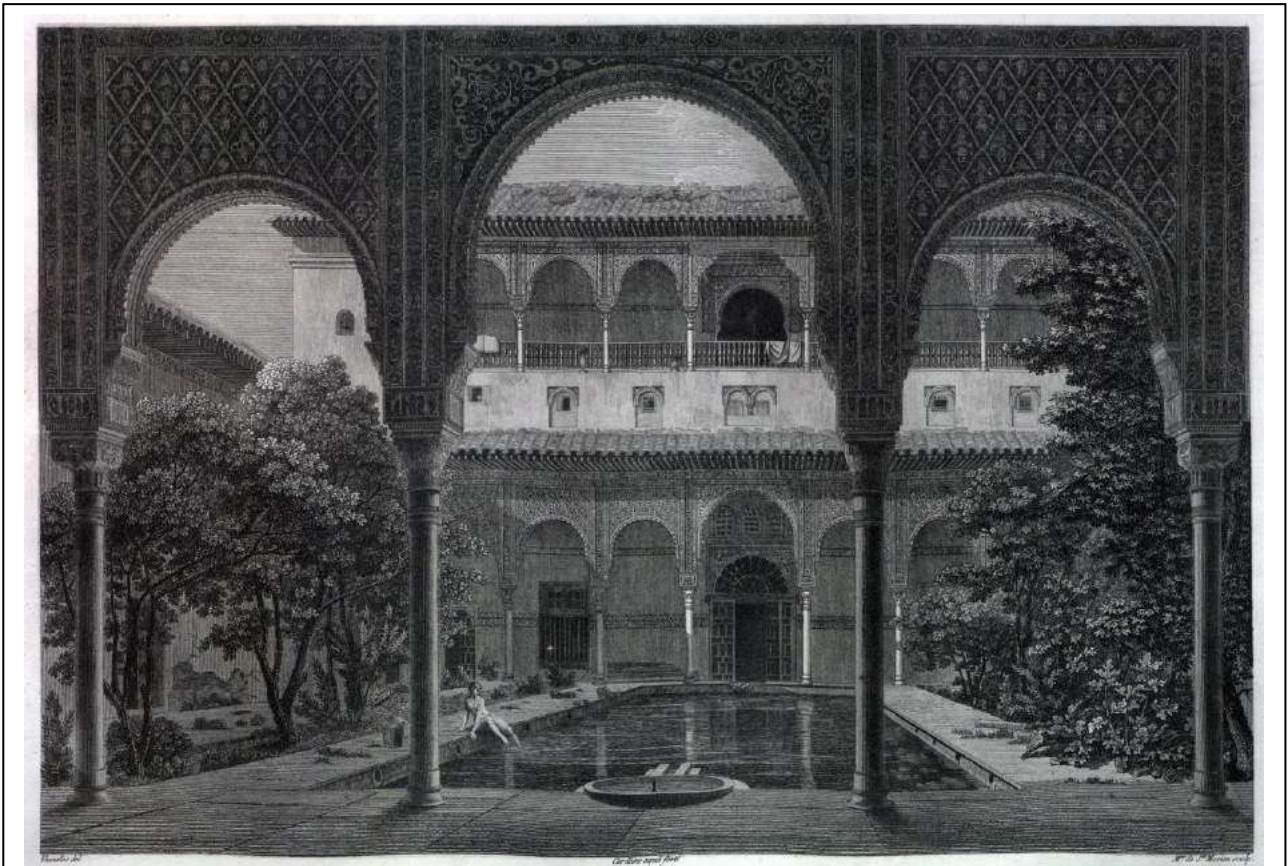


Figure 54.

Patio de los Arrayanes; Alexandre L. J. de Laborde; 1820

The interest for the relationship between interiors and the outdoors is further highlighted in the plate dedicated to the Patio de los Arrayanes (Figure 54), introduced as a bath due to the decorative presence of the great rectangular pool. The illusory symmetry of the three arches in the foreground frames an off-center scene in the courtyard. The inclusion of irregular trees instead of the rectangular bushes of myrtle present nowadays, as well as the naked female figure tentatively entering the water seem to suggest the author's desire to recall the garden of Eden, extensively associated with the Alhambra.

Such intimate perspective can also be found in the engraving representing the Jardin de Lindaraja (Figure 55), where the bifora of the Mirador is seen across the courtyard, framed by an archway sustained by Nasrid columns. Once again, the point of view chosen for the image aims to subtly shift the symmetry of the composition, adding to its dynamism. With respect to the previously discussed plate, the role of nature in the depiction is heightened: the plants assume a wilder look, entwining with the architecture and leading the Picturesque image towards a more Romantic sensibility.

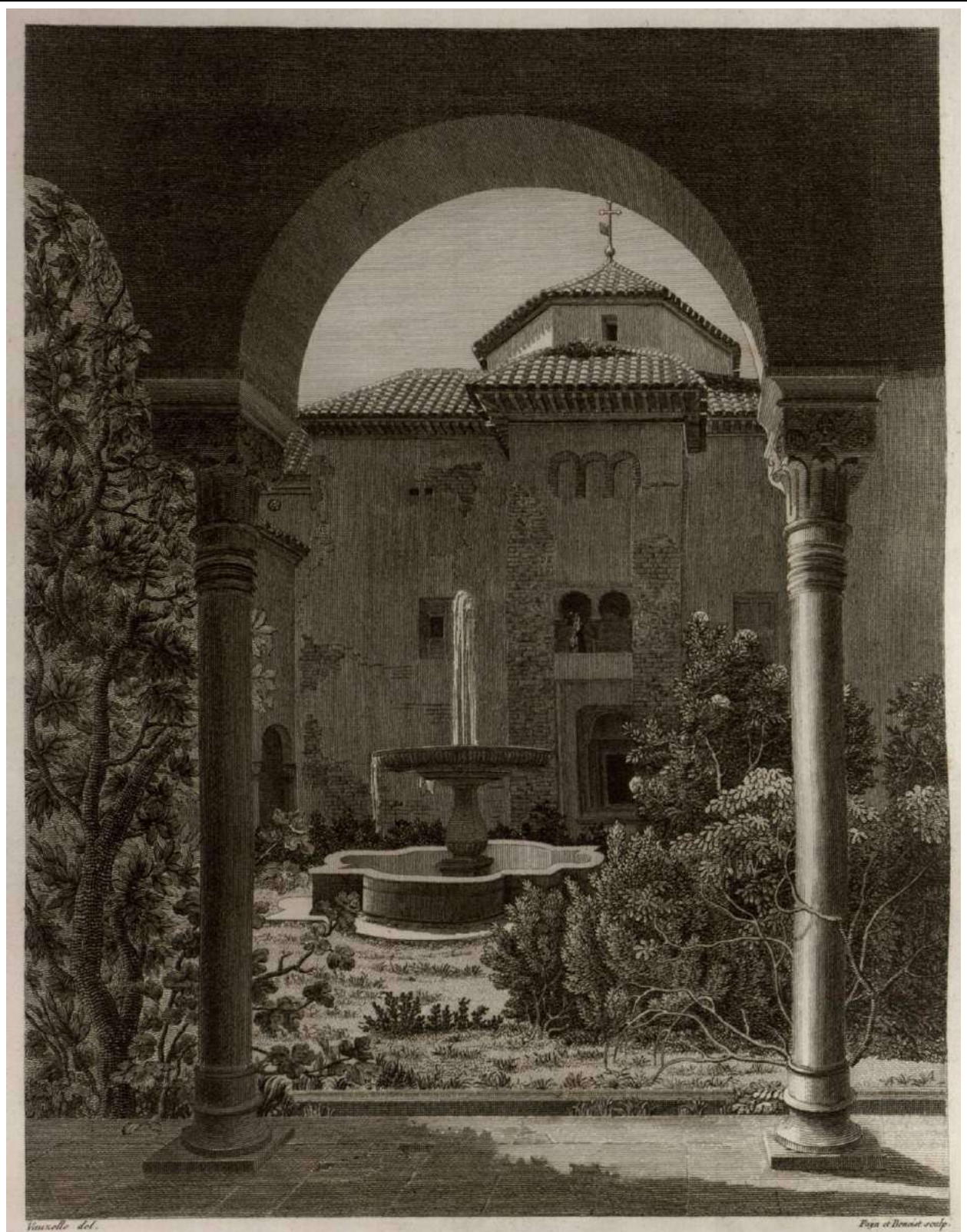


Figure 55.

Jardin de Lindaraja; Alexandre L. J. de Laborde; 1820



Figure 56.

View of the Alhambra from Calle de los Gomeles; Alexandre L. J. de Laborde; 1820

Such progression appears more fully realized in the views of the entrance of the Alhambra from Calle de los Gomeles (Figure 56) and of both the north-eastern (Figure 57) and south-western sides of the monument, as in these cases the foreground is occupied by trees and bushes, while in the distance the volumes of the Nasrid fortress emerge stark against the sky. Moreover, de Laborde accentuates what nature is actually present in the scenery by selecting specific points of view in order to underline certain aspects of the composition: in the plates representing the Alhambra as seen from the bank of Darro river (Figure 58), the author chooses to employ a strongly angular perspective, thus distancing himself from previous images that used a more direct approach, usually depicting the monumental complex from the Albaicín.

De Laborde's volume offers precious documentary evidence of how artists belonging to the Picturesque stylistic current interpreted the Alhambra and how such aesthetic vision introduced elements that would be further explored through Romanticism. As the sense of wonder is given by light gradients and intimacy, the artist does not rely on exaggerated distortions to achieve impressive views. The resulting work, therefore, appears remarkably precise in terms of measurements and

proportions, as noticeable in the engravings dedicated to the Salón de los Embajadores (Figure 59) and to the Salón de Baños, as well as in the view of the Alhambra from the Generalife, which shows the monument from a perspective similar to that adopted by Swinburne, yet achieving at the same time more faithful proportions and more refined lighting effects. In “Voyage pittoresque et historique de l’Espagne”, the realism is interwoven with the search for emotivity, thus offering both a prized documental source and a stylistic suggestion which would inspire and influence later artists.



Figure 57.

North-eastern view of the Alhambra; Alexandre L. J. de Laborde; 1820

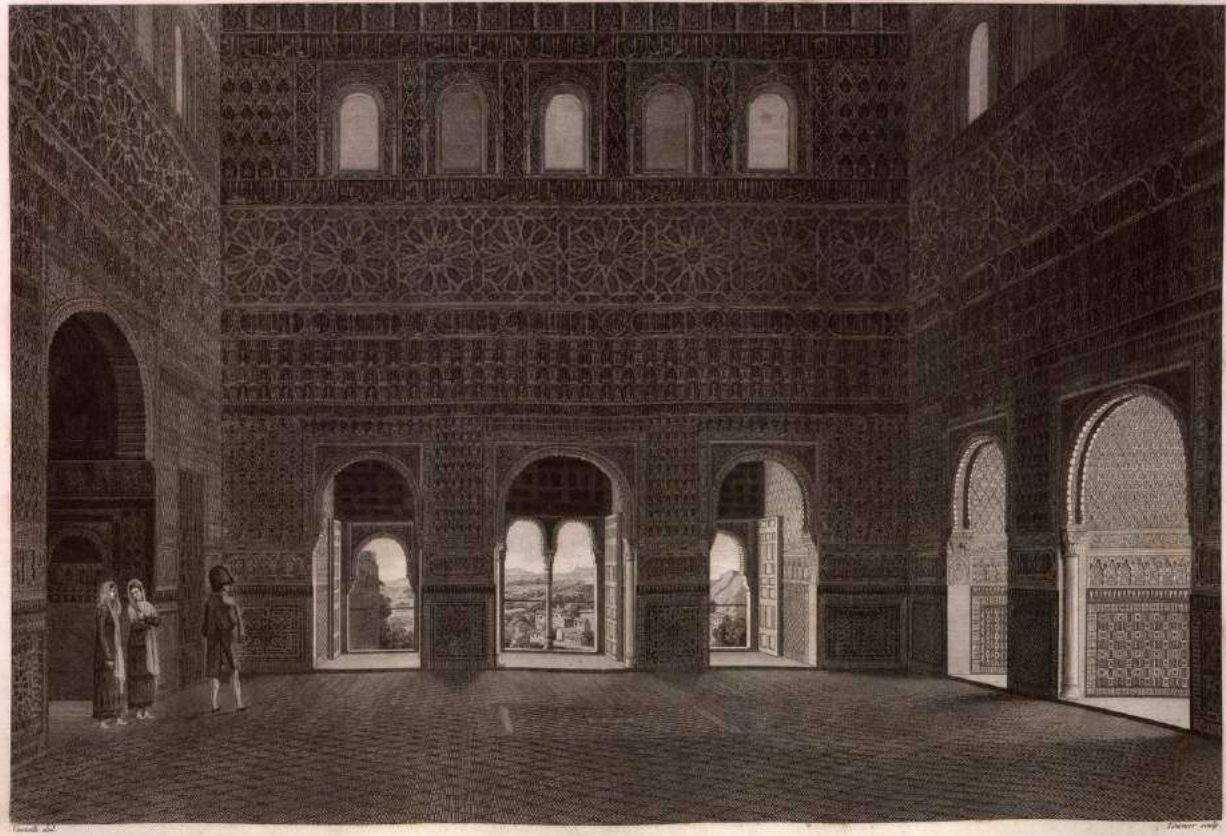


Figure 59.

Salón de los Embajadores; Alexandre L. J. de Laborde; 1820

7.3. From Picturesque to early Romanticism

The Iberian Peninsula truly became the objective of European bourgeoisie travelers after 1823, when an impressive number of tourists reached Granada, a fabled destination described in a number of publications and artworks. Graphical representations of the city and of the Alhambra played a fundamental role in increasing the influx of voyagers, as demonstrated by baron Isidore Justin Séverin Taylor and by Scottish artist David Wilkie, to whom Washington Irving dedicated his book. In 1832, T. H. S. Bucknall Estcourt published an album titled “Alhambra 1827”, which recompiled a series of fourteen engravings and a drawing.

This rare volume, while still bridging two currents from a chronological point of view, can already be considered an example of Romantic sensibility. The author prefers showing the monument within the context of the surrounding landscape, thus dedicating the near totality of the plates to the perimeter of the Alhambra. The focus on nature and its capacity to evoke emotion is so strong that the representation of the Patio de los Leones (Figure 60) includes several imaginary trees, as well as inaccurate details that betray a disinterest towards the archaeological aspect. The plate depicting the Puerta de la Justicia (Figure 61) offers a sense of monumentality and mystery, as the entrance of the door is almost blocked by the looming plants. Similarly, the engraving of the Torre de los Siete Suelos (Figure 62) represents the imposing ruins perched on a steep and wild-looking hillside, which dwarves the figures in the lower right corner.

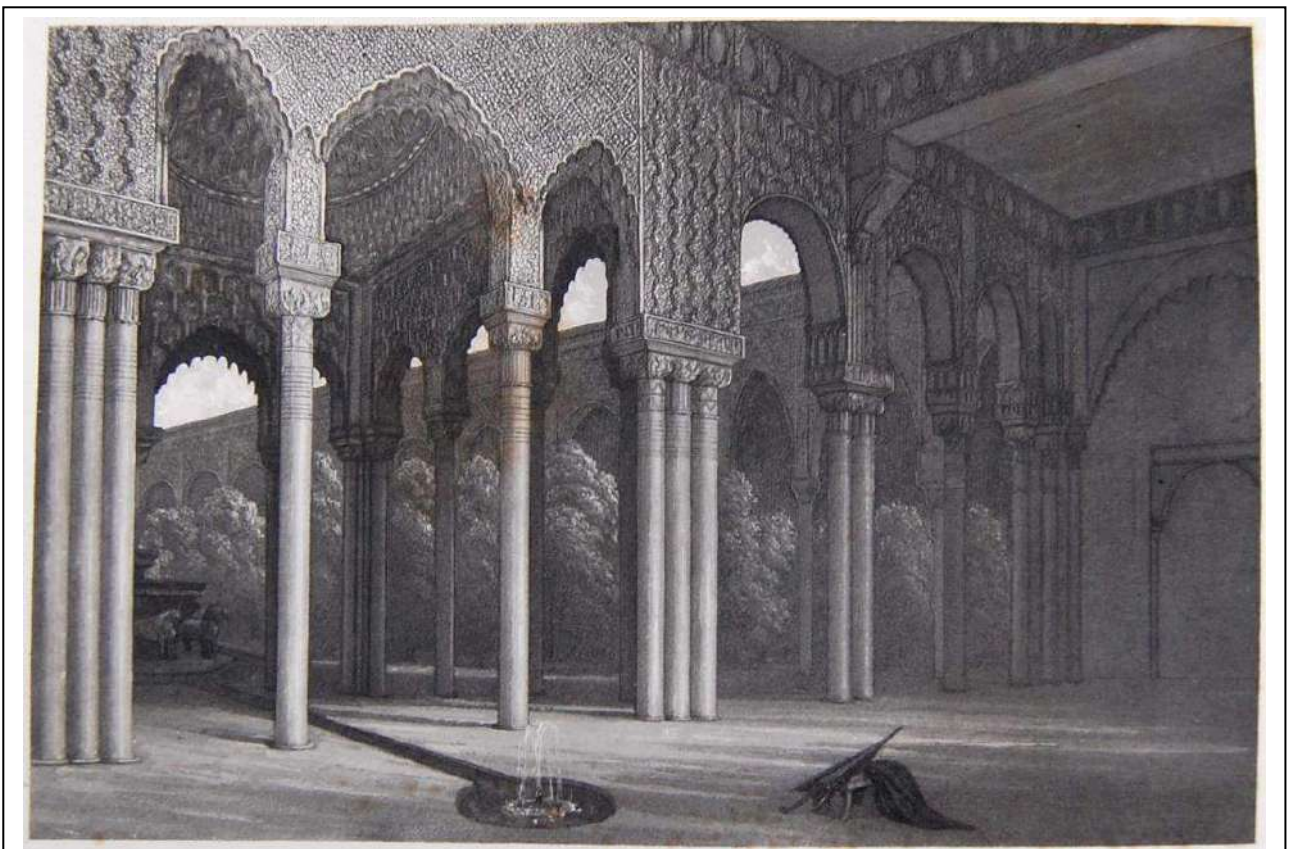


Figure 60.

Patio de los Leones; T.H.S. Bucknall Estcourt; 1832

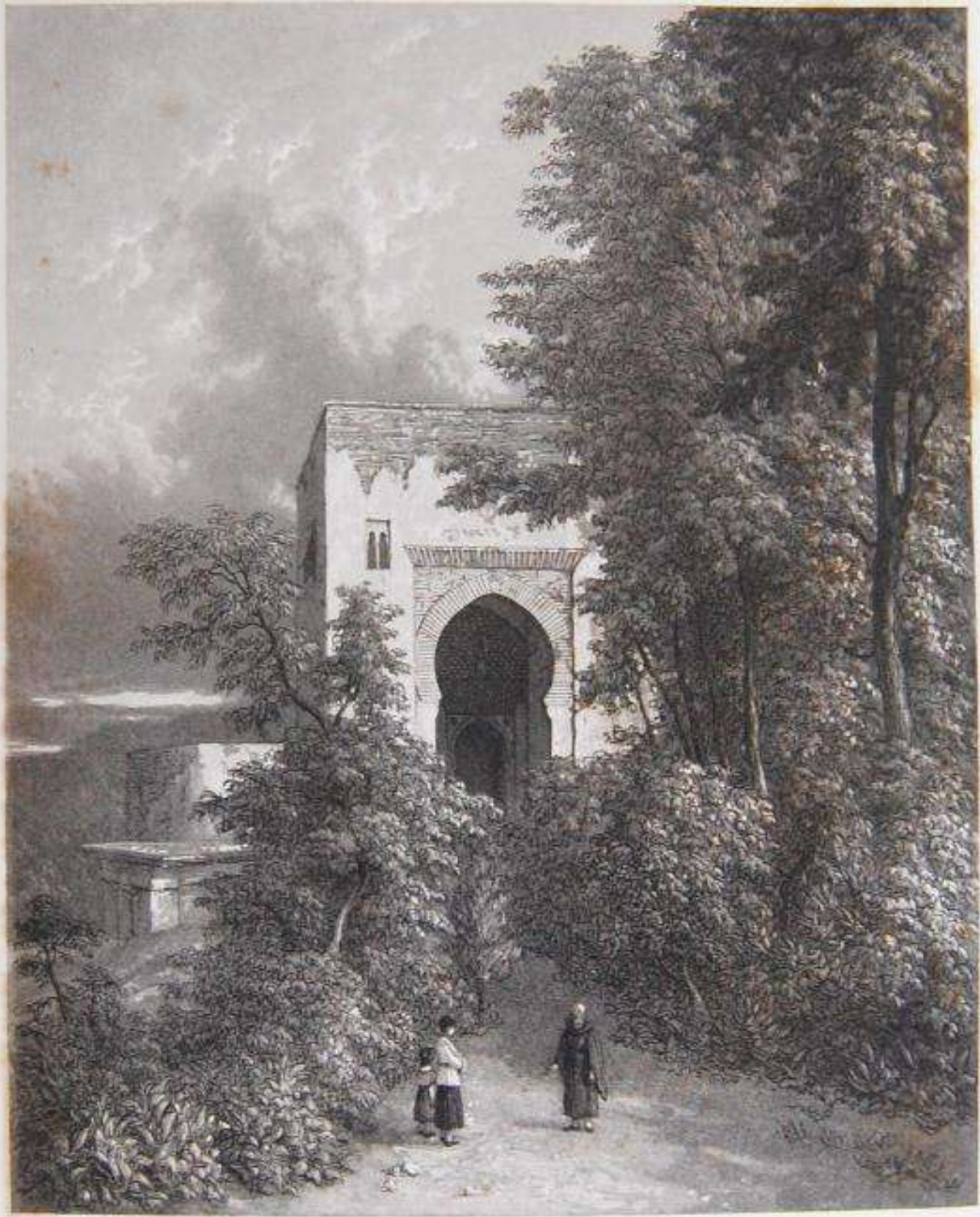


Figure 61.

Puerta de la Justicia; T.H.S. Bucknall Estcourt; 1832



Figure 62.

Torre de los Siete Suelos; T.H.S. Bucknall Estcourt; 1832

Estcourt does not always employ novel perspectives, rather opting for those already used by Swinburne, Murphy or de Laborde, yet improving their realism. His focus, however, is concentrated on the interplay between landscape and ruins, aiming to obtain and convey a feeling of majestic awe and reverent fear as one contemplates the concretization of the concepts of nature and time. The Romantic sensibility behind such scope can be found in the representations of Islamic architecture: the plate dedicated to the Torre de Comares (Figure 63) shows the tower from a low point of view, thus depicting it as a well-defined and impressive volume dominating the valley from the top of a slope covered in vegetation. While a similar portion of the monument is also represented as seen from the bank of the Darro river (Figure 65) in a much more serene composition, the perspective chosen by Estcourt in this engraving highlights the verticality of the monument, almost inducing a sense of vertigo and thus including as part of the image a psychological and emotional effect, further underlined by both lighting and atmospheric conditions.



Figure 63.

Torre de Comares; T.H.S. Bucknall Estcourt; 1832

In the spring of 1829, the Viscountess of Saint-Priest travelled to Andalusia, collecting in a small volume titled “Souvenirs du voyage de Mme la Vicomtesse de St.-Priest en Andalousie pendant les mois d’Avril et Mai, 1829” a series of drawings and watercolors by Lussy.

While information about such trip is rather lacking, the book of signature was inaugurated on May 9th by the viscountess herself. The images focused on the Alhambra include “Comares” (Figure 64), depicting the homonymous courtyard, and “Puerta del Vino”, which show an interest for the architectural elements and their concise yet accurate representation, faithful to both proportions and details.



Figure 65.

View from the Darro river; T.H.S. Bucknall Estcourt; 1832

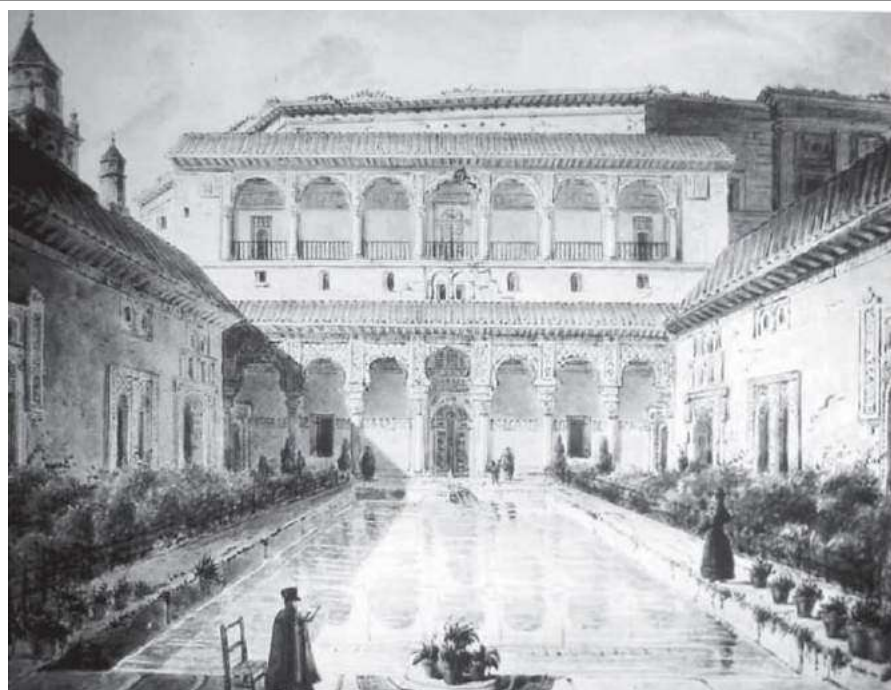


Figure 64.

Comares; Lussy; 1829

8. Romanticism and the Alhambra

As the publication of travel diaries became a general tendency, the interest towards Granada and its principal monument increased, attracting more and more visitors. Thus, during the XIX century, the city of Granada gradually acquired the image of a fantastical combination and contrast between the medieval and the exotic, playing into the Orientalism tendency that transformed it into the ideal place for Romantic escapism. An ever-growing number of travelers reached the city and its monuments, progressively turning the Alhambra into an essential stop for voyagers undertaking the Gran Tour. Such travelers were further fascinated by the difference between the wealthy Islamic past, during which the monumental complex and the whole city seemed to be an earthly reflection of paradise, and the ruin in which the indifference of the Spanish monarchs had transformed it: in his “Handbook for travelers in Spain”,¹³¹ Richard Ford notes that Granada had been rich, brilliant and cultured under the Nasrid kingdom, while he mercilessly describes it as poor, ignorant and indolent during his time. His description of the local population as disinterested in the monumental testimony of its Islamic past, focused on the present and content with little, however, served a precise purpose. In fact, besides using such traits to compare southern Spain and the Orient, the objective of this critique was also to justify the foreign intervention to “discover” and save the archaeological remains from the ignorant apathy and active destruction of the locals.

For most voyagers, however, the contrasts mentioned above further exalted the sense of the sublime sought after by Romantic artists and authors, while British and French travelers alike often blamed in their diaries the fall of the Nasrid sultanate as the cause of Spain’s ruin.

Such premise, namely a fascination for the Islamic heritage of the city severed from the factual knowledge of its history, led to the creation of an imaginary and fantastical representation of Granada as the epitome of Romantic dreams, especially thanks to the fortuitous survival of its monuments, which offered a visual aid for such fantasies.

The most emblematic of them was, evidently, the Alhambra. The monumental complex exemplified the juxtaposition of glorious past and unfavorable present, of Islamic and Christian legacy, not only considered on its own but also, most notably as one of the terms in the comparison between the

¹³¹ (Ford, 1845)

palatine fortress and the city. The slow demographic and socio-economical descent of Granada, already observed by a few XVIII century travelers, became apparent to the Romantic voyagers who contrasted it with the splendid past of the Alhambra, thus developing its melancholic and sublime image. Moreover, the monument became a somewhat paradoxical gate to the Orient located in western Europe, as the Islamic architecture was capable of transporting through time and space, offering travelers a different physical environment that, rather than Mediterranean, seemed to be Middle Eastern: Richard Ford compares Granada to Broussa, in Turkey, Girault de Prangey and, later, Davillier to Constantinople, reminding of the city's Moorish epithet as the Damascus of al-Andalus. The sense of nostalgia evoked by the Alhambra appears in several accounts of travelers, such as J.F. Peyron's "Essais sur l'Espagne et Voyage fait en 1777 et 1778", as well as a few works of fiction, like Chateaubriand's "Le dernier des Abencerrages", written after the author's trip to Spain to meet his lover Natalie de Noailles, de Laborde's sister.

Three voyagers contributed more than most to the creation of the Romantic myth of Alhambra, which can be dated around the 1830s.

Firstly, the afore-mentioned British traveler T. H. S. Estcourt collected his drawings of the monumental complex in an album, thus beginning a trend followed by various compatriots who compiled anthologies of images dedicated to the city. An equally important role was played by writers Victor Hugo with the poem "Grenade" and Washington Irving with "Tales of the Alhambra", whose literary descriptions of the monument managed to offer vivid plastic images of its halls and gardens. The latter, in particular, has come to represent a sort of emblem of the Romantic voyager fascinated by the Islamic monument, as his volume captured the imagination of his contemporary and is still nowadays a fundamental testimony of the literary influence of the Alhambra. Moreover, Irving's direct connections to a number of other illustrious travelers, documented in his letters,¹³² offer important insights in the development of a touristic interest towards Granada and its most famous monument.

Such tourism, testified by the numerous drawings, prints and writings regarding the Alhambra, was not always beneficial to the monument, as it led to the practice of choosing as souvenirs its archaeological remains, or disfiguring its walls by etching travelers' names on them. The latter luckily

¹³² (Irving & Garnica Silva, 2009)

partially subsided after prince Dolgorouki's gift of an album for signature in 1829. The Spanish Crown gradually began to show an increased interest in the monument as well, as in 1830, king Ferdinand VII funded the restoration of parts of the palatine complex.

While the majority of voyagers kept a diary and either described or represented the palatial fortress, in an early stage those texts and depictions that were later published often passed through revisions of industry experts who had no direct knowledge of the Alhambra, therefore introducing important changes and producing images quite different from reality.

Only later professional artists were tasked with creating faithful drawings and engravings of the monumental complex, to be published in albums or as illustrations for travel literature. Among them, Robert Jennings, the British editor of "Landscape Annuals", produced guides dedicated to Spain between 1835 and 1838, accompanying Thomas Roscoe's texts with David Roberts' images, while several other authors and artists claim their work was commissioned by nobleman and monarchs. The French novelist Alexandre Dumas, who reached Granada in 1846, was surrounded by painters Louis Boulanger, Eugène Giraud and Desbarolles, similarly to the Baron Taylor, who between 1835 and 1837 was accompanied by artists Dauzats and Blanchard.

It must be noted, however, that in most cases the drawings and paintings that were produced on site only constituted visual notes to later work on the final image in the comfort of a studio, with the aid of an engraver who would create the plate to be included in the publication. Even in these occurrences, therefore, the fidelity of the original image, strongly tinted by emotion and sometimes hurry, was further clouded by the process of reworking it and changing both medium and author. During this period, several engraving methods were adopted, such as xylography, lithography, intaglio and etching, allowing artist more freedom in choosing and developing appropriate techniques for their illustrations. In several cases, drawings and plates were plagiarized, further contributing to the diffusion of a less and less precise and realistic image of the Alhambra as copiers distorted the proportions and added or removed openings.

However, some authors distinguish themselves for their attention to the production of engravings so faithful that were later used as the basis for restoring some areas of the monumental complex. The colonnade and tower of the Partal, reconstructed by Leopoldo Torres Balbás, benefitted of J. F.

Lewis’s lithography “La casa de Sánchez”, dated 1834, while his drawings of the Cuarto Dorado also aided the restoration of such area during the 1920s.¹³³

8.1. *Girault de Prangey’s publications*

In 1832, the French artist Philibert Joseph Girault de Prangey visited the Alhambra. His work shows an unprecedented methodical analysis of the architecture of al-Andalus, as he had already visited other territories tied to Islam, such as Tunis, Algeria and Sicily. While these voyages would not offer a preparation tailored to Andalusian specificities, they provided a satisfactory level of knowledge in the context of a world fascinated with the abstract idea of the Orient yet far from familiar with its material manifestations. The results were published in the volumes titled “Monuments Arabes et Moresques de Cordoue, Séville et Grenade”¹³⁴ and “Choix d’ornaments Moresques de l’Alhambra”.

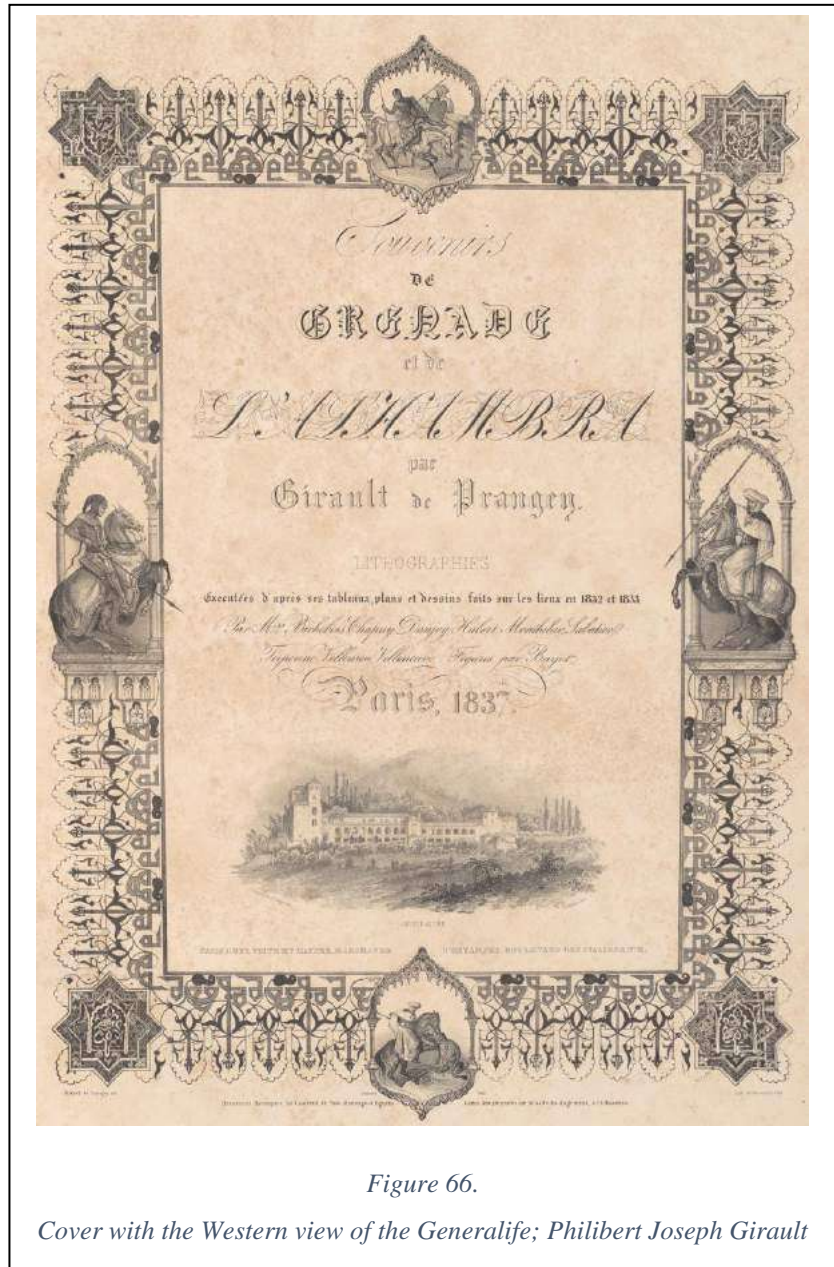


Figure 66.

Cover with the Western view of the Generalife; Philibert Joseph Girault

¹³³ (López-Vílchez, 2017)

¹³⁴ (Girault de Prangey, 1837)



Figure 67.

Cover with the Fuente de los Leones as part of the decoration of a jarrón Alhambra; Philibert Joseph Girault de Prangey; 1837

Girault de Prangey was fascinated by the monument, declaring it the most brilliant legacy of a whole civilization and using it as inspiration for the oil on canvas he would exhibit at the 1836 Salon of Paris, “Promenade et tours d’enceinte du palais de l’Alhambra à Grenade”.

While similar to Murphy’s and de Laborde’s books in terms of premise and structure, Girault de Prangey’s “Monuments Arabes et Moresques de Cordoue, Séville et Grenade”, dated 1837, employs a purely Romantic aesthetic while keeping faithful to reality with regards to the conservation of the monumental complex, also aided by the choice of lithography.

Nearly half the volume concentrates on Granada, presented with a cover depicting the western side of the Generalife (Figure 66) framed by an elaborate mix of arabesques and pseudo-kufic inscriptions, interrupted at the corners by eight-pointed stars and in the midpoint of each side by

medieval knights, followed by a secondary cover which proposes a depiction of the Fuente de los Leones as part of the decoration of a jarrón Alhambra (Figure 67), a type of vase.

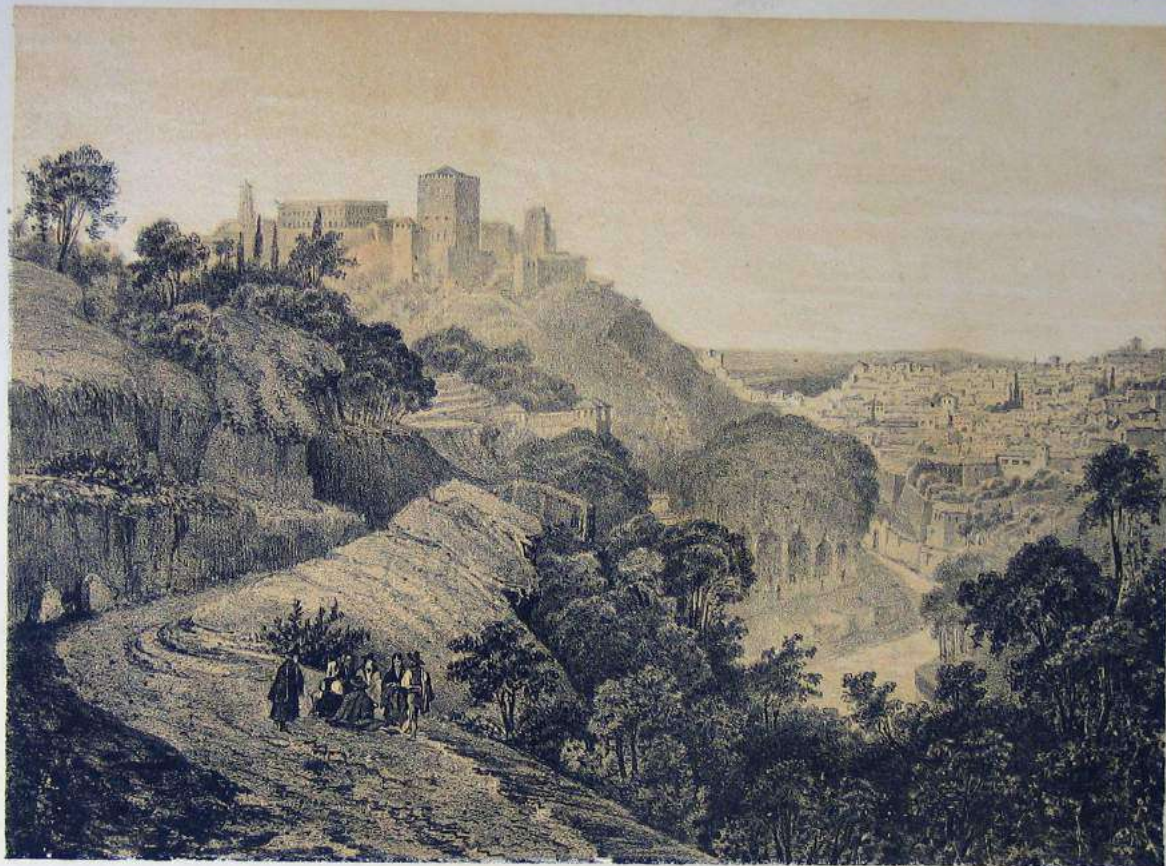


Figure 68.

View from the spring of the Avellano; Philibert Joseph Girault de Prangey; 1837

The author describes the Alhambra as a crown suspended over the enchanted city, which he compares to Rome, Naples and Berne, portraying it as a perpetual garden and pride of Iberian Islam. The monumental complex is, according Girault de Prangey, built rapidly and almost by charm, as an austere exterior hides magnificent wonders: the author briefly illustrates the history of the building, dimly concluding that, as he writes, only underprivileged families and beggars live among the ruins. In a more detailed description, he compares the impressive Puerta de la Justicia to the Temple of Peace and Nero's Domus Aurea in Rome, he appreciates the delicate ornaments of the Puerta del Vino and profusely compliments the halls of the Nasrid Palaces, underlining the chromatic choices that tie them to the Ancient Palace of Tunis and ascribing to the Palacio de los Leones the most amazing and best harmonized variety of decorations.



Figure 69.

Cuesta de los Molinos; Philibert Joseph Girault de Prangey; 1837

The author ideally continued his study with the volume “Choix d’ornaments Moresques de l’Alhambra”, in which thirty plates in chromolithography focus on the decoration and interiors of the palace, with a remarkable level of precision regarding measurements and proportions. Such dedication to conveying a mimetic representation of reality can be appreciated in the views of the Alhambra and its city, which, however, do not lack emotion because of their exactitude.

In the first of Girault de Prangey’s works dedicated to the architecture of al-Andalus, the view from the spring of the Avellano (Figure 68) depicts the palace as the intermediate one of three levels in which the image can be divided, showing at the forefront a group of small human figures on a path surrounded by wild vegetation, while in the background Granada appears. The Alhambra dominates the valley, its many towers soaring: on the left, the bell tower of the church of Santa María is followed by the rectangular silhouette of the eastern and northern façades of the Palace of Charles V. From this perspective, the Peinador de la Reina stands between the imperial palace and the Torre de Comares,



Figure 70.

Puerta de la Justicia; Philibert Joseph Girault de Prangey; 1837

the highest point of the representation, as the towers of the Alcazaba and the last part of the fortified wall mark the end the monumental complex.

Another plate, known as the “Cuesta de los Molinos” (Figure 69), focuses exclusively on a portion of the Nasrid Palaces as seen from the so-called barranco del Rey Chico, a cliff on the north-eastern side of the monumental complex. While the foreground is occupied by a group of locals among the rocks, a steep hillside leads to the Alhambra, depicted on the upper left as the light hits its towers, namely the Torre de las Damas, the Tocador de la Reina and the Torre de Comares. The novel point of view is further underlined by the dramatic composition and the careful use of shadows, as well as the presence of a powerful and sometime cruel nature, given by the wild vegetation, steep rocky hillside and clouded sky.

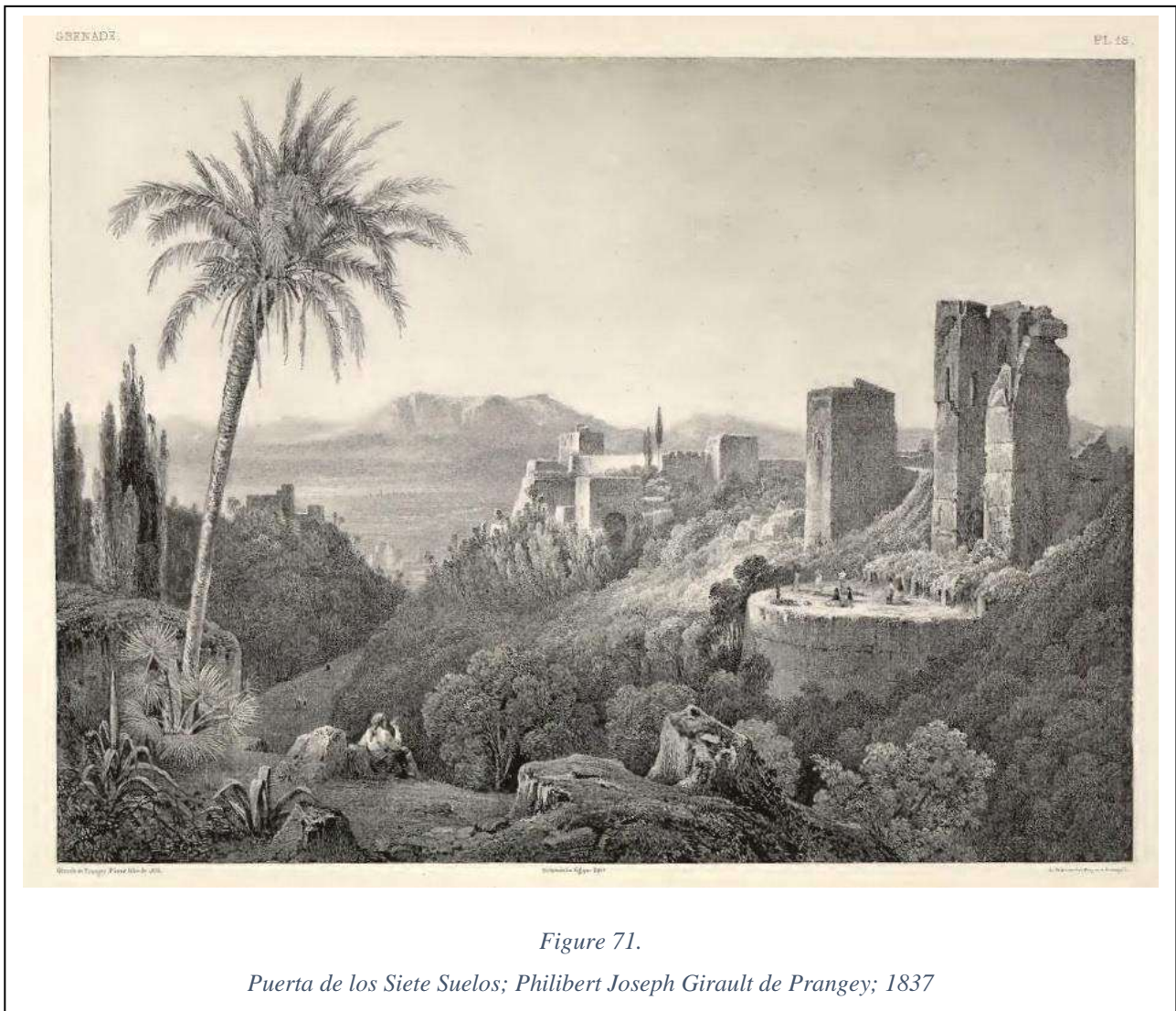


Figure 71.

Puerta de los Siete Suelos; Philibert Joseph Girault de Prangey; 1837

Girault de Prangey continued to focus on the exteriors of the fortress as he united ruins and nature within plates such as those dedicated to the Puerta de la Justicia (Figure 70) and the Puerta de los Siete Suelos (Figure 71), which proposes the same perspective as the “Promenade et tours d’enceinte du palais de l’Alhambra à Grenade”. However, in his volume he also provides a number of depictions concentrated on the interiors of the Nasrid Palaces, in which the artist adopts many of the stylistic elements previously enucleated: a deliberate use of light to lead the viewer’s attention, a composition with well-defined planes, the presence of few human figures that add a folkloristic note to the image.

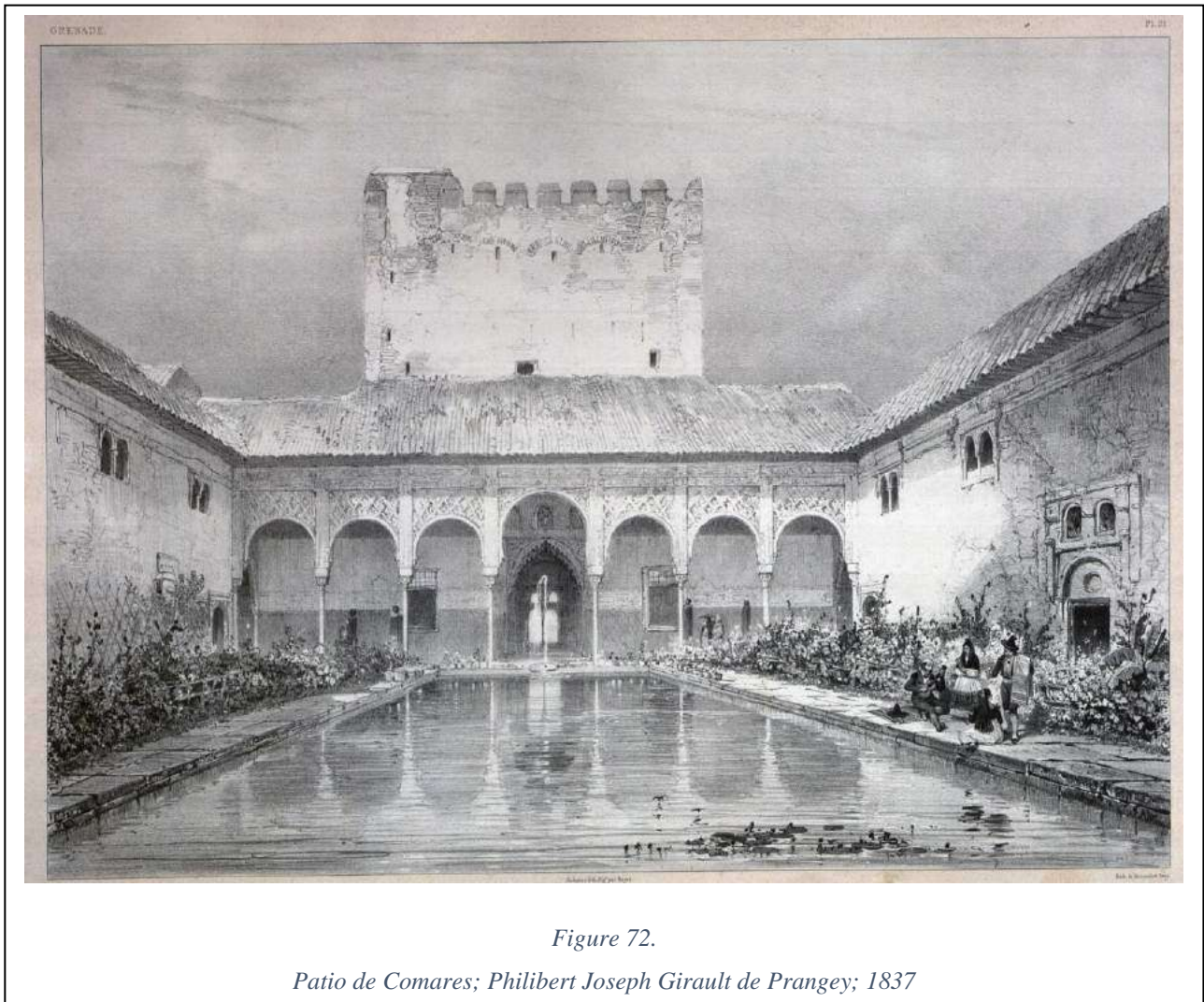


Figure 72.

Patio de Comares; Philibert Joseph Girault de Prangey; 1837

The plates dedicated to the Patio de Comares (Figure 72) depict both its colonnaded sides, orbiting around the great central pool in which the palaces are reflected. In fact, such choice was the result of Girault de Prangey’s sensibility for Islamic aesthetics, developed through his previous travels. Both the images and the text underline the importance of water in this cultural context, as the descriptions

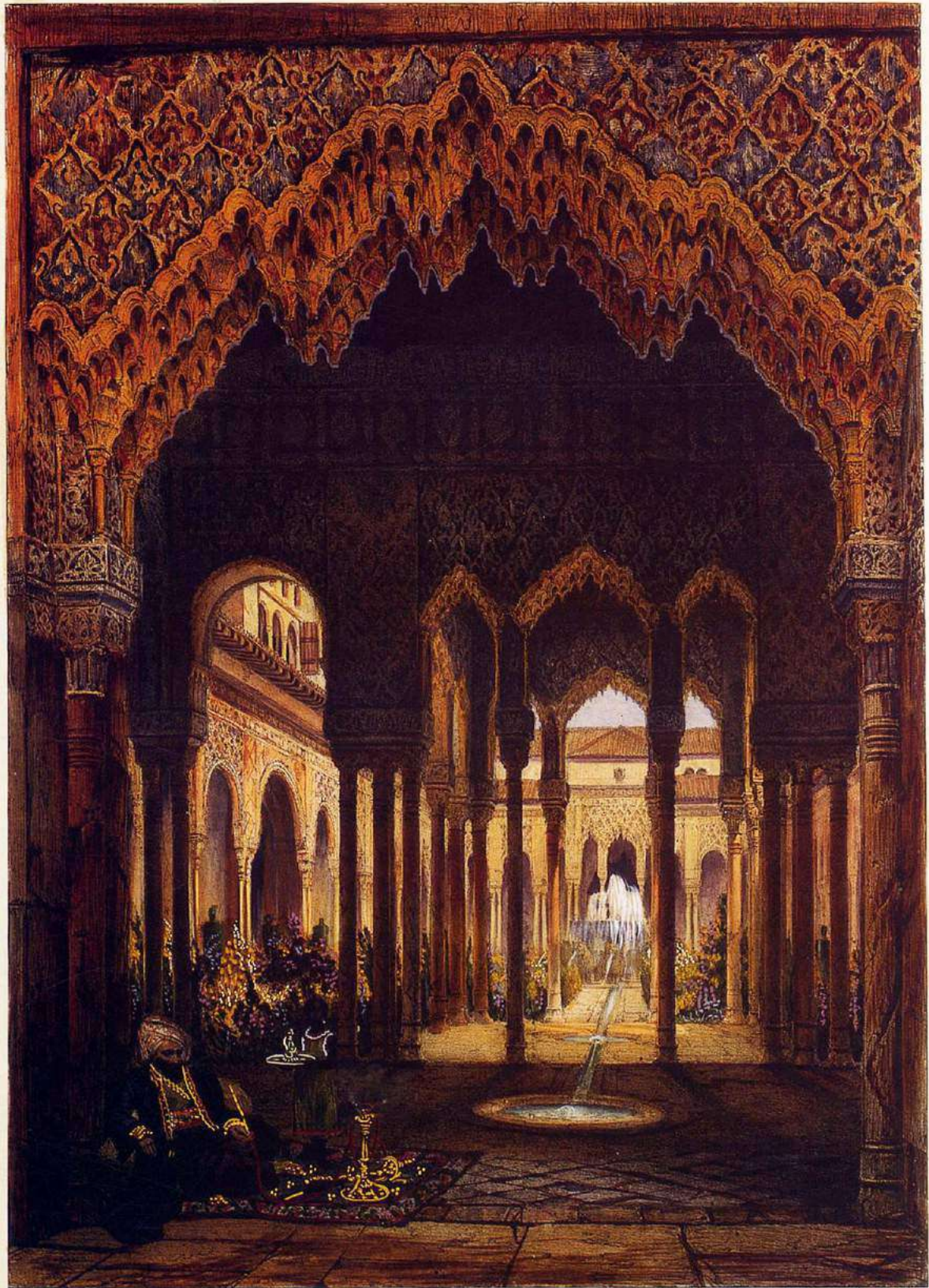


Figure 73.

Patio de los Leones from the Sala de la Justicia; Philibert Joseph Girault de Prangey; 1837

concentrate on murmuring fountains and the clear waters of the pool. At the same time, the author is also keenly aware of the interplay between open and closed areas, as shown in the succession of differently lighted spaces framed by arches and, when possible, by the use of telescopic perspective, such as in the case of the view from the opening in the Salón de los Embajadores. Moreover, he offers careful and detailed representations of the ornamental elements of the architecture, despite the obvious limitations of the medium.

These aspects appear even more evident in the images of the Patio de los Leones, the most luxurious part of the monument according to the artist, who created two plates dedicated to this area, both concentrated on the pavilions. In the first, Girault de Prangey opts for a perspective from the Sala de la Justicia, displaying its axis as a canal leads from the small round basin underneath the gallery to the central fountain. A slightly off-center point of view livens up what would otherwise be a symmetrical composition, while the leftmost arch frames an Oriental scene in the foreground in which



Figure 74.

Patio de los Leones; Philibert Joseph Girault de Prangey; 1837

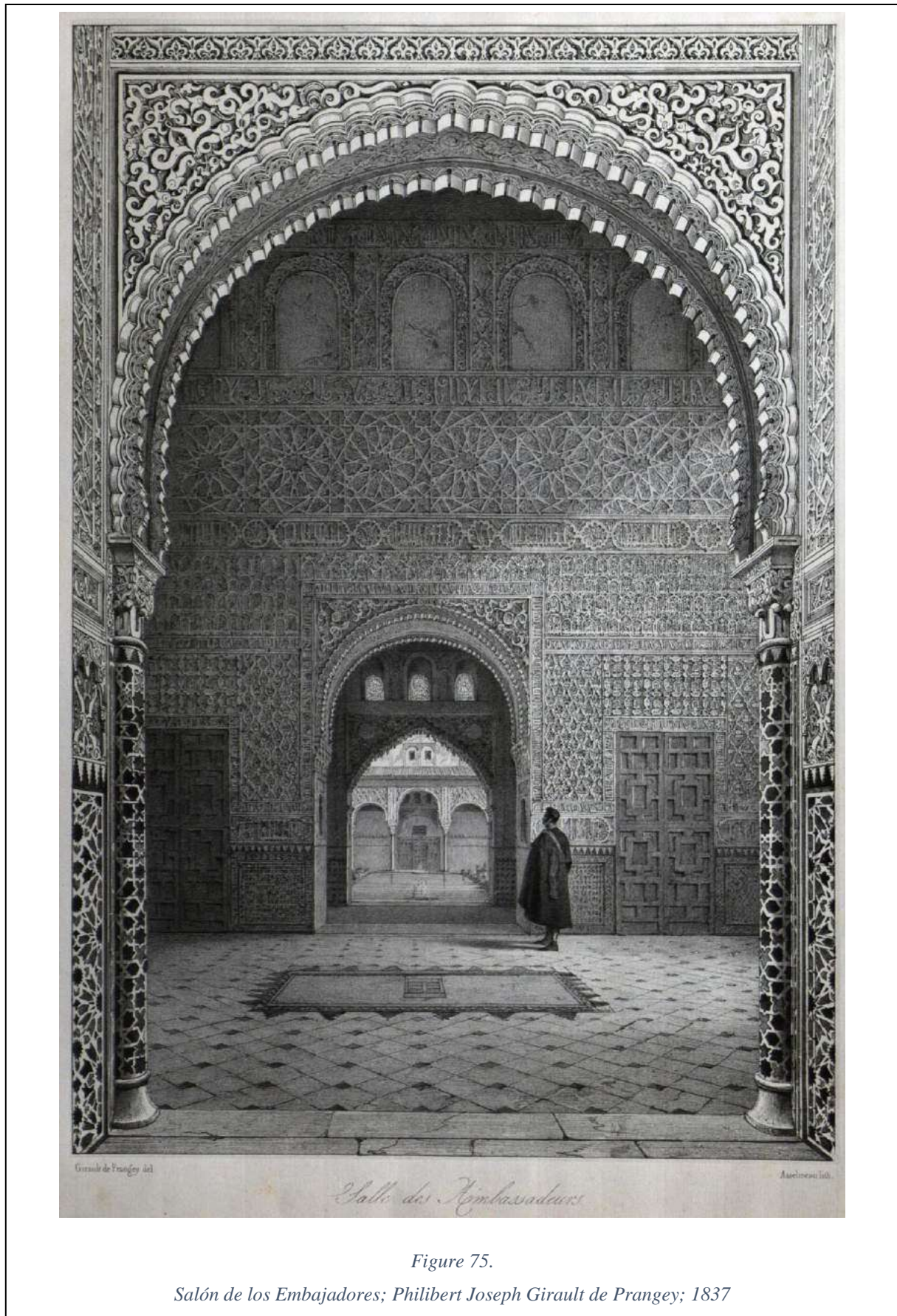


Figure 75.

Salón de los Embajadores; Philibert Joseph Girault de Prangey; 1837

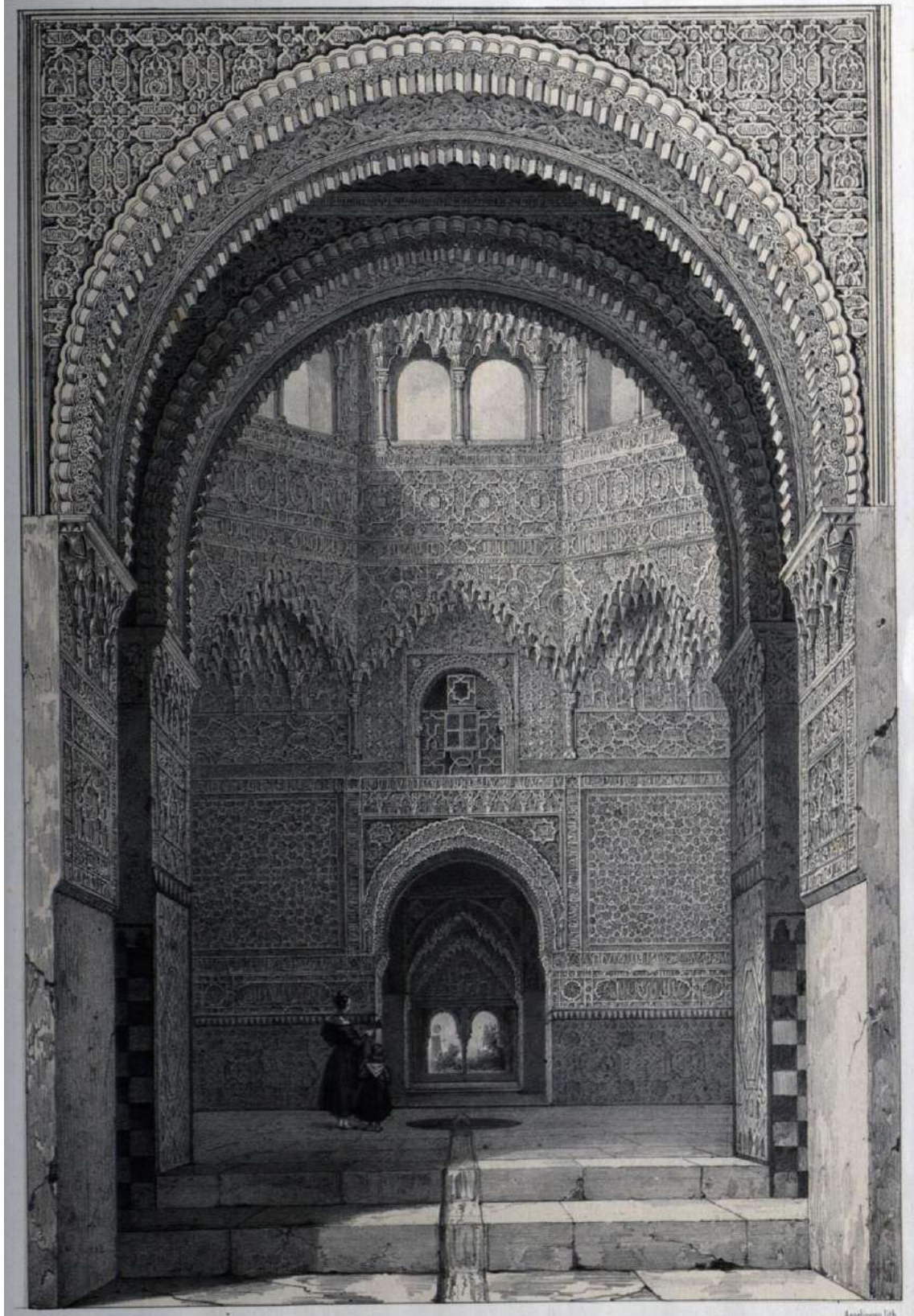


Figure 76.

Sala de las dos Hermanas; Philibert Joseph Girault de Prangey; 1837

a sultan smokes a hookah as a servant tends to him. The second plate (Figure 74), instead, offers a wide perspective of the Patio, in which a garden, no longer present in the contemporary configuration of the courtyard, plays a predominant role as a symbol of the ruin pervading the Nasrid Palaces. The artist also includes in his work illustrations of the halls of the Palacio de los Leones, as, according to the author, pleasant ornamental variations transform its spaces into one of the highest achievements of Moorish civilization. An image of the Mirador de Lindaraja represents it as a Romantic bejeweled box suspended above a garden, while the young figure in the right corner underlines the melancholic intimacy of the balcony. The Sala de la Justicia, instead, is depicted through a composition that provides a sense of almost infinite succession of arches, as the light hits their muqarnas in such a way that the eye clearly distinguishes their rhythm. In the foreground, in front of a small group of men, some architectural fragments such as a capital and some floor tiles indicate the poor conservation of the palace, lamentable yet tied to its Romantic aura.



Figure 77.

Patio de los Leones; Philibert Joseph Girault de Prangey; 1837

Girault de Prangey's work also offers a catalogue of architectural and ornamental details, accurately depicting columns, capitals, muqarnas, niches, inscriptions, tiles, and, above all, plaster decorations. The artist carefully represents the various geometric patterns and arabesques, occasionally including examples from objects such as swords. The recompilation also highlights the few figurative elements visible in the monument, such as the lions from the homonymous fountain and the symmetrical stylized bas-relief showing a pride of felines attacking some antelopes. Such analysis is the focus of "Choix d'ornements Moresques de l'Alhambra", which, while including a few cases of decorations that do not belong to the monumental complex, mainly concentrates on replicating exactly patterns and details in their context.

This choice allows for a few views of the interiors, for example that of the Salón de los Embajadores (Figure 75), in which the compositional and lighting characteristics seen in the previous volume are combined with a precise illustration of the plasterwork and tile ornaments: an original telescopic perspective from the northern opening towards the inside of the palace allows to frame the Patio de Comares in a succession of arches, marked by different levels of shadows, while the observer can concentrate on the decorations of the hall. Similarly, the Sala de las dos Hermanas (Figure 76), depicted with perfect symmetry, is shown from the doorway, as a great arch delimits the image and is echoed in the access to the Mirador de Lindaraja. The use of an original perspective can be appreciated in the plate of the Patio de los Leones (Figure 77) as well: in order to represent the plaster panels of the arches and the ceiling, the point of view selected by the artist is located inside the gallery, as from one of its sides the vision turns upwards, limiting the open area of the courtyard only to the leftmost portion of the image. Such choice, however, leads to a deformation of both the proportions and the alignment of the columns and, together with the inclusion of somewhat stereotyped figures, lowers the overall quality of the depiction.

8.2. *Richard and Harriet Ford's artwork*

The Romantic apogee of the Alhambra corresponds to the visits of a series of British travelers, among which was Richard Ford. A keen and enthusiastic observer, he arrived in 1830 and stayed in Andalusia for three years: the result of such long visit was the publication of an illustrated volume titled "A

handbook for travellers in Spain”,¹³⁵ which continued his task of facilitating the arrival of his nationals, such as John Frederick Lewis and David Roberts, whose artistry was better suited to represent the monumental complex.

During several months, Ford and his family lived in the Alhambra, between the Governor’s house and the Palacio de Comares, as the author produced a series of drawings and watercolors: these, collected together with those of his wife Harriet, show a certain evolution in ability. While concerned with the exactness of his representations, the artist opted for a more neoclassical approach, vocally distancing himself and his work from the Romantic aesthetic, which he accepted only in his literature. According to Ford, living in the Alhambra was absolutely necessary to understand the monument and learn how to imagine its glorious past.

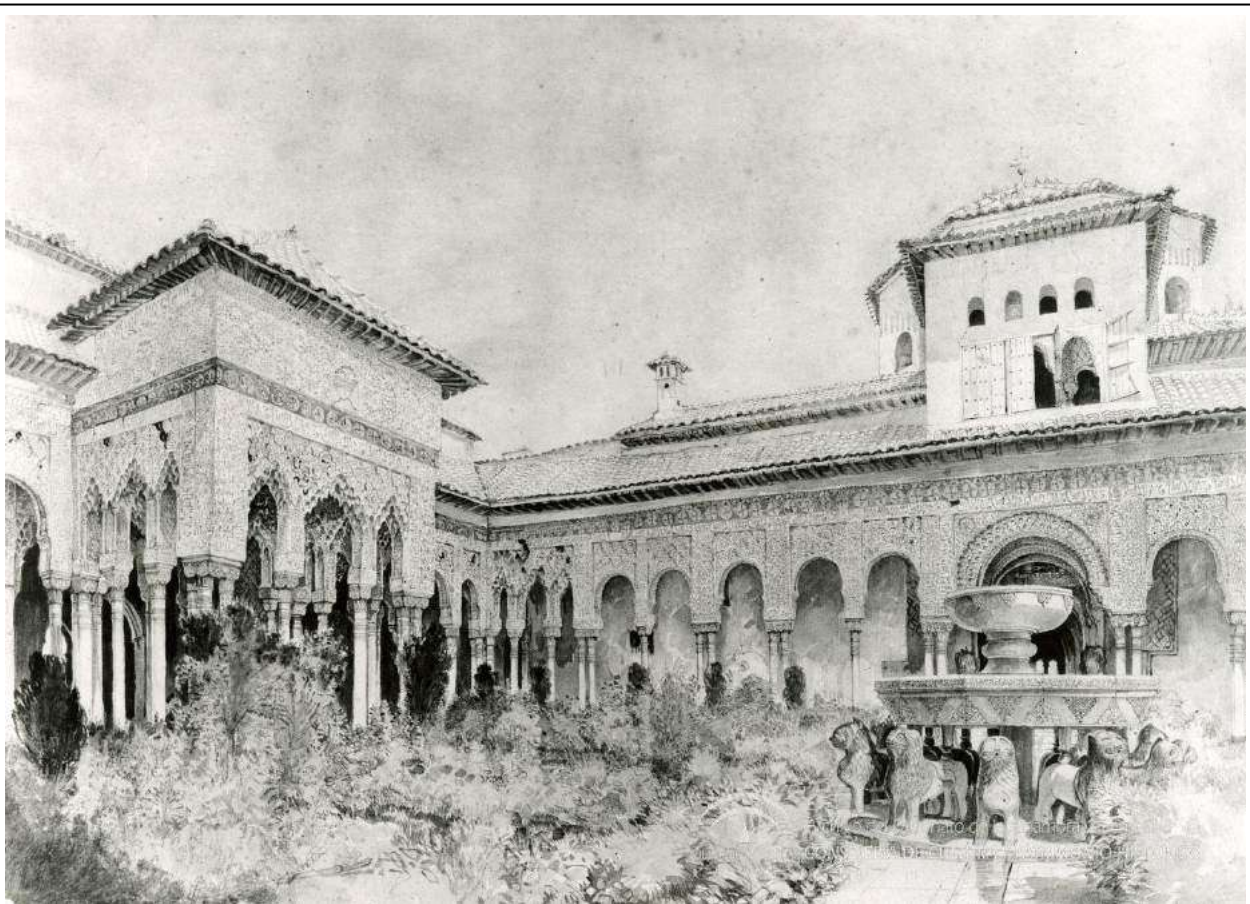


Figure 78.

Patio de los Leones; Harriet Ford née Capel; 1833

¹³⁵ (Ford, 1845)

Notably, while Richard Ford concentrated on finding new perspectives for the perimeter of the fortress, the only three depictions of the interiors of the palatial complex, one for each of the courtyards, were created by the careful paintbrush of Harriet Ford née Capel. Her drawing of the Patio de los Leones (Figure 78) illustrates it from a novel, oblique perspective, as the point of view from inside the garden spans between one of the pavilions and the central fountain, modeled with excellent shadowing.¹³⁶

8.3. Roberts's "Landscape Annual"

In 1832, Scottish artist David Roberts reached the Iberian Peninsula, attracted by the idea of providing a worthy rendition of its Islamic architecture. In a letter to his sister, the artist described Granada's privileged location and the Alhambra's magnificent architecture, as well as underlining his dedication to drawing the monument during a three-week visit.



Figure 79.

Fortress of the Alhambra; David Roberts; 1835

When the artist returned from his Spanish tour, he was chosen to illustrate "Landscape Annual", a soon-to-be popular British guidebook published by R. Jennings: Roberts's Romantic approach was well-received by the public, leading him to collect his drawings in "The Picturesque Sketches in Spain", published in 1837. Moreover, he was commissioned to paint some canvases on the same

¹³⁶ (Barrios Rozúa, 1995)

theme, titled “Fortress of the Alhambra” (Figure 79), for Lord Nortwick, “Court of Lions. Alhambra”, for Count Jennnison, and “Alhambra” for Marquis Kandowne.

The 1835 volume “The Tourist in Spain. Granada”, written by Thomas Roscoe, includes twenty-one illustrations by Roberts, both drawings on steel plates and works of lithography. Most of the artwork is dedicated to the Alhambra, especially to panoramic views of the monumental complex, such as those of the courtyards.

Roberts’s experience as a scenographer influenced his compositions, as the altered dimensions and bold perspectives offered dynamism to his works. However, such interest in creating unusual views affected the level of fidelity to reality, most notably in terms of vertical or horizontal distortion of the architecture, which was partially due to the angle of perspective chosen by the artist.



Figure 80.

Torre de Comares; David Roberts; 1835

In engravings like “Torre de Comares” (Figure 80) or “Puerta de la Justicia”, the palaces loom over the scenery as giant and vaguely threatening ruins that dwarf the figures in the foreground, an evocative contrast between the glorious yet decaying past of the city and its daily folklore. Such comparison is also used in the more tranquil compositions, like the view of the Alhambra from the Albaicín (Figure 81): while in the foreground a terrace near the muralla Cadima hosts a group of people, the monumental complex dominates the image with the Nasrid Palaces shrouded in shadows and the towers of the Alcazaba emphasized by the light. The distortion is evident as the military

fortress appears to be extended, in contrast with the shrinking residential area of the monument. The Romantic aesthetic of crumbling yet imposing ruins, symbolic of an historic legacy looming over an unremarkable present, seems to be a recurring theme in Robert's illustrations, which favor decaying towers and collapsing palaces. One of the prints in which such sensibility appears most evident is the one depicting the Torre de los Siete Suelos (Figure 82), a nocturnal scene in which the building, fragile and overgrown with plants, is delineated by the moonlight, as in the sky a crescent reminds observers of the Islamic origin of the monument. The composition plays with elements such as mystery, dream and melancholy, as well as the inexorable passage of time and its effects, thus evoking a series of sensations that encapsulate Romanticism.

Besides offering an interpretation of the monumental complex in its entirety and of the details of the fortified perimeter, Roberts also provides a number of representations dedicated to the interiors of the palaces, developing a series of images of the Alhambra among the most plagiarized.



Figure 81.

View of the Alhambra from the Albaicín; David Roberts; 1835

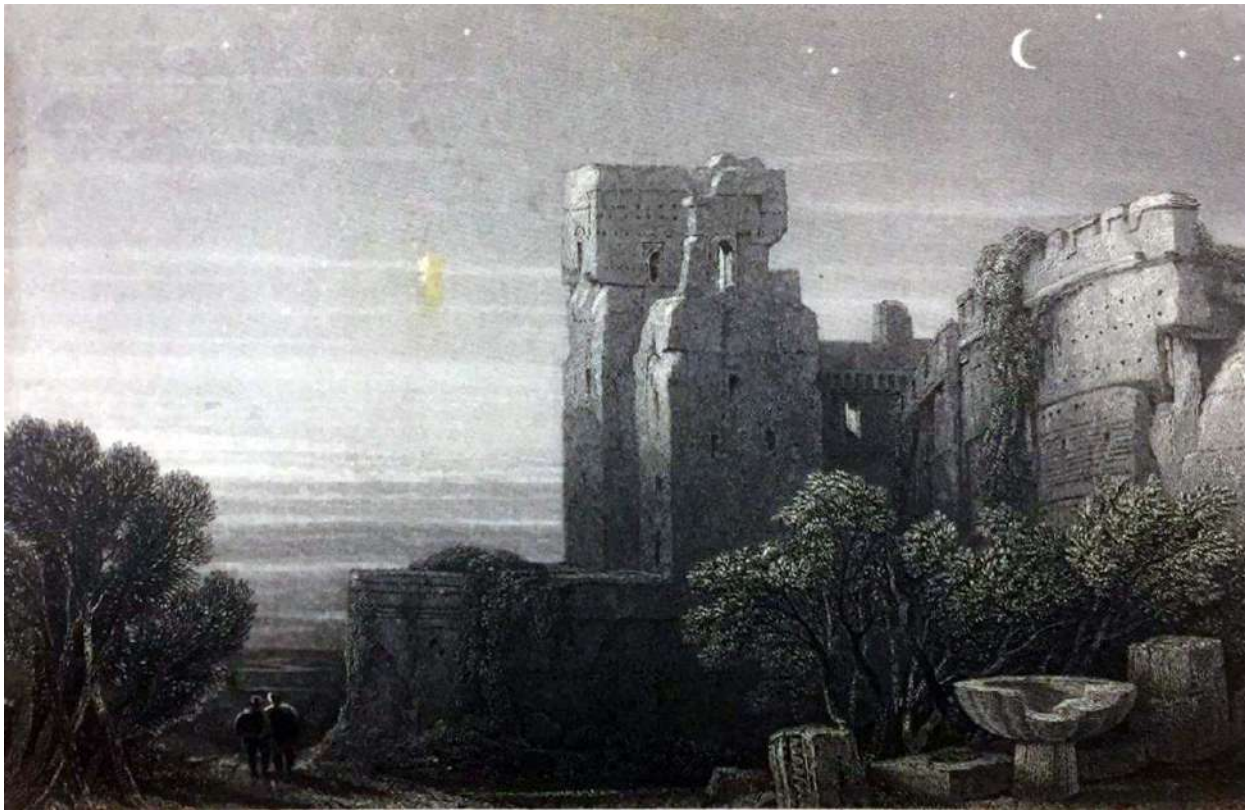


Figure 82.

Torre de los Siete Suelos; David Roberts; 1835

The Patio de los Arrayanes (Figure 83) is shown as a quiet alcove tinted by the morning light as tourists and locals relax by the central pool, adopting a rather realistic perspective which allows the image to be fairly faithful to the actual building. The angular point of view of the Patio de los Leones (Figure 84), on the other hand, demonstrates Roberts's tendency to distort reality in order to achieve a more surprising effect, for the proportions suggested by the inclusion of small human figures imply a much taller structure. Similar verticality, reminiscent of Gothic architecture and further emphasized by the use of chiaroscuro, can be found in the images of the Sala de los Abencerrajes and of the Sala de la Justicia as well.

Roberts briefly returned to the subject of the Alhambra with "The Picturesque Sketches in Spain", a volume in which, however, only six out of twenty-six plates focus on Granada and two of them are dedicated to the monumental complex. The most famous one, depicting the Torre de Comares, shows the titular subject as seen from the bank of the Darro, thus offering an imposing view of the tower and of the Tocador de la Reina. Once again, the Alhambra is represented as looming yet in ruin,

according to a precise Romantic aesthetic that would exercise an influence on a number of artists of the same period.

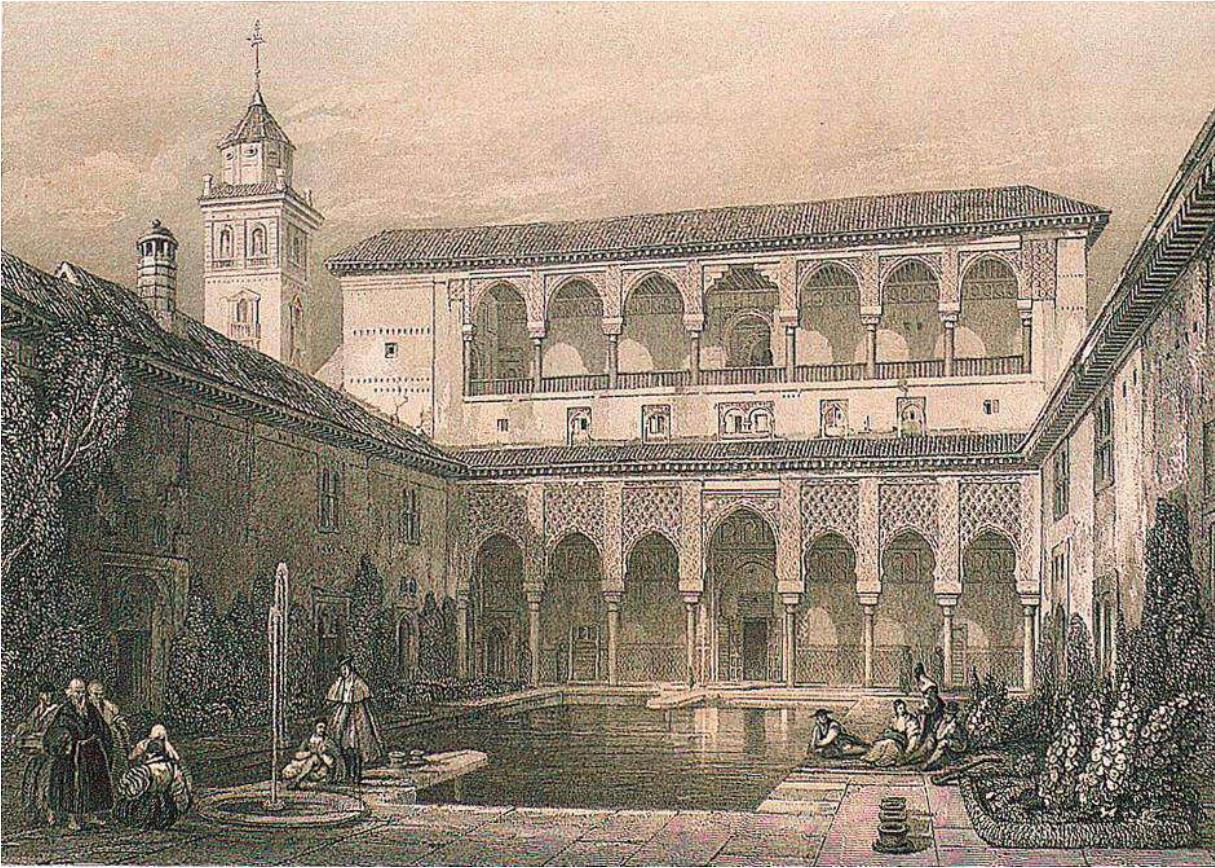


Figure 83.

Patio de los Arrayanes; David Roberts; 1835

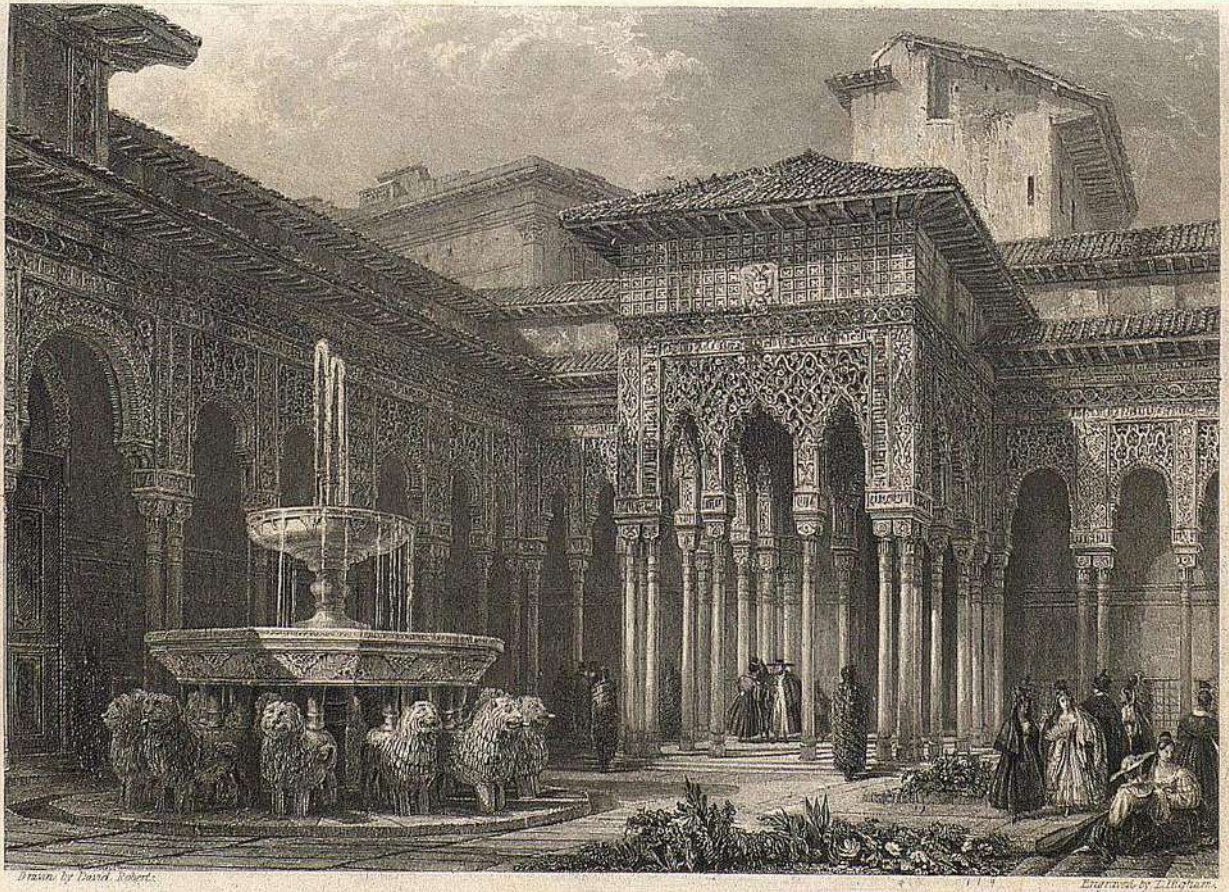


Figure 84.

Patio de los Leones; David Roberts; 1835

8.4. Lewis's "Sketches and Drawings of the Alhambra"

During the same years as Roberts, another illustrious British artist travelled to the Iberian Peninsula and chose it as a favorite object of study. John Fredrick Lewis, a friend of Roberts's mentored by Edwin Lanseer, reached Spain, where he resided for two years, in 1832, the same year in which his signature appears in the guest album of the Alhambra.

After this first visit in which the artist simply toured the monument, Lewis returned to work on the images that would compose the volume "Sketches and Drawings of the Alhambra", consisting of twenty-six lithography prints.

The artist paid close attention to reality, creating faithful representations that balance simplicity, order and light, an aspect that deeply influences the brilliance of Lewis's watercolors. Moreover, he



Figure 85.

Puerta del Vino; John Frederick Lewis; 1843

searched for a more intimate vision of the monumental complex, in which the grandeur is accompanied by details recalling the daily tranquility of life at the Alhambra.

Such sensibility can be found in the exterior views as well: both the depiction of the Puerta del Vino (Figure 85) and of the Torre de Comares present the architectural elements in an objective way, showing the suboptimal state of conservation and the traces of those less fortunate who were living within the fortress. At the same time, when representing the Torre de Comares, Lewis managed to expertly use a perspective of the gallery that adds to the monumentality of the tower and chose a composition that includes in the frame the slope of the hillside, providing a sense of vertigo close to the Romantic sublime.

The artist's predilection for clear lines and symmetric compositions is evident in plates such as "Patio del los Arrayanes or Court of the Myrtles", in which the slightly off-center Torre de Comares is clearly marked as the axis of the courtyard and of the image, redoubled in the water of the pool, or



Figure 86.

Entrance of the Sala de las dos Hermanas; John Frederick Lewis; 1843

as “Entrance to the Hall of Ambassadors”, in which the opposite side of the patio is framed by two consecutive arches, alternating light and shadow. A similar amplified succession is found in the plate depicting the entrance of the Sala de las dos Hermanas (Figure 86), in which the perspective of a series of arches leads from the well-lit colonnade of the Patio de los Leones to the shadowy bifora of the Mirador de Lindaraja.



Figure 87.

Entrance to the Hall of the Abencerrajes; John Frederick Lewis; 1843

However, Lewis strives to convey a sense of intimacy even when portraying the best-known parts of the Alhambra. In the Salón de los Embajadores, he follows Ford and Girault’s steps, illustrating the view from one of the eastern openings and emphasizing the quiet space of such niche. The depictions of the Patio de los Leones continue such trend, especially noticeable in the “Entrance to the Hall of

the Abencerrajes” (Figure 87), in which an oblique perspective shows the narrow area between the columns and the doorway where a man is sitting.¹³⁷

After the detailed works of Roberts and Lewis, Romantic British artists seem to gradually lose interest in the Alhambra, for, while the copies of previous ones continue to be popular, few new depictions appear. George Vivian, for example, dedicates a few illustrations to the monument in his volume “Spanish Scenery”, representing the view from the Tocado de la Reina and from the spring of the Avellano.

However, it is indubitably the French authors who once again focus on the palatial complex, from both a literary and graphical point of view.

8.5. *Taylor’s “Voyage pittoresque en Espagne, en Portugal et sur la côte d’Afrique”*

Among some of the most prominent original depictions of the Alhambra pertaining to French Romanticism are those of Baron Isidor Justin Severin Taylor, compiled in the book “Voyage pittoresque en Espagne, en Portugal et sur la côte d’Afrique”, focused on what the author called “impressions”, or peculiar details.

Taylor first reached Spain in 1823, as he traveled with the so-called Hundred Thousand Sons of Saint Louis, an occasion in which he also sketched some drawings of Granada, such as a picturesque image of the Patio de los Leones (Figure 88). In 1833 and between 1835 and 1837, Taylor revisited the region in order to prepare a Spanish art gallery for the Louvre, according to king Louis Philippe I’s wishes, seizing the occasion to produce more views for his publication.

Taylor’s volume was completed in 1860 and comprised over a hundred and sixty prints, thus becoming the most extensive French work about Spain.

¹³⁷(Lewis, 1835)

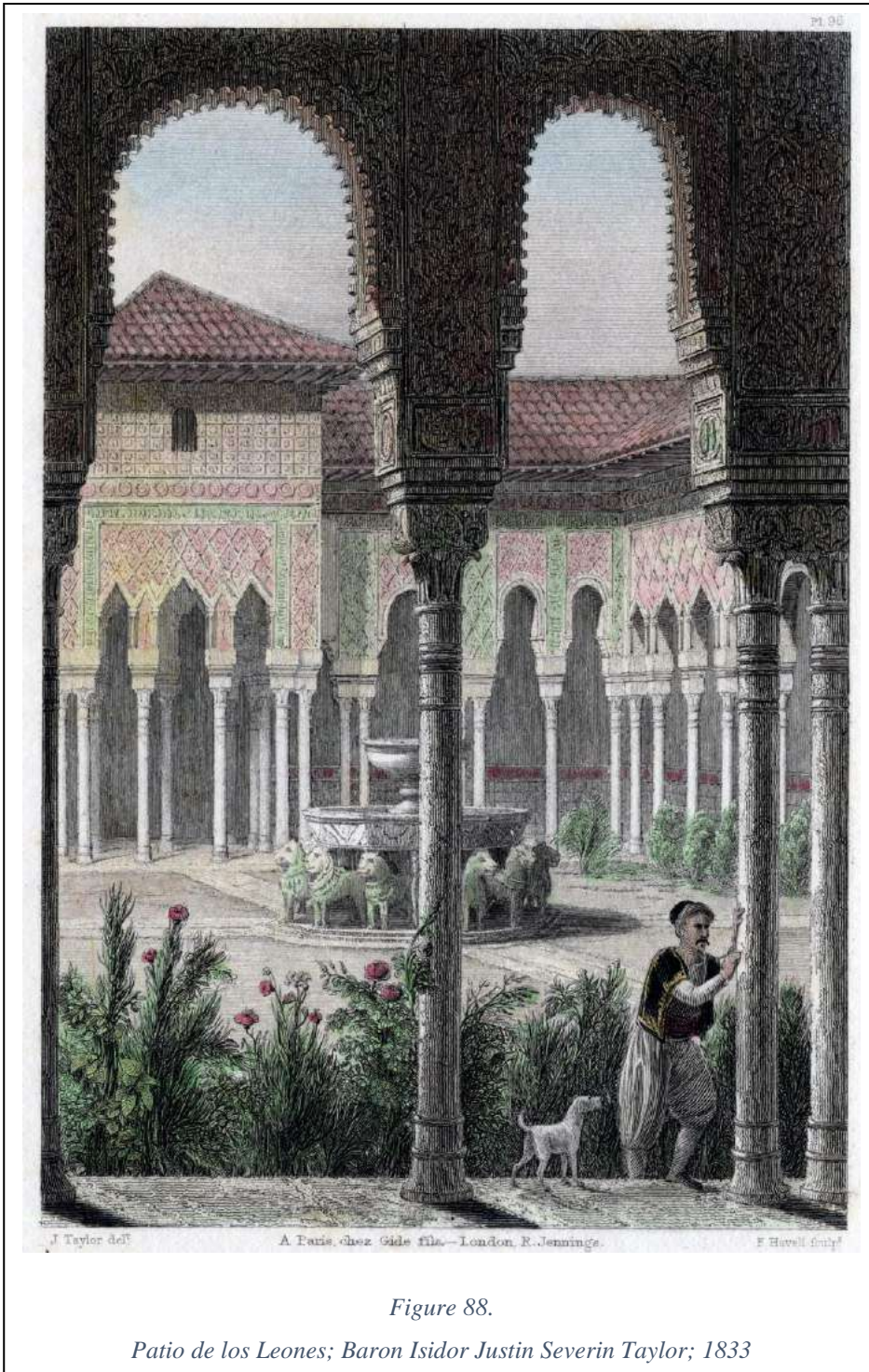


Figure 88.

Patio de los Leones; Baron Isidor Justin Severin Taylor; 1833

Eighteen prints were dedicated to the Kingdom of Granada, mainly focusing on the Alhambra, but their artistic and documental value lacks the exceptionality of other representations, rather infusing with the Baron's authority the presentation of an already familiar monument. The depictions of the palatial complex show little novelty, favoring well-known points of view and concentrating on the most famous areas, such as the Patio de los Leones. Like other Romantic artists before him, mainly Girault de Prangey, Taylor enhances the chiaroscuro effect given by the

alternating interior and exterior spaces, therefore adding an element of movement to tranquil, slightly asymmetrical compositions like those representing the Patio de los Arayannes, the Puerta de la Justicia or the Mirador de Lindaraja.

8.6. *Doré's illustrations for de Davillier's "Le Voyage en Espagne"*

In 1861, the French Baron de Davillier joined the numbers of those who, enticed by the artistic and picturesque appeal of the Iberian Peninsula, travelled to Spain and wrote about the experience. The nobleman was accompanied by young Gustave Doré, who had already visited the region of the Pyrenees in 1855 and was eager to further his knowledge of the rest of the kingdom.

Between 1861 and 1862, author and artist voyaged and produced both texts and sketches, which were gradually published by the Parisian magazine "Le Tour du Monde" until 1873. A year later, de Davillier recompiled the materials in a publication titled "Le Voyage en Espagne".¹³⁸

In the volume, de Davillier dedicates three chapters to Granada, providing readers with a rapid excursus of the history of the city and delving into examples of its former glory. The author, impatient



Figure 89.

View of the Alhambra; Gustave Doré; 1874

¹³⁸ (Davillier, 1874)

to see the Alhambra, immediately visited the monument when arriving in the city and compared such event to the entrance into a fairy realm. He extensively describes the gardens and halls, declaring that the complex had no equal in the world and that it would be necessary to spend weeks among its ruins in order to fully appreciate it.

De Davillier meticulous journal is accompanied by Doré's illustration, which, partially influenced by previous compositions designed by aforementioned authors such as de Laborde and Taylor, show a tendency towards the creation of scenes rather than architectural portrayals. The artist's works are characterized most of all by an interest in humanity and folklore, as well as an exploration for the iconography of ruins, usually emphasized by a defined contrast between light and shadow. Doré populates the Romantic image of the Alhambra, including a series of figures chosen from those who lived in the monument.

In the volume, Doré shows a remarkable range, as the images vary from beautiful, detailed views of the complex, with great attention to the ornamental component of its interiors, to vignettes and caricatures meant to immediately capture a fleeting impression. The use of xylography allowed the artist to convey the emotional aspects of the local landscape and people, however his views of the Alhambra sometime lack documental precision, focusing more on the scenography and the folklore in order to evoke a Romantic fantasy.

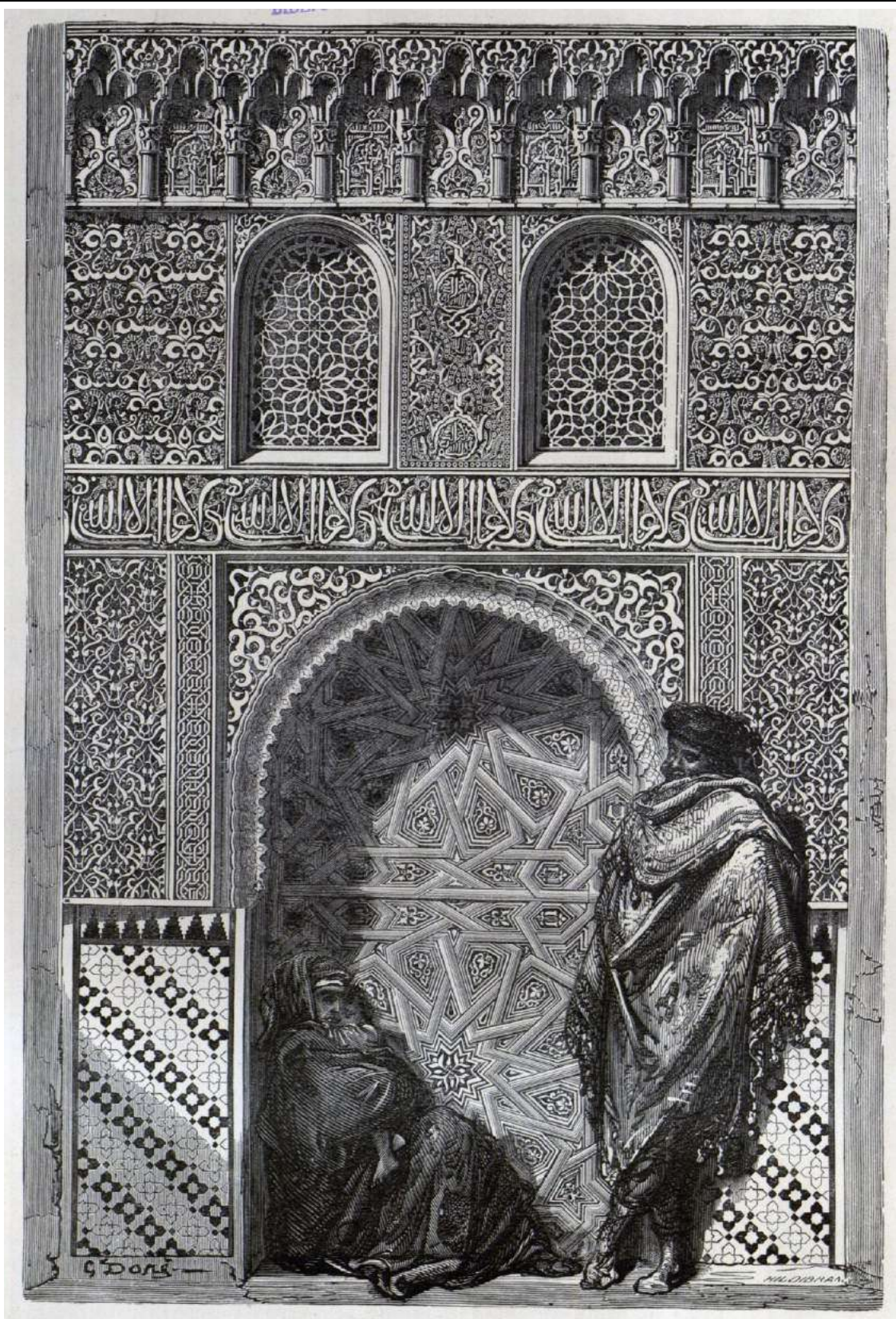


Figure 90.

Puerta de la Torre de las Infantas; Gustave Doré; 1874

Illustrations such as the general view of the Alhambra (Figure 89), a panoramic representation of the north eastern side of the complex, or the gate of the Torre de las Infantas (Figure 90), in which the intricate plasterwork and ceramic decorations are perfectly reproduced, showcase the artist's ability to recreate a faithful yet lively image that conveys the fascination of its real-world equivalent. Similarly, depictions of the Mirador de Lindaraja (Figure 91), of the Patio de Comares (Figure 92) and of the entrance to the Sala de la Justicia showcase an interest in spaces of transition between open and closed areas, which Doré underlines by alternating lighter and darker areas. One of the most exquisite depictions of the Alhambra is, rather unsurprisingly, that of its emblem, the Patio de los Leones (Figure 93). In its composition, the artist frames the central fountain within one of the pavilions protruding from the shorter sides of the courtyard and populates the wood-like colonnade with peacocks, to accentuate the exoticism and luxury of the Palace.



Figure 91.

Mirador de Lindaraja; Gustave Doré; 1874

Other illustrations, such as the one dedicated to the Puerta de Justicia, tend to veer towards sketches that quickly define the volumes of the fortress through a sapient use of chiaroscuro and offer a sense of their monumental proportions by means of small human figures.

These representations are accompanied by quirkier ones, in which a few, sometimes exaggerated elements delineate a scene which caught the artist's eye. One of the most famous examples of similar vignettes is that of the despoilers of the azulejos (Figure 94) of the Alhambra: a couple is depicted in front of a decorated pillar, as the man is about to hammer at the architecture in order to obtain some of its tiles, while the woman is on the look-out. While Dore's emphasis on the peculiar expressions of the two figures gives the image a comical aspect, the caricature also documents an important element of the history of the Alhambra, namely, the despicable practice of gathering souvenirs from the monument.

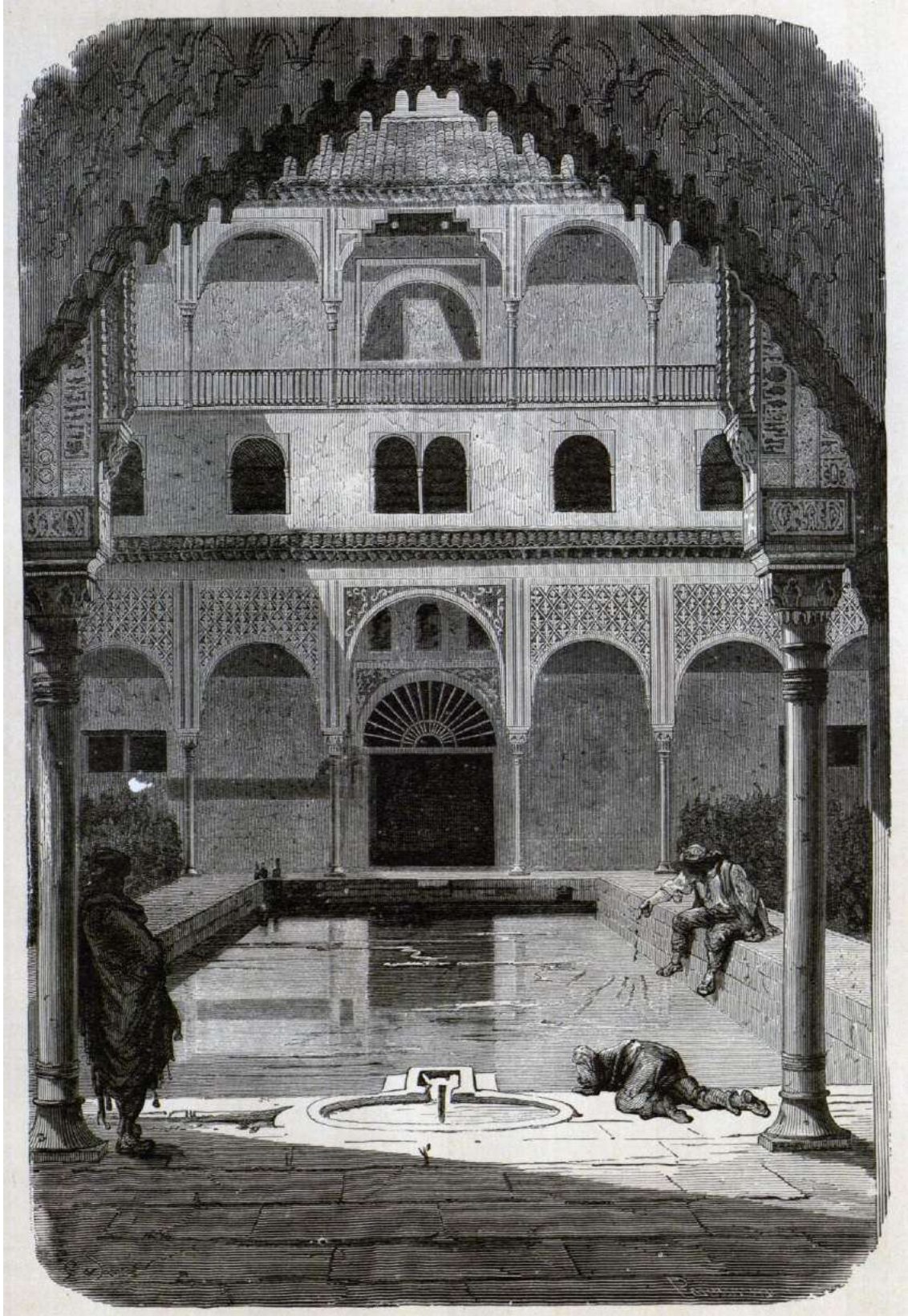


Figure 92.

Patio de Comares; Gustave Doré; 1874

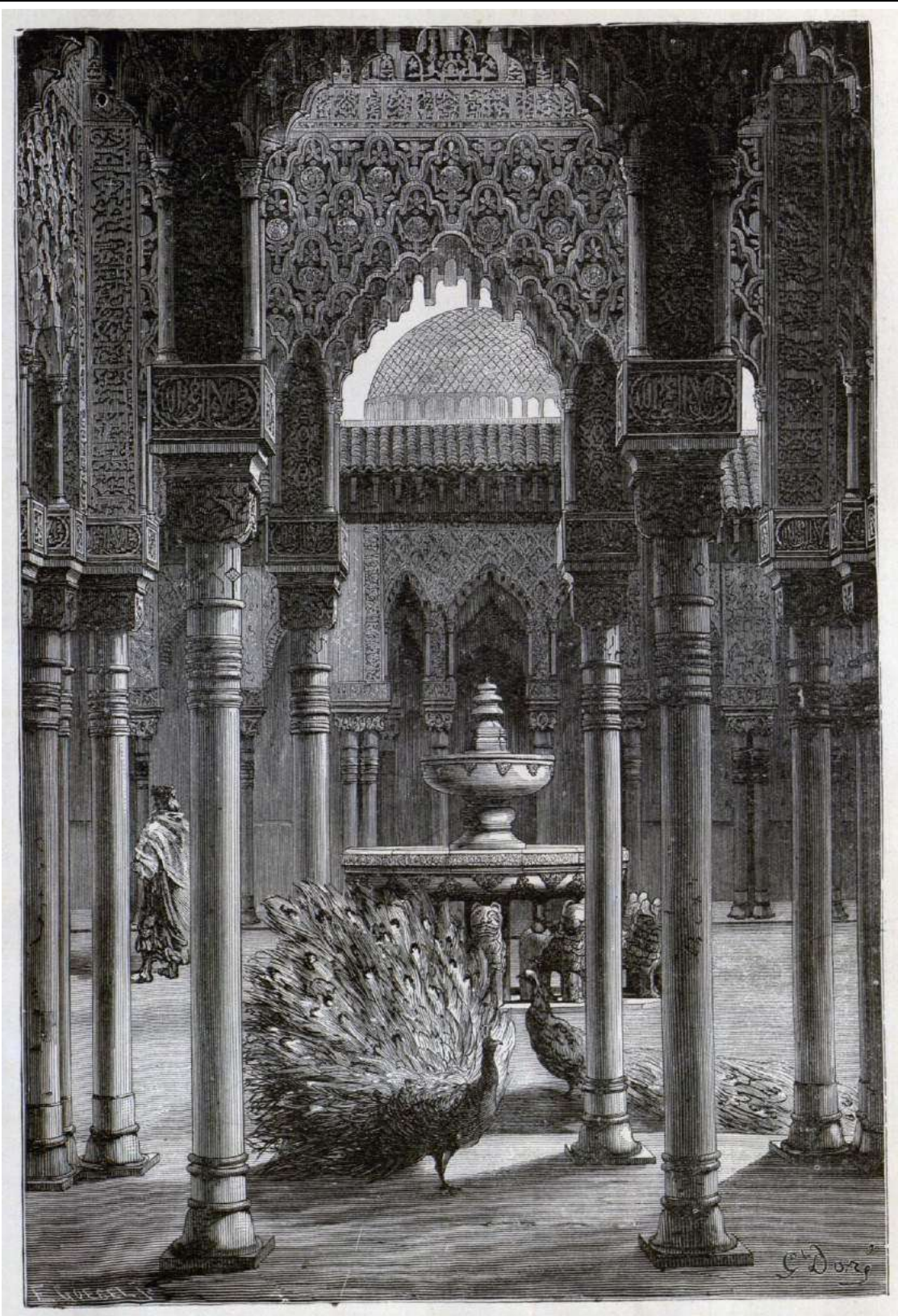


Figure 93.

Patio de los Leones; Gustave Doré; 1874



Figure 94.

Despoilers of the azulejos of the Alhambra; Gustave Doré; 1874

9. A return to mimesis

As mentioned, during the XIX century, the rising fame of the Alhambra led the Spanish monarchy to fund a series of restorations. Started in 1828 by José Contreras, the work was continued by his son Rafael in 1847, who adopted a decorative approach in accordance with the theories proposed by French architect Viollet-le-Duc. During this phase, in fact, the restorations did not follow a precise and scientific rigor, rather, they were strongly influenced by the architecture of other areas of the Islamic world, such as Turkey: the most famous example of this approach is represented by the addition of a dome similar to those of Iranian architecture to one of the pavilions of the Patio de los Leones. At the same time, however, Contreras managed to develop a number of relations with other important European cultural institutions, thus further strengthening the diffusion of the image of the Alhambra.¹³⁹

In the same years that Romanticism dominated artistic and literary creations of most of the Western world and found an inexhaustible source of inspiration in the Alhambra, another approach to the monument began to appear. Fueled by a desire for objectivity, in fact, a more scientific outlook led artists to find yet another reason to visit and immortalize the palatine complex.

In the first place, a rising interest in art history and its prominent debates, such as the hierarchy of styles and the importance of polychromatic elements in architecture, would prompt intellectual to consider the Alhambra as a prime example of Near Eastern art, a well-suited point of comparison for Western emblems such as the Parthenon. The deeper analysis also had the effect of producing collections of details that would be used as decorative motifs for the contemporary creations of both artisans and industries.

Moreover, the XIX century provided a new and exciting medium with which to experiment. As photography entered the lives of artists and amateurs, ushering the age of the image, the number of depictions of the Alhambra multiplied. The novel technology offered an objectivity which had never before been available, yet at the same time it lent itself to enough manipulations for photographers to create unique representations of an illustrious subject.

¹³⁹ (Eggleton, 2012)

9.1. *Jones's Alhambra: a catalogue of decorations*

In 1834, after travelling from Greece to Egypt and Turkey, British architect Owen Jones visited Granada, where he and his French travel companion, Jules Goury, dedicated six months to the analysis of the Alhambra. When a cholera epidemic swept over the city and resulted in Goury's death, Jones continued the work alone and returned three years later to finish "Plans, Elevations, Sections and Details of the Alhambra",¹⁴⁰ a recompilation of over a hundred prints dedicated to the memory of his friend, who had drawn some of the original images. The volume captured the interest of several architects as well as a number of European courts, thus playing a fundamental role in the diffusion of the Moorish trend and influencing the stylized buildings of Eclecticism and Revivalism.

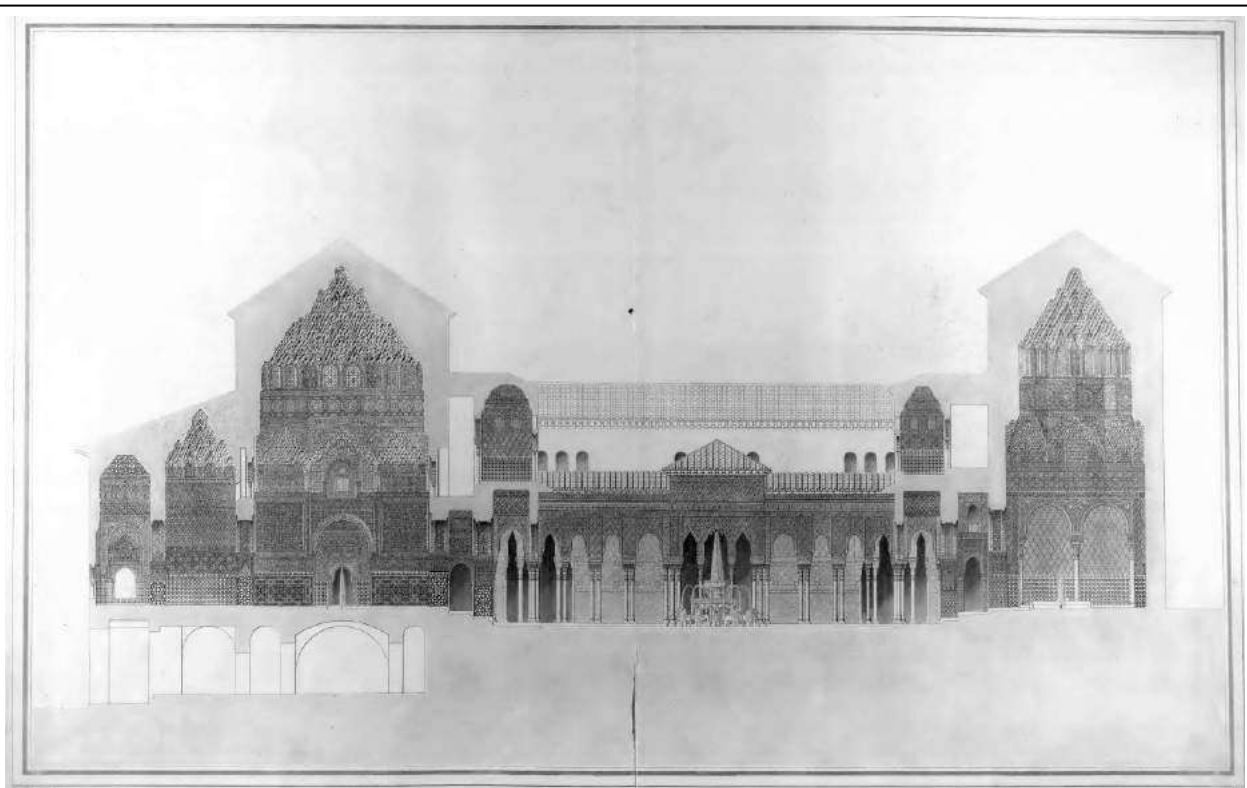


Figure 95.

Elevation of the Patio de los Leones; Owen Jones; 1845

Besides the titular scientific representations (Figure 95 and Figure 96), the book includes some traditional compositions, often using points of view similar to those of previous artists. The

¹⁴⁰ (Jones & Goury, 1845)

perspective of the Patio de los Arrayanes (Figure 97) shows the courtyard as seen from the Sala de la Barca, framing the southern gallery in the background within the entrance archway of the hall. The image of the Sala de las Dos Hermanas (Figure 98) offers a parallel arrangement, in which the symmetry is further underlined by the rhythmic succession of arches, from the entrance to the bifora of the Mirador de Lindaraja. Analogously, the Patio de los Leones (Figure 99) is represented as a perfectly symmetrical forest of columns that channel the viewer's eye towards the fountain, the focal point of the composition, marked by the slightly oblique canal. The depictions include a small number of human figures that both add a folkloric element and serve as a comparison device to give a sense of proportion.

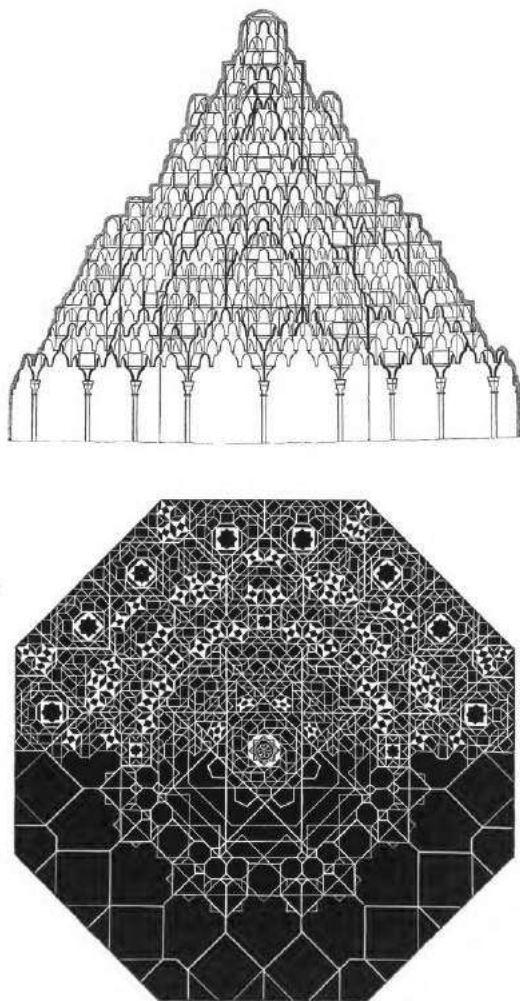


Figure 96.

Plan and elevation of the dome of the Sala de las Dos Hermanas;

Owen Jones; 1845

However, there can be no doubt that the artist's focus is the accurate representation of the space, including its most intricate ornaments. The light employed is soft and homogenous, as different as possible from that seen in Romantic images, in order to avoid stark contrast and shadows that could hide the details of the monument. The framing devices in the foreground occupy a greater part of the composition: archways are represented with a significant portion of the surrounding wall, which allows Jones to meticulously delve into the minutia of the tile panels and plaster decorations.

The effects of the residence in Granada permeated the rest of Jones's career, both as professor and as creator of a series of buildings

inspired by the monument, such as the Crystal Palace. His extensive study of the Alhambra culminated in the publication of the 1856 volume titled “The Grammar of Ornament”, which once again achieved a great success in the Western world. Among the various decorative elements analyzed, the author focused more than ever before on those of Islamic origin, especially from the palatial complex of Granada, considered a summary of ornamental theory and the epitome of so-called Moorish art.

Moreover, Jones’s research proposed a new approach toward the Alhambra, which had become a symbol of Romanticism and seemed inextricably tied to such aesthetic: in fact, the purpose of his publications rendered necessary a novel outlook, based on rational methodology and objective representation. At the same time, Jones’s work finds illustrious precedents in the details of some earlier artists, most notably Girault de Prangey’s and his “Choix d’ornaments Moresques de l’Alhambra”, a volume owned by the British architect.

In order to properly capture the variety and luxury of the decoration included in both “Plans, Elevations, Sections and Details of the Alhambra” and in “The Grammar of Ornament”, Jones carefully studied the use of color in Islamic architecture, a symbol of vitality linked to the allure of the Mediterranean and of the Orient.

Certain areas of the Alhambra still presented the desired chromatic richness in its ceramic tiles, plasterwork and carpentry, which therefore required the use of chromolithography to be depicted in the publication (Figure 100). Furthermore, the theme of whether color was employed in architecture was the main focus of the debate on classic Greece, a topic which had involved both Jones and Goury, and the inclusion of polychrome elements in what was deemed the masterpiece of Islamic art, partially also due to an evolutionary theory of art history, swayed the opinion of several critics.

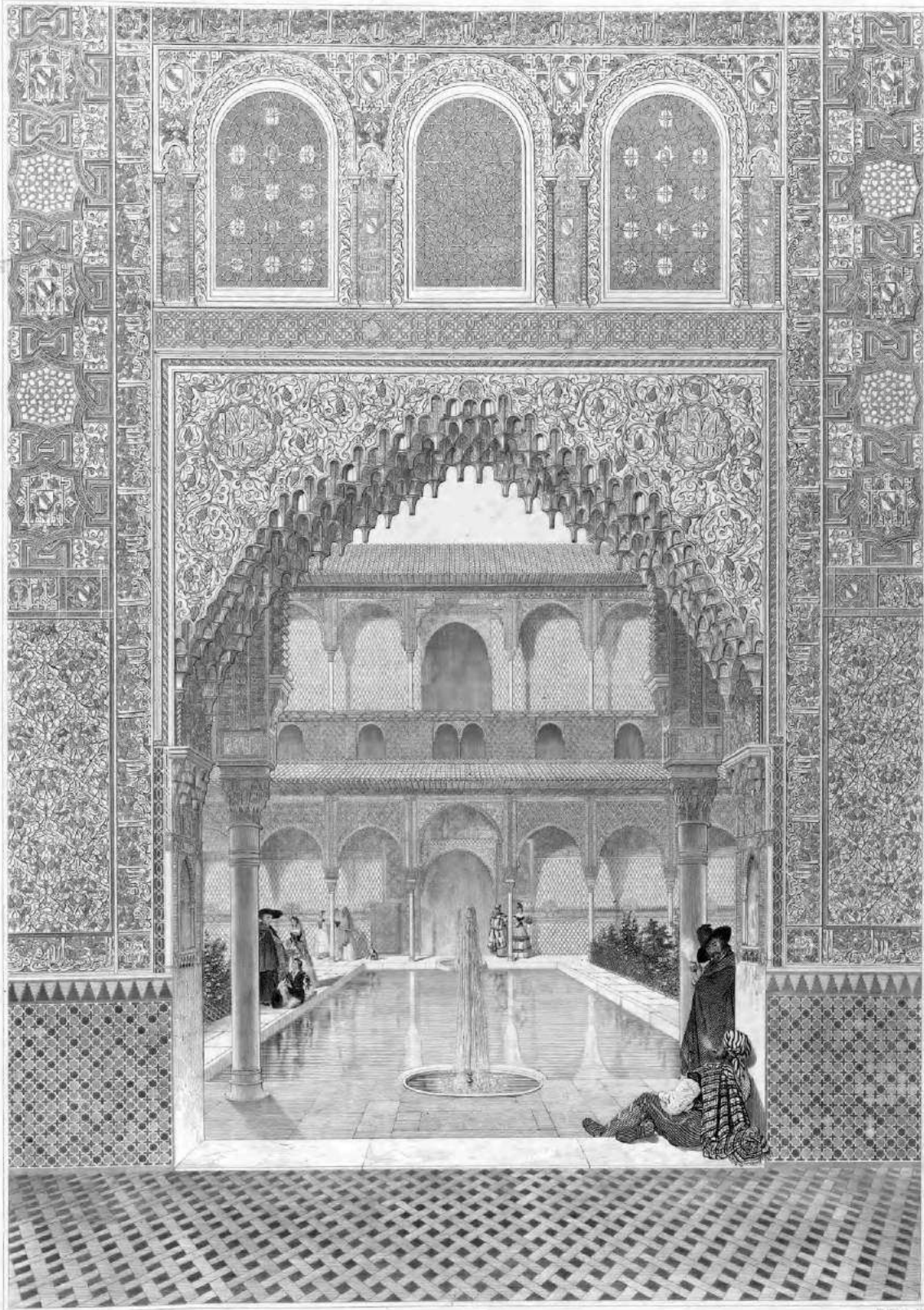


Figure 97.

Patio de los Arrayanes; Owen Jones; 1845

However, Jones's publications consist in more than a mere collection of decorations: rather, the architect investigates the process behind the creation of such ornaments, searching for general principles that can be made explicit and elucidated as general rules.

When analyzing the Sala de la Justicia, the author underlined the balance between greater shapes and smaller details, which together manage to keep the eye engaged, while when considering the monumental complex as a whole, he deduced the existence a pattern in the use of color, identifying examples and exceptions. Moreover, he focused on the method used to unite curves and straight lines in order to achieve harmony, on the flux of such lines and on how they can combine to create geometric shapes or divide even irregular regions in smaller areas that can be successfully adorned. As these rules lead towards what Jones defines as "melody of form", their origin can be traced back to natural elements, such as leaves and the organic growth of their veins, evoked by the arabesque.

The artist therefore aimed to not only faithfully represent the variety of decorations of the Alhambra, but most importantly to find a underlying set of laws and the respective procedures that would allow a deeper knowledge of the corpus as well as an understanding of its relationship to other ornamental styles and, most importantly of the rapport between architecture and decoration.

Besides the publication of the aforementioned volumes, Jones's fascination with the Alhambra led him to participate and impact a number of activities related to such interest.

The artist illustrated books on similar themes written by other authors, such as John Gibson Lockhart's "Ancient Spanish Ballads" and designed hundreds of textile, paper and ceramic patterns influenced by the Islamic monument, collaborating with several fashion companies. Jones was involved in the decoration of several mansions, as Eclecticism and Orientalism became dominant trends and architects all over Europe turned to his books for inspiration.

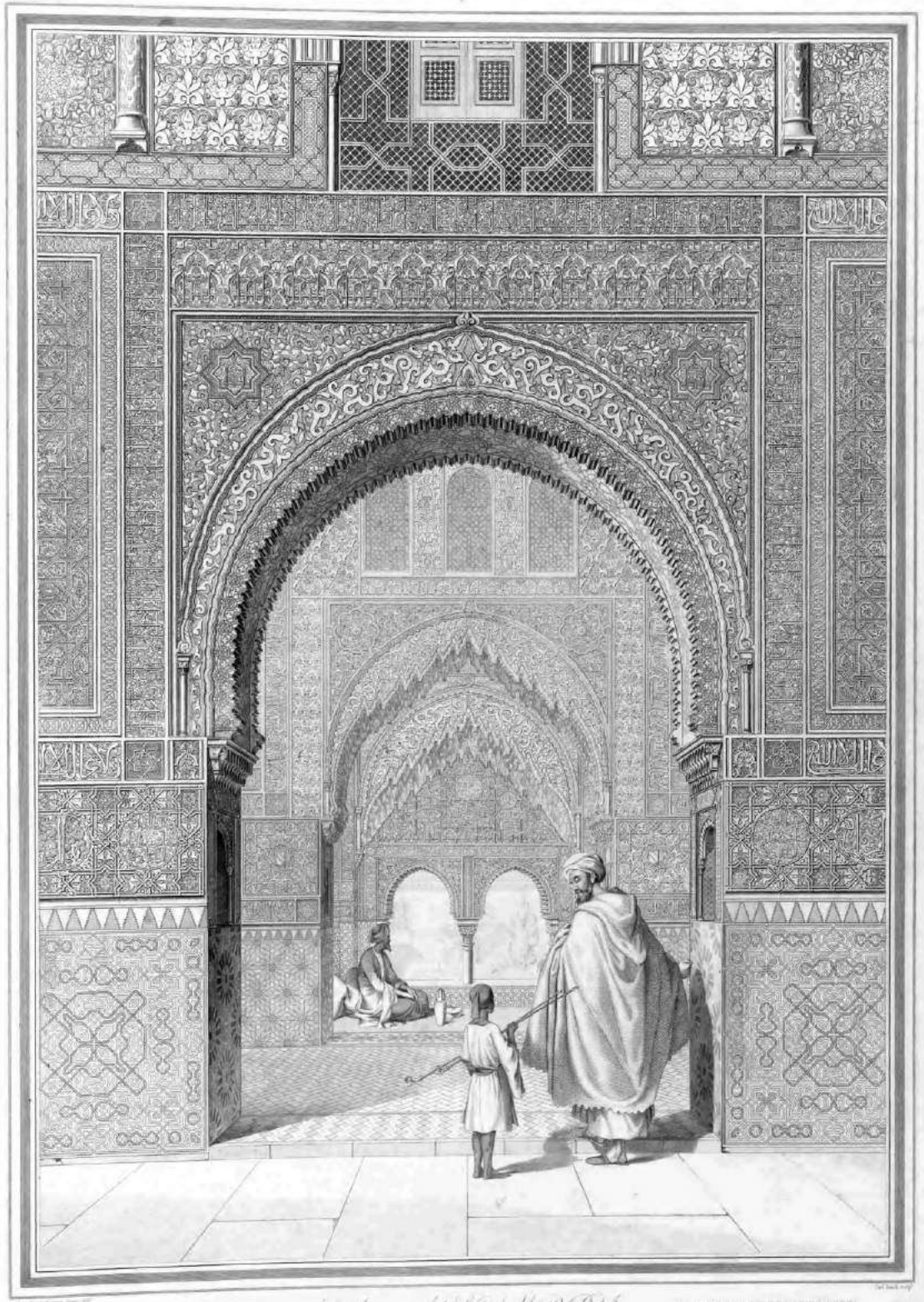


Figure 98.

Sala de las Dos Hermanas; Owen Jones; 1845

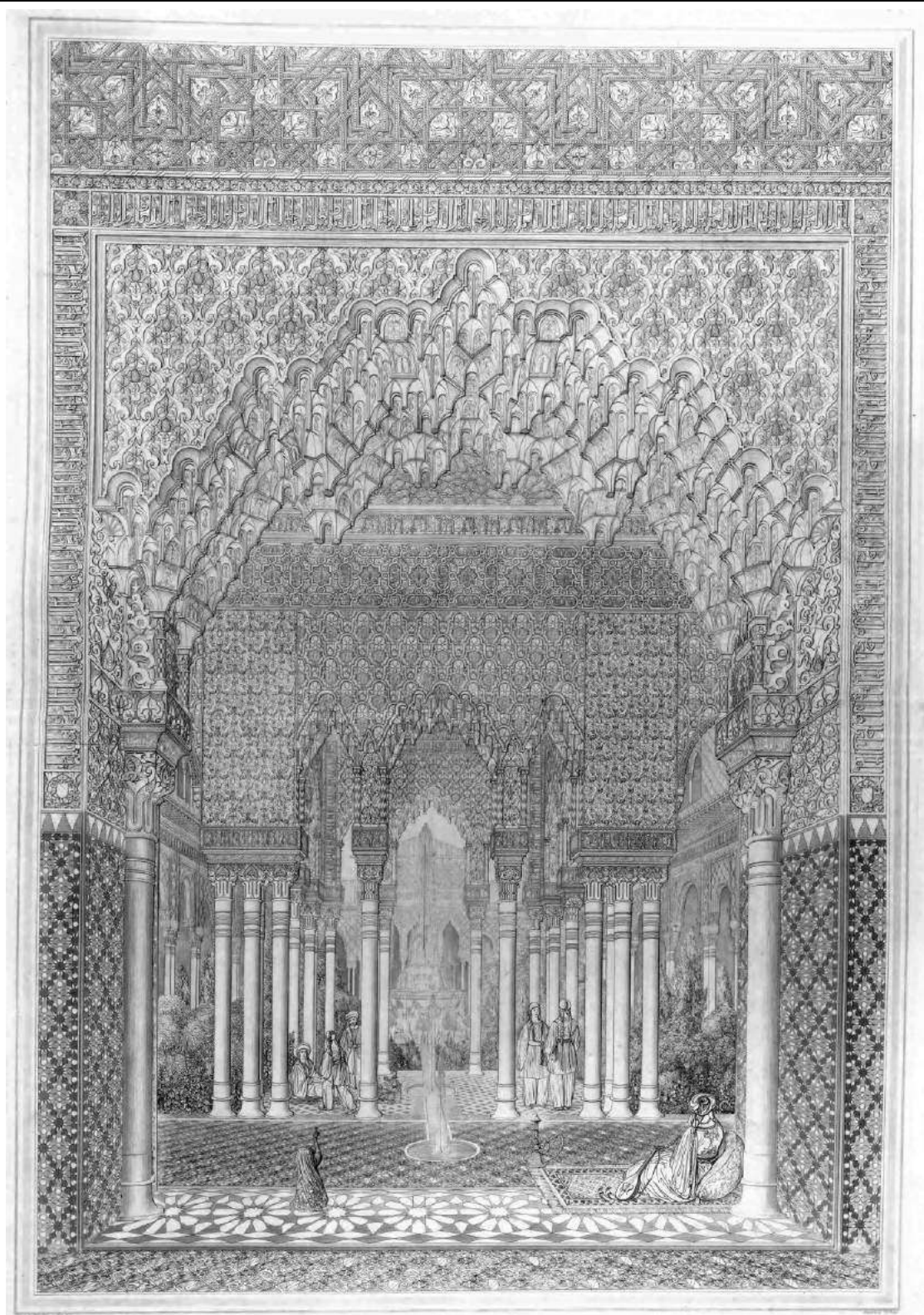


Figure 99.

Patio de los Leones; Owen Jones; 1845

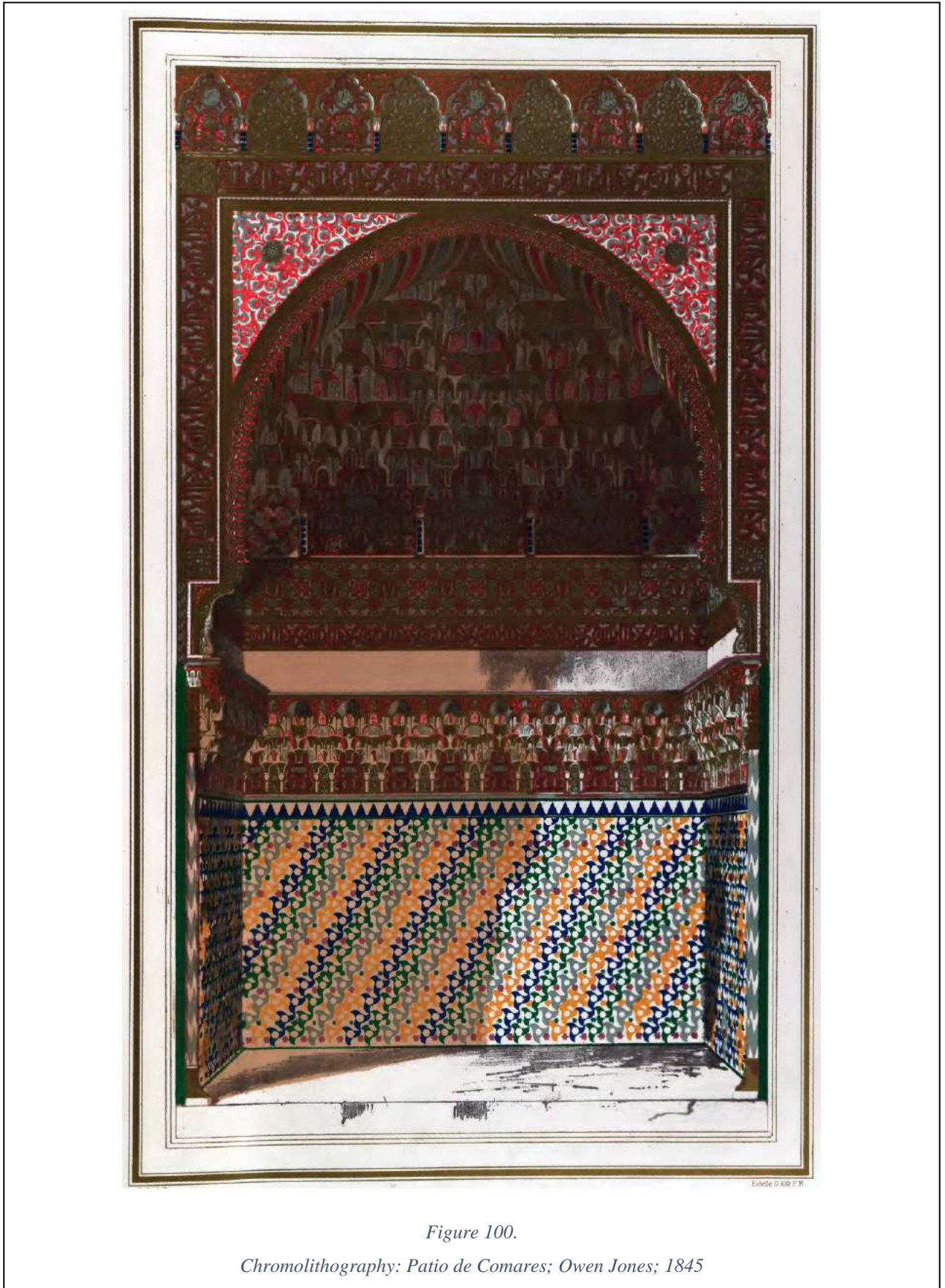


Figure 100.

Chromolithography: Patio de Comares; Owen Jones; 1845

Most importantly, Jones was able to conjugate the results of his studies with the use of novel materials such as cast-iron and glass, contributing to the Crystal Palace, an impressive building created for the 1851 Great Exhibition. The ability to properly combine an extensive modern structure with decorations selected from a drastically different context marked the architect as a visionary and tied the opulence of Orientalism to that of the Industrial society. A few years later, Jones completed another version of the Crystal Palace, in Sydenham, by adding a reinterpreted replica of the Patio de los Leones, immortalized in Philip Henry Delamotte's photographs (Figure 101 and Figure 102). Jones's involvement in the decoration of the Crystal Palace allowed him to experiment with elements of chromatic theory developed during his study of the Alhambra, in which primary colors dominate the plasterwork and wooden decorations. In order to highlight such relationship and better explain his theoretical approach, in 1854 Jones published a small volume, titled "The Alhambra Court".¹⁴¹ In the book, the author offered a guide to its creation and contributed to the ongoing debate about the role of design and color, while also providing recognition to the team that the architect had led in building the court. Moreover, the volume includes Jones's conclusions about the interplay between architecture and ornamentation, perfectly exemplified by his team's experience in collaborating at the Crystal Palace: decorative arts are part of a single family, derived from architecture, with which they must work to achieve a common objective.

¹⁴¹ (Jones, Calatrava, & Tito, El patio Alhambra en el Crystal Palace con estudios introductorios de Juan Calatrava y José Tito, 2010)



Figure 102.

Entrance to the Court of the Alhambra in the Crystal Palace; Philip Henry Delamotte; 1854

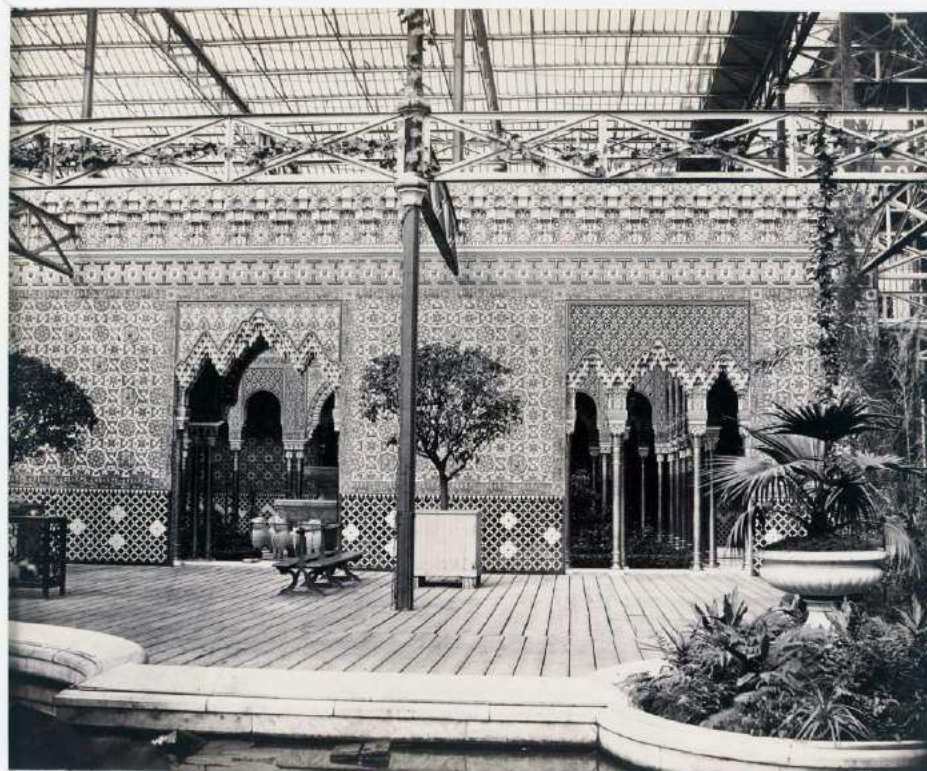


Figure 101.

The Court of Lions in the Crystal Palace; Philip Henry Delamotte; 1854

9.2. *Early photographs of the Alhambra*

During the XIX century, a new medium was developed as a tool for accurate representation: photography. The Alhambra became a privileged focus of this novel instrument almost at the same time as it began to be used by artists, as the diffusion of the monument's depictions had led to widespread interest and many were eager to test the technological advancement on such a fascinating and famous subject.



Figure 103.

Patio de los Leones; Théophile Gautier and Eugène Piot; 1840

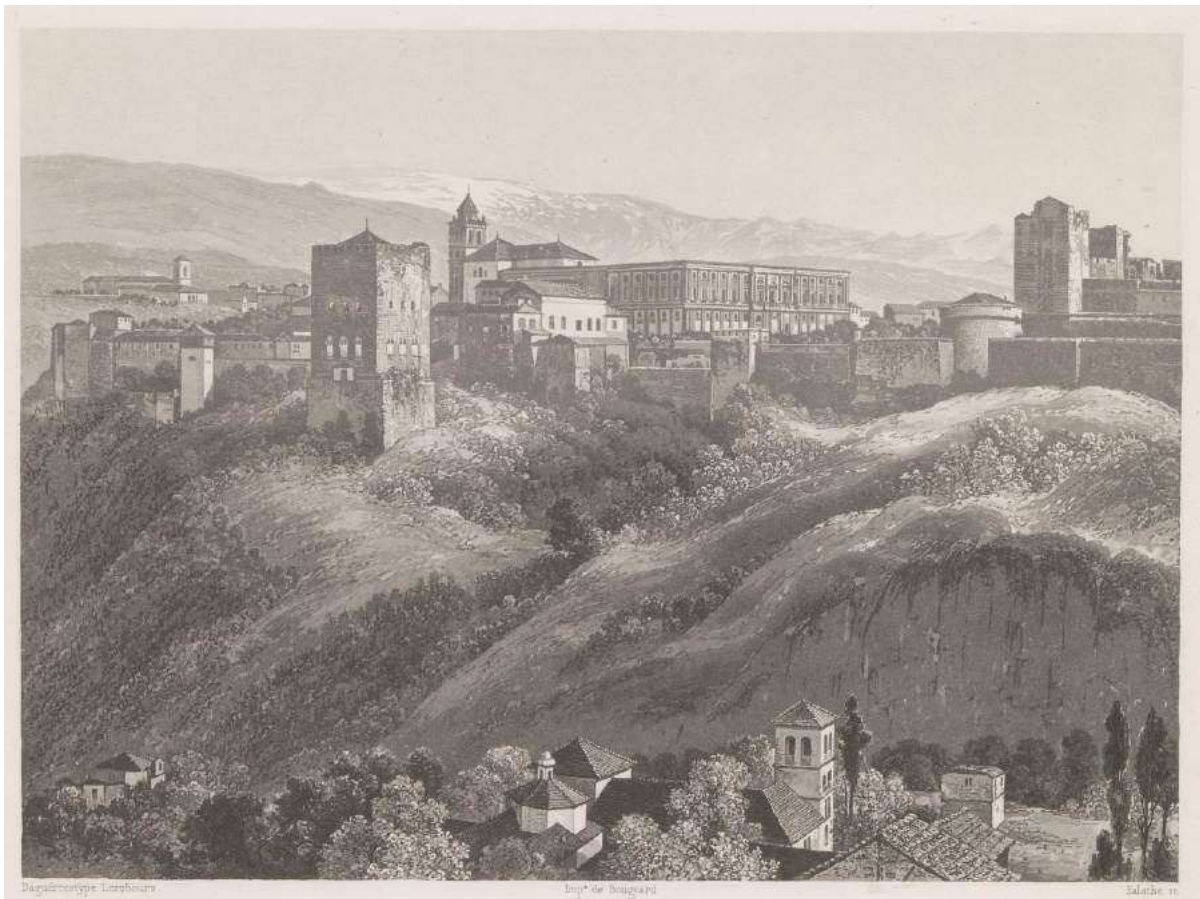


Figure 104.

View of the Alhambra from the Albaicín; Edmé-François Jomard; 1841

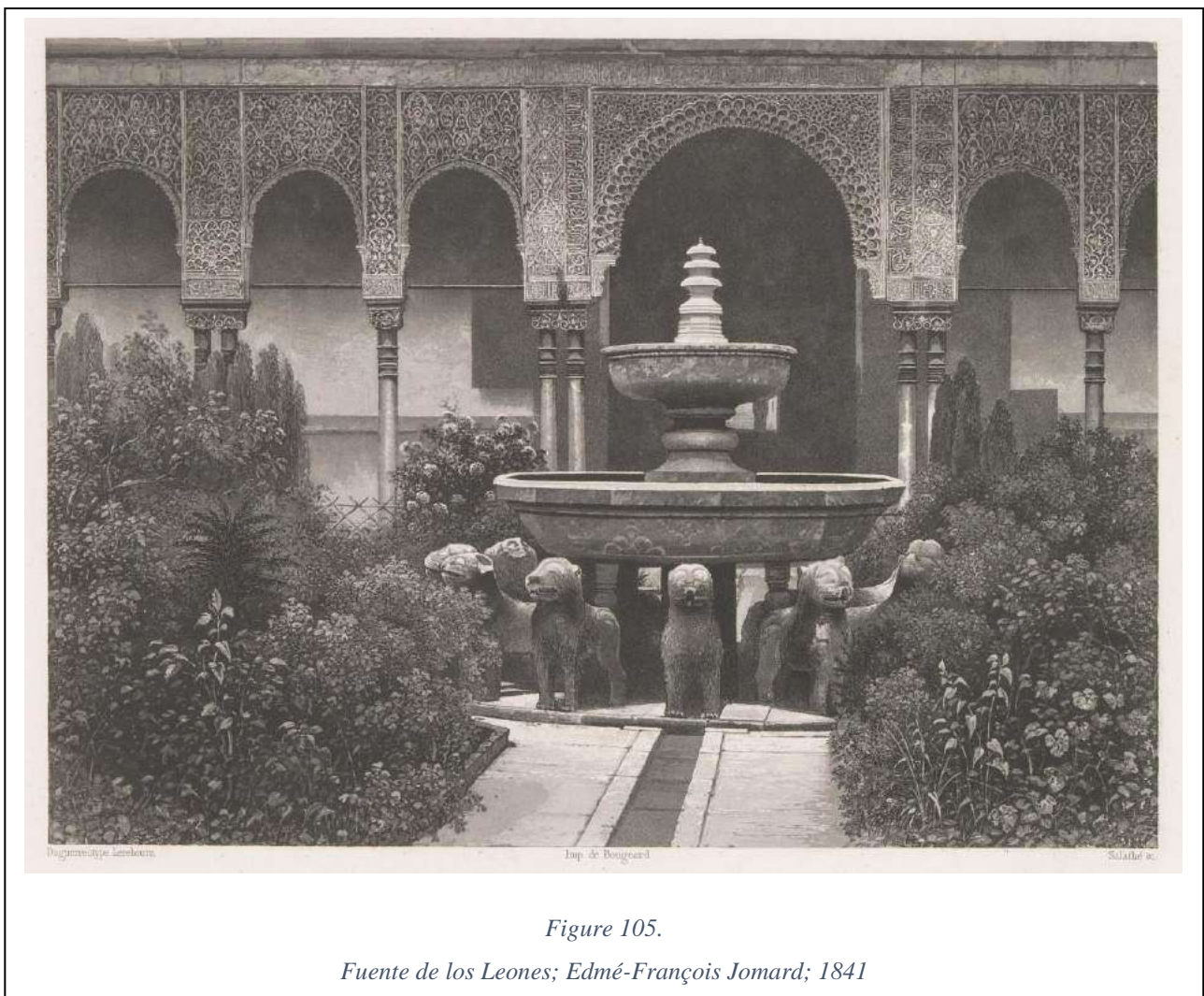
The catalogue of the exhibition “Imágenes en el tiempo. Un siglo de fotografía en la Alhambra 1840-1940”,¹⁴² which took place in the Museo de San Isidro of Madrid, offers an excursus of the main developments in how photography was used to capture the essence of the palace. From the first images still influenced by Romanticism and Orientalism to the XX century, the quantity and quality of photographs depicting the palatial complex in its various aspects is further underlined by the relevance of those photographers, both Spanish and foreigners, who selected the Alhambra as their focus and produced entire series dedicated to it.

Moreover, photographic images have united the artistic and documental aspects of representation, thus providing a valuable tool for historic memory, especially as a source of knowledge for the correct reconstruction of stratigraphy. This element is one of even greater importance in the case of the

¹⁴² (Piñar, Sougez, Kurtz, & Navarro, 2002)

Alhambra, not only because these depictions permitted a portrayal of the daily life in the monument, as they include its inhabitants. In fact, the period during which photography became a privileged tool of representation also constitutes a time of great change for the complex, as it underwent numerous modifications, additions and restorations.

Among the first voyagers who were able to capture the Alhambra on their film were Théophile Gautier and Eugène Piot (Figure 103), French travelers who reached Spain in 1840 and chronicled their trip in “Voyage en Espagne”.¹⁴³ They resided in the palace for a few days, which Gautier describes as the most delightful of his life thus explaining the desire to retain them with his camera. His photographs offer a fairly realist view of the monument, especially when compared to the



¹⁴³ (Gautier, 1845)

illustrations of his contemporary, which the artist critiques as unfaithful to the actual conservation of areas such as the Patio de los Leones.

Between 1842 and 1844, Noël (or Nicolas) Marie Paymal Lerebours commissioned “Excursions Daguerriennes”, a series of over a hundred daguerreotypes representing various world-renowned monuments. Among them, two plates depict the Alhambra: a view from the Albaicín (Figure 104) and a portrayal of the Fuente de los Leones (Figure 105), both probably photographed by Edmé-François Jomard.

During the 1840s, daguerreotypes were soon substituted by calotypes in the context of travel photography: although it entailed a lower resolution, the material was lighter and more economic, thus offering a more welcoming medium for enthusiast. Therefore, in the following decade, a number of tourists photographed the Alhambra during their voyages.



Figure 106.

Patio de Comares; Edward King Tenison; 1851

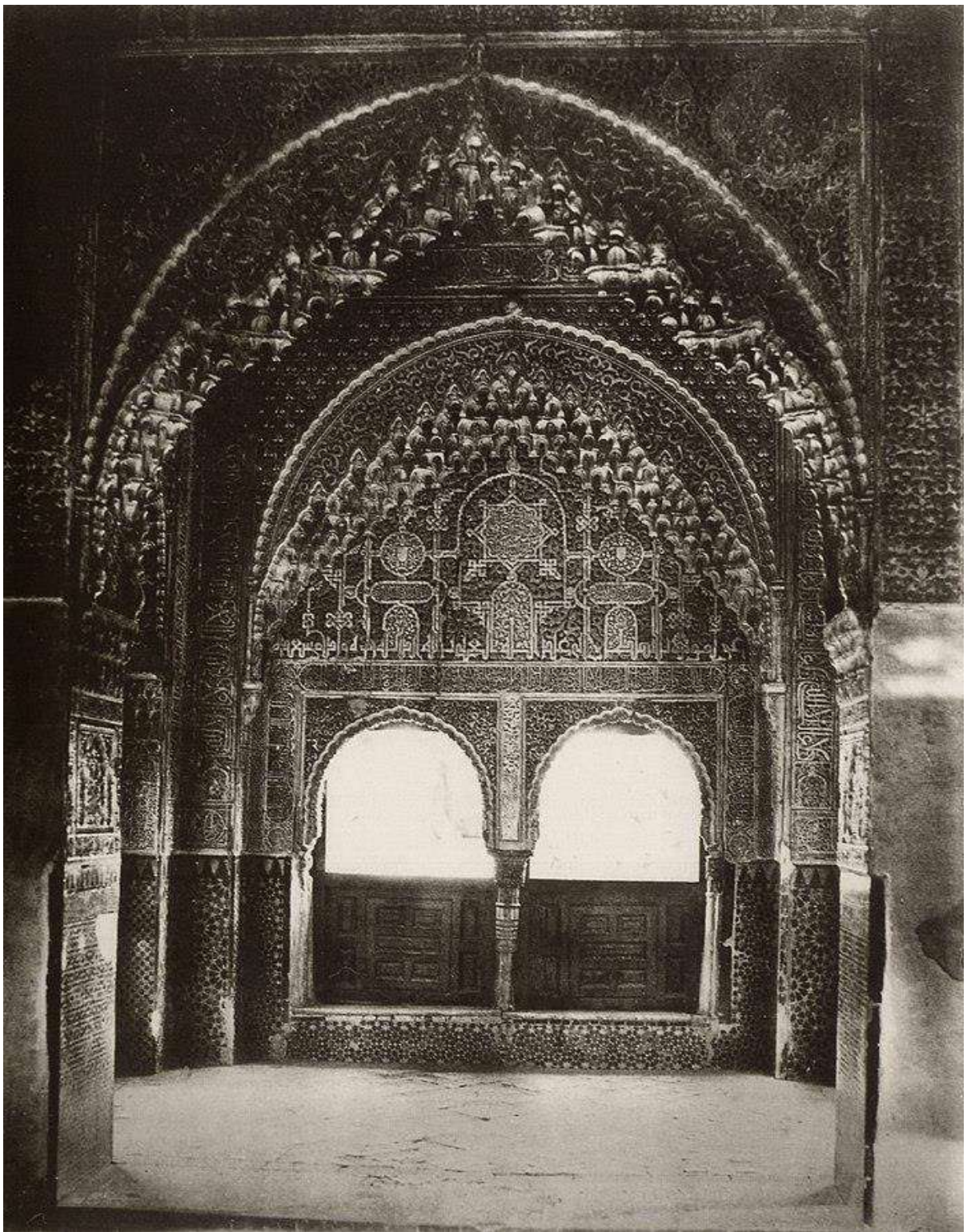


Figure 107.

Mirador del Lindaraja; Jakob August Lorent; 1858

British travelers Edward-King and Louisa Tenison resided in the south of Spain for two years, an experience told by Lady Louisa in “Castille and Andalusia”¹⁴⁴ and depicted by Tenison in the album “Recuerdos de España”. The calotypes include views of the main courtyards of the Nasrid Palaces (Figure 106), as well as representations of the Purta de la Justicia and the Generalife.

In the same decade, the Alhambra was immortalized by Francisco de Leygonier y Haubert, Hugh Owen, Jakob August Lorent (Figure 107) and Gustave de Beaucorps, as well as an array of nearly unknown or anonymous photographers, who concentrated on the palaces and the gardens, the archaeological remains and the folkloristic scenes. Moreover, these depictions started to be commercialized by editors, who often united the works of various travelers and sold them either as collections or as single images, leading to the creation of postcards and stereoscopic views much appreciated by the upper middle class.

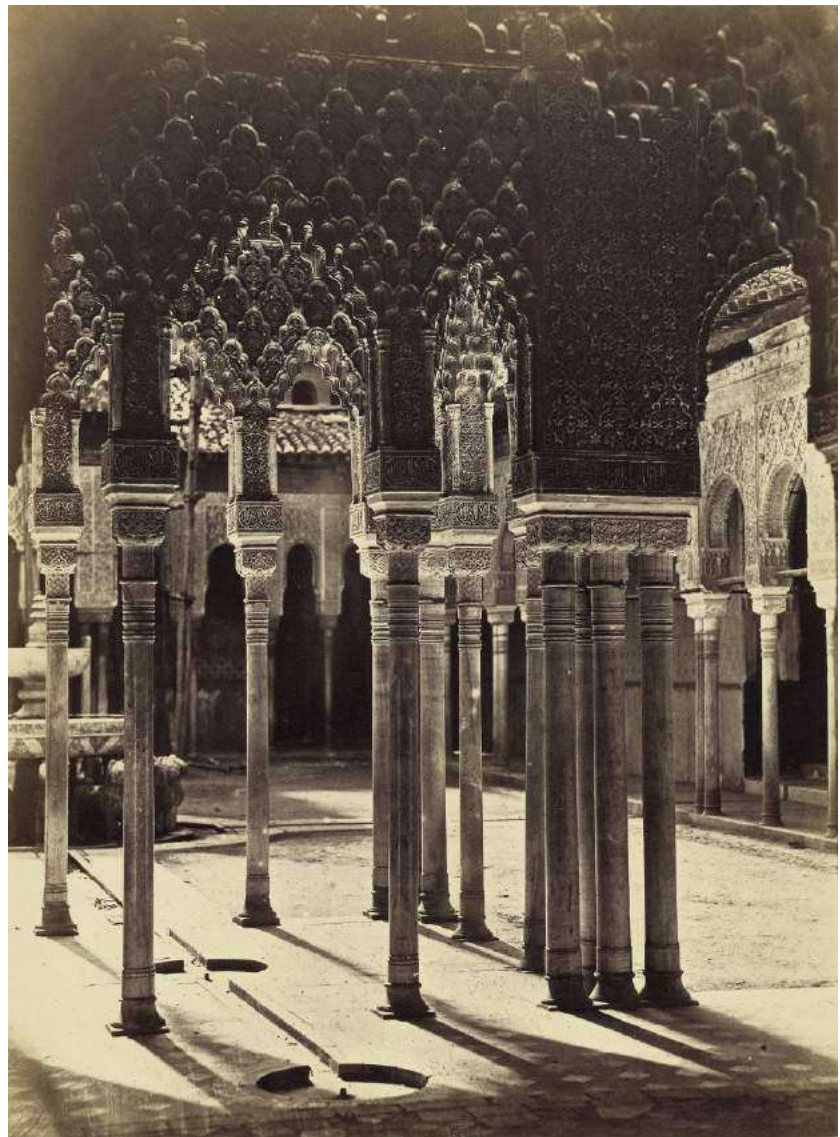


Figure 108.

Patio de los Leones; Charles Clifford; 1862

¹⁴⁴ (Tenison, 1853)

Between 1850 and 1862, British photographer Charles Clifford voyaged through the Iberian Peninsula, obtaining a number of remarkable images which, however, provide meagre information about the details of his experience. His approach is akin to that of a witness and a recorder of what he sees during his travel and thus much more similar to the objectivity of the Age of Enlightenment than to Romantic paradigms. In fact, from a technical point of view, Clifford's images appear noteworthy, as he manages to capture a range of lighter and darker areas, while also applying optical corrections, in order to reach a higher level of fidelity to reality.

The production of monumental views of the Spain led Clifford to concentrate several of his depictions

on the Alhambra (Figure 108 and Figure 109), the first of which dates back to 1853, when the technical restrictions of the daguerreotype forced him to carefully select the subject of the limited production. Nevertheless, Granada is one of the Spanish cities that he most photographs and the number of Andalusian images suggests that the area was the main objective of his trip. The city itself, which he visited at least three times, appears in few depictions, while the Alhambra dominates the collection, with views of the monument or of the scenery visible from it, as to document its privileged position.

More than by a fascination towards the palatine complex, shared with many of his



Figure 109.

Sala de la Justicia; Charles Clifford; 1862

contemporaries, Clifford appears to be moved by a deep appreciation of the artistic heritage of the Alhambra and, at the same time, by a reasonable concern about its conservation. The amount of photographic material dedicated to the monumental complex can therefore be partially explained by his desire to preserve its image from the conditions of abandon and ruin to which it seemed destined, further fueled by the fear of the possible destruction modernity would bring. Clifford's representations, however, also bear witness to the process of restorations, started in 1847 by Rafael Contreras and which would later lead to recognizing the Alhambra as a unique heritage site.

10. Alhambra fin de siècle

Following the Glorious Revolution, which, in 1868, had deposed the Spanish monarch, in 1870 the Alhambra became property of the Spanish State and an official national monument, recognized as a fundamental part of the country's historical and artistic heritage. The program of restorations continued along the guidelines marked by architects such as Contreras: the works aimed primarily to reconstruct those parts of the palatial complex that had suffered modifications, often including elements foreign to the Nasrid context of the Alhambra.

In fact, Andalusian architecture became a topic of debate for the proponents of the main restoration theories, while the Alhambra became, in this field as in many others, the exemplary subject of such disputes. The logical consequence of the Romantic fascination with the Alhambra pressured for an integral restoration that would reestablish its integrity, focusing on its exotic spirit rather than on documentary sources: a successful work would then be able to give visitors the illusion of a monument which has not undergone the passage of time, with little regard for authenticity.

At the turn of the century, the role of the Alhambra in the collective European imagination was well consolidated. The palatial complex was far more than a mere monument: the Romantic search for the sublime had found in it an inexhaustible source of inspiration, an exotic fantasy adorned by luxurious ornaments which Jones's catalogues allowed to replicate. Indeed, the widespread fame of the Alhambra would not only draw more and more tourists, many of them illustrious intellectuals, but also deeply influence a number of works created by artists who had never visited the palace.

10.1. A model for Orientalist architecture

As previously mentioned, since the Romanticism, the Alhambra had been one of the most prominent models for the works of Orientalist and Exoticist artists.¹⁴⁵ This tendency became even more accentuated during the last decades of the XIX century, as circulation of artistic and literary works regarding the monument, its history and its folklore increased.

Several foreign architects who had visited the Alhambra or had perused the publications dedicated to it developed a substyle of Historicism indicated as Moorish Revival: the decorative elements inspired by the architecture of al-Andalus, often mixed with those of other Islamic cultures, would

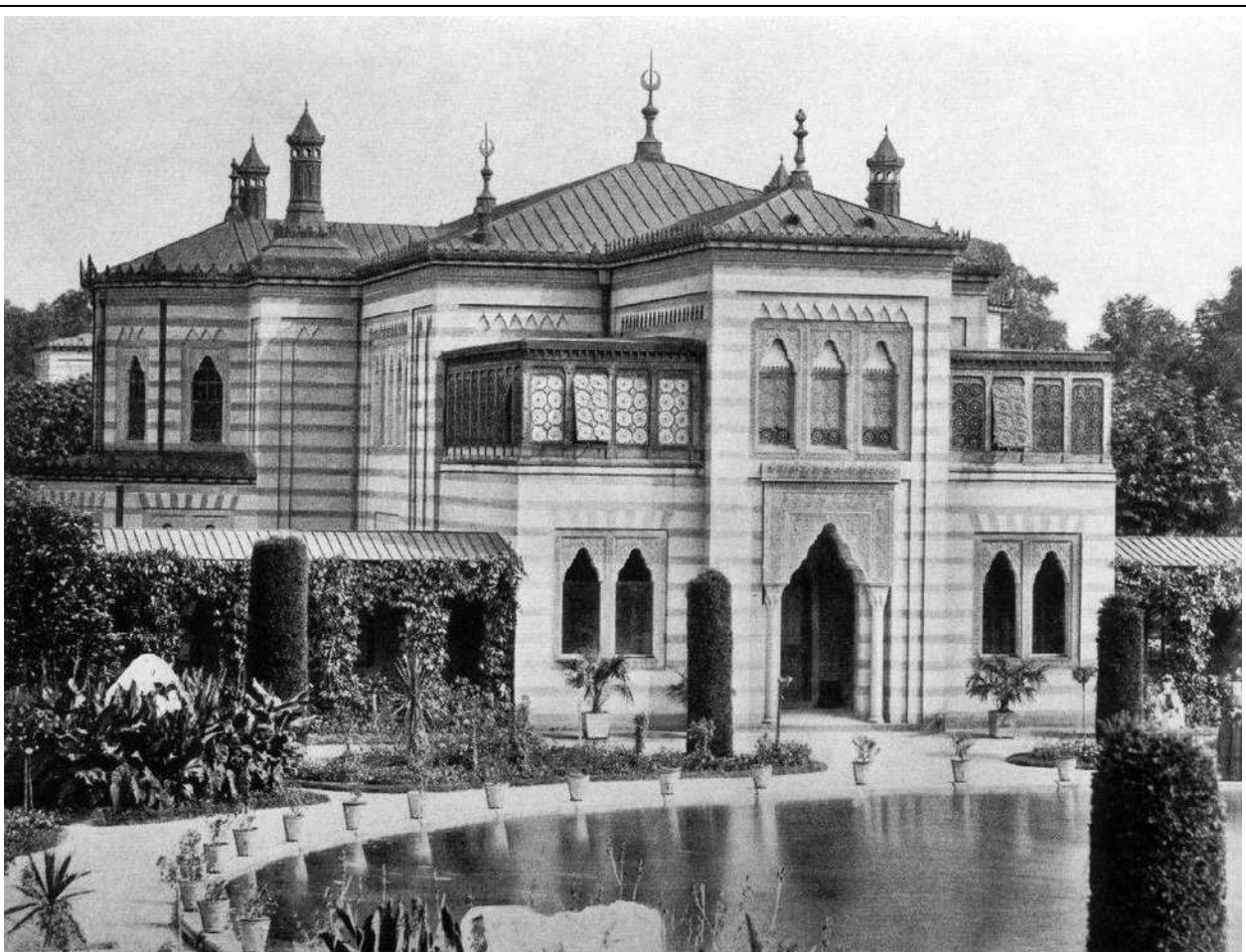


Figure 110.

Maurische Villa; Karl Ludwig von Zanth; 1846

¹⁴⁵ (Calatrava Escobar & Zucconi, 2012)

immediately conjure a sense of luxury and evasion, especially sought after by the upper classes. The creation of courtyards and smoking rooms entirely ornated with Moorish patterns became a widespread tendency among European and American bourgeois, which would last well into the 1930s. The products of this time, however, lacked the nuanced balance typical of the originals, as they simply used an array of ornaments to decorate a space that was not based on Nasrid or even generally Islamic architectural principles, such as the relationship between interiors and exteriors.

The list of architects who was influenced by the Moorish revival style starts with Karl Ludwig von Zanth, who designed the “Maurische Villa” (Figure 110) in Stuttgart already between 1842 and 1846, and spans from czarist Russia to the Americas, including the apparently paradoxical addition of Ottoman Turkey, which was influenced not by al-Andalus itself but rather by the Western architectural fashion inspired by it.

The exceptional state of conservation of the Alhambra, aided by the extensive XIX century restorations, easily transformed it into the model of Historicist architecture as well as its later derivations such as Eclecticism. The monument, analyzed and sectioned, was reconstructed in a series of permutations, which combined its elements in ever varying compositions all over the world.¹⁴⁶

10.2. An inspiration for Orientalist painting

The Orientalist tendency, however, was far from limited to architecture, as it embraced a number of artistic disciplines, with the notable inclusion of painting.¹⁴⁷

Since the success of the first translation of “Arabian nights”, which Antoine Galland offered to the French public, the Western idea of the Orient had acquired precise characteristics, such as violent and sensual elements that enhanced its role of escapist fantasy. Such archetypes were thoroughly represented not only in literary texts, but also in artistic depictions that narrated the most intriguing and often inaccurate aspects of Eastern cultures.

Among the various painters who ascribed to such current, Eugène Delacroix had the chance to visit the Alhambra in 1832, in the context of a diplomatic trip to Morocco. Such experience influenced his artwork, as his attention was captured by the brilliant light, the landscape and the general mysterious charm exerted by the exotism of the area. The effects of Delacroix’s voyage are most noticeable in

¹⁴⁶ (Rodríguez Domingo, 2006)

¹⁴⁷ (McSweeney & Hopkins, 2017)

his choice of subjects: his interest in Orientalist themes, already clear in works such as the 1827 oil on canvas “La Mort de Sardanapale” (Figure 111), is redoubled as he focuses on young women, mostly in leisurely contexts such as harems and hammams.



Figure 111.

La Mort de Sardanapale; Eugène Delacroix; 1827

Nevertheless, while Orientalism was a trend throughout the XIX century, the inclusion of Nasrid spaces as a specific setting only started in the 1870s, as artists employed the environments to achieve a higher sense of realism. Moreover, as the depictions of the monument offered a clear vision for the environment, lending themselves to harem and hammam scenes, the traditional folklore tied to the palace and its history provided fascinating subjects, partly included in Irving’s “Tales of the Alhambra”. (Irving, *The Alhambra: a series of tales and sketches of the Moors and Spaniards*, 1832) Among the various legends connected to the Nasrid halls, that of the assassination of the Abencerrajes became a particularly renowned. The tale, according to which an entire family was slaughtered as

punishment for one member seducing a lady of the sultan's family, gained fame thanks to Chateaubriand's novel and was depicted by numerous artists, as it united the Orientalist themes of eroticism and violence, while also providing a tangible scenery for the events, the homonymous hall in the Palacio de los Leones.¹⁴⁸

Indeed, three representations of the tale of the Abencerrajes can be considered especially interesting due to their aesthetic and stylistic elements as well as their documentary value as reinterpretation of the Alhambra: the artworks of Mariano Fortuny, Henri Regnault, and Georges Clairin.

Spanish painter Mariano Fortuny resided in Granada between 1870 and 1872, a period during which his works greatly contributed to the diffusion of the image of the Alhambra as a favorite location for Orientalist fantasies. Moreover, Fortuny became the focal point of an international network of artists who visited him in the Andalusian city and were thus inspired to choose it as a subject: Martín Rico, Attilio Simonetti, Josep Tapiró, Georges Clairin and several others lived and worked together in Granada during those years.¹⁴⁹

Fortuny's interpretation of the tale of the Abencerrajes can be seen in "La matanza de los Abencerrajes" (Figure 112), an oil on canvas dated 1870. In the painting, the murder has just been completed and a few corpses lay on the ground, as a group of people arrives at the door. The scene is clearly located in the homonymous hall of the Alhambra, which is depicted as viewed from the south-eastern corner: the twin arches on the western side immediately offer a recognizable architecture, as their representation provides further elements such as the three circular medallions in the plaster decoration above the central column and the shape of the capitals. While the plaster ornaments are not detailed, the shapes into which they divide the walls faithfully reflect the correct ones still visible today, as do part of the tile patterns, the series of arches at the entrance and the central fountain. The dimensions of the room, however, are slightly dilatated to accommodate the composition: the dark area on the left, maybe meant to suggest a continuation of the wall after the arches, is an invention of the artist, necessary to provide sufficient space for the figured dressed in red.

In the same year, the subject of the Abencerrajes was painted also by Henri Regnault, who had traveled to Granada in 1869 and, like many other Orientalist artists, had surrendered to its charm. In

¹⁴⁸ (Rodríguez Domingo, *El erotismo de la Alhambra: cuerpo femenino y pintura orientalista*, 2019)

¹⁴⁹ (Carbonell i Pallarès, 2006)

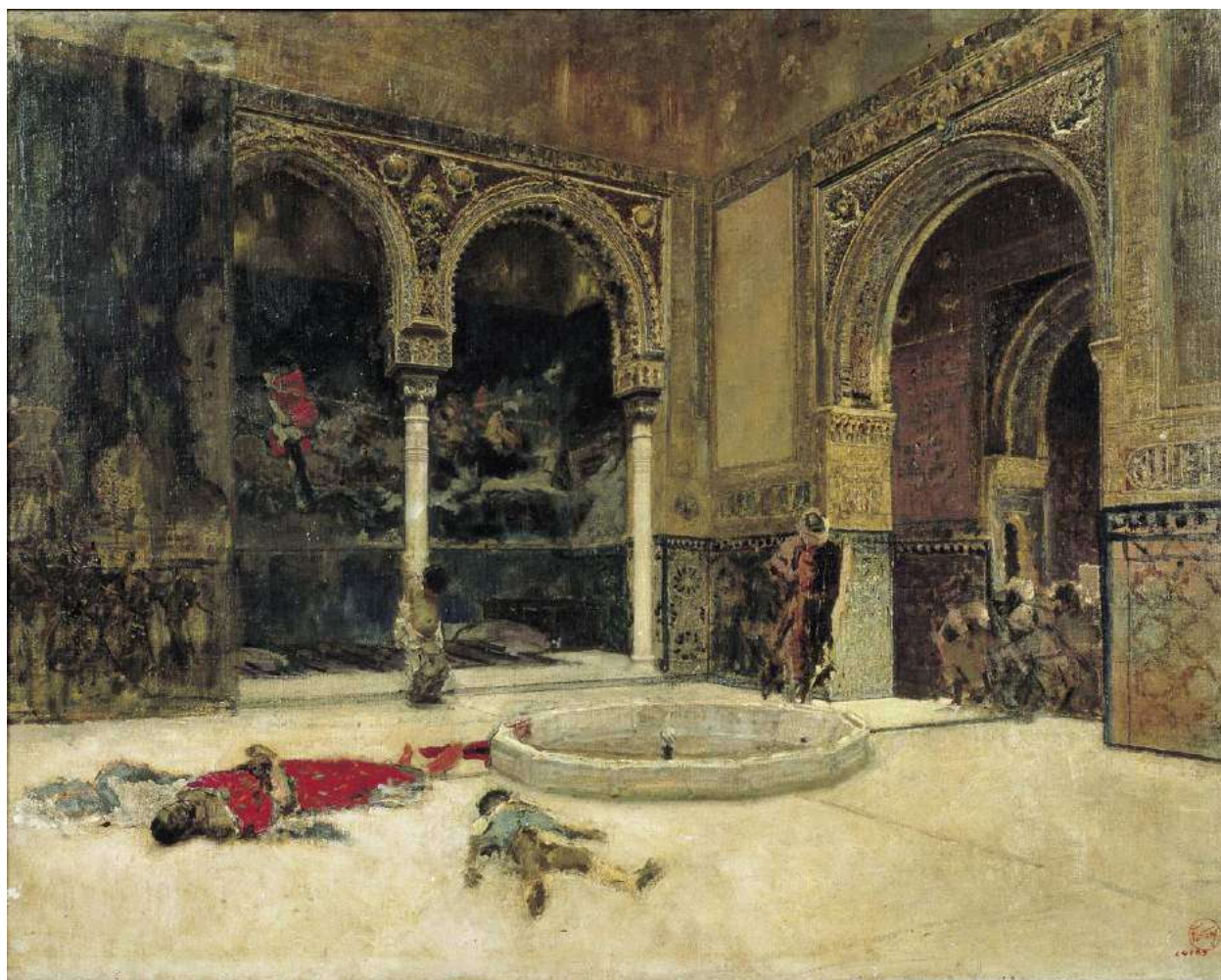


Figure 112.

La matanza de los Abencerrajes; Mariano Fortuny; 1870

his oil on canvas, titled “Exécution sans jugement sous les rois maures de Grenade” (Figure 113), the painter selects a dramatic vertical composition, almost entirely structured around the man standing on the left. The figure is using the long robes he is wearing to clean a sword with which he has just executed a member of the offending family. In the foreground, the severed head of the corpse lays on the steps, spilling fresh blood on the marble.

The violent scene is set against a richly detailed, luminous background, which, however, does not represent the Sala de los Abencerrajes, but rather, the Sala de las Dos Hermanas; a few telling elements, in fact, allow the observer to distinguish the two halls which face each other across the Patio de los Leones. In the first place, on the lower right of the painting, just below the sultan’s blade, a few arches open on a smaller, lighter area, distinguished by a small bifora: it is a depiction of the Mirador de Lindaraja, the small balcony that opens on the homonymous garden from the Sala de las Dos Hermanas. Moreover, just above this element, a wooden latticework of the mashrabiya type



Figure 113.

Exécution sans jugement sous les rois maures de Grenade; Henri Regnault; 1870

covers an arch before giving way to the muqarnas ceiling, the shape of which is different from that of the Sala de los Abencerrajes.

While choosing to change the location of the folk tale, Regnault still offers an authentic and remarkable view of one of the halls of the Alhambra. The faithfulness of the depiction can be noticed in the disposition of the plaster ornaments, which for the most part coincides with the actual ones. On the other hand, similarly to Fortuny, the artist needs to adopt an imaginative solution in order to accommodate the composition: the dramatic effect of the blood spilling on the floor as the sultan towers over the corpse compels the painter to increase the number of steps and ignore the presence of the water canal running through their center.

The legend was explored a few years later by another French artist, Georges Clairin, in “Le massacre des Abencérages” (Figure 114). Painted in 1874, the artwork presents a crowded, agitated scene taking place just after the slaughter.

Several figures populate the artwork: two youngsters stand on the left, holding swords and looking at a severed head, in the lower right, a man shows a sword and more heads of his enemies, while a darker skinned character is crouching front of him, intent in wrapping them with a drape. Further back, two men at run in front of the entrance of the hall, inside which the observer can glimpse at the death and confusion embodied by several other figures. The only element of stillness, the focal point around which the dynamic composition seems to rotate, is the sultan near the center of the canvas. The verticality of his stance is accentuated by his long robes, while his attitude seems almost nonchalant: one arm is draped across the fountain, holding a knife and the severed head the children are observing. The richness of details offered by the artist can be noticed in the choice of clothing, jewelry and accessories worn by his protagonists, as well as in the location.

Unlike the paintings previously examined, Clairin's depiction is set in a courtyard in front of the Sala de los Abencerrajes, which is clearly represented on the right side. Beyond two decorated entrance arches, the hall is shown quite accurately, showing the eastern twin arches and a glimpse of the muqarnas near the ceiling. The proportions of the room, however, appear distorted to enhance its dimensions, as to fit more character and increase the grandeur of the palace. The rest of the scenery borrows architectural elements of the Alhambra but cannot be identified as the Patio de los Leones, which the Sala de los Abencerrajes faces. On the left, the background correctly shows the plasterwork lattice between the arches of the courtyard, but the fountain appears incomplete, as it is missing the eponymous lions, as well as, it seems, the canals connecting it to the four main halls of the patio.



Figure 114.

Le massacre des Abencérages; Georges Clairin; 1874

10.3. A backdrop for the imagined odalisque

Since Jean-Auguste-Dominique Ingres's 1814 oil on canvas "La Grande Odalisque" (Figure 115) was exhibited at the Salon in Paris and gained remarkable fame, the oriental courtesan became a recurring figure for XIX century painters, who conflated the foreign lands of Islamic culture with beautiful seductresses. As demonstrated by Delacroix's previously mentioned explorations, the allure of the imagined life conducted by these concubines, entirely dedicated to pleasure and idleness, would allow the subject to persist until the following century, occasionally paired with the prototype of the femme fatale.

Such is the case of Symbolist subjects, which favored themes such as mystery and sensuality, thus acquiring mystical layers capable of evoking a great fascination. Stories such as that of Salomè, evoking both the danger of a bloodthirsty woman and the charm of the odalisque prototype, were often chosen the main theme for Symbolist painting, which included realistic elements from Islamic architectures, such as the Alhambra. Nasrid columns and plasterwork patterns can be recognized as

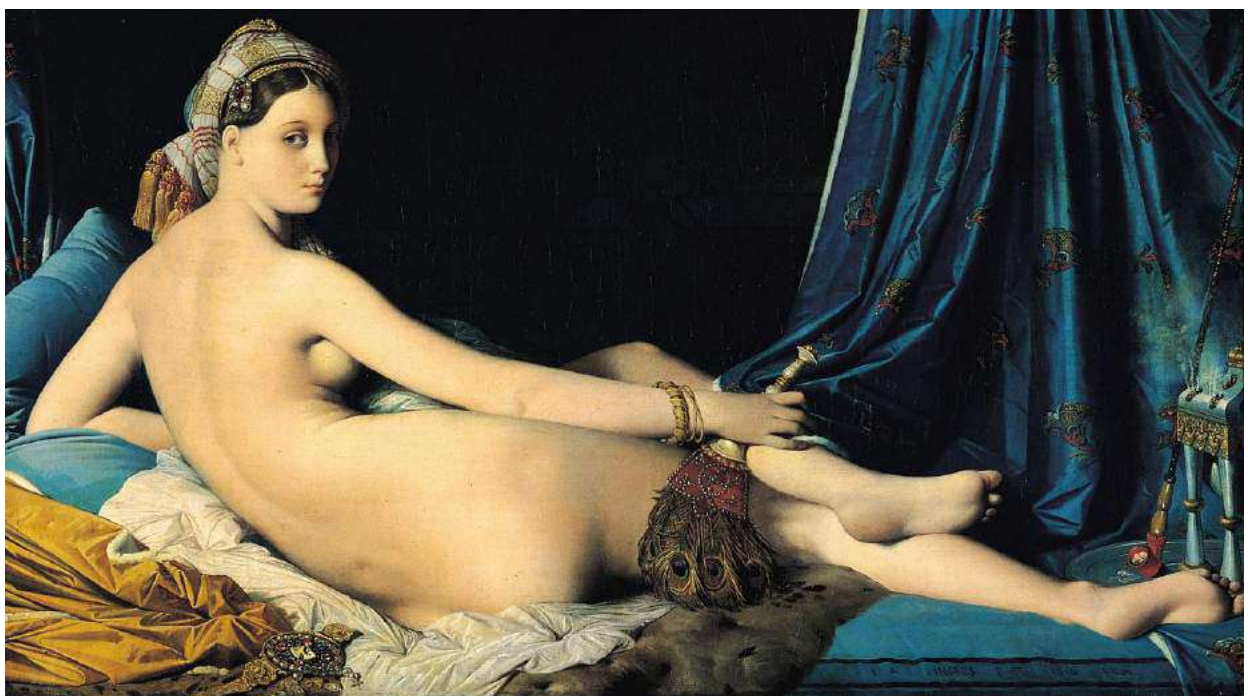


Figure 115.

La Grande Odalisque; Jean-Auguste-Dominique Ingres; 1814



Figure 116.

L'Apparition; Gustave Moreau; 1876

an inspiration for the intricate background of “L’Apparition” (Figure 116), the 1875 watercolor by Gustave Moreau, while it must be noted that Maurice Denis had the opportunity to visit the monument.

The Orientalist trope of the odalisque was met with great favor by turn-of-the-century Western society and continued to be employed during the early decades of the XX century. Most famously, Henri Matisse dedicated a series of paintings to the theme, inspired by his 1910 visit to the Alhambra, where he was fascinated by the geometrical plaster works, the ceramic tiles and the brilliant light filtering through the lattice screens. Indeed, in the paintings dedicated to the odalisques (Figure 117), Matisse carefully delineates the environment, including

elements from his trips to the South of Spain, to Morocco and Algeria, both in terms of decoration and of the relaxed atmosphere pervading the scenes.¹⁵⁰

¹⁵⁰ (Villafranca, Jarauta, Schneider, Monod-Fontaine, & Labrusse, 2010)

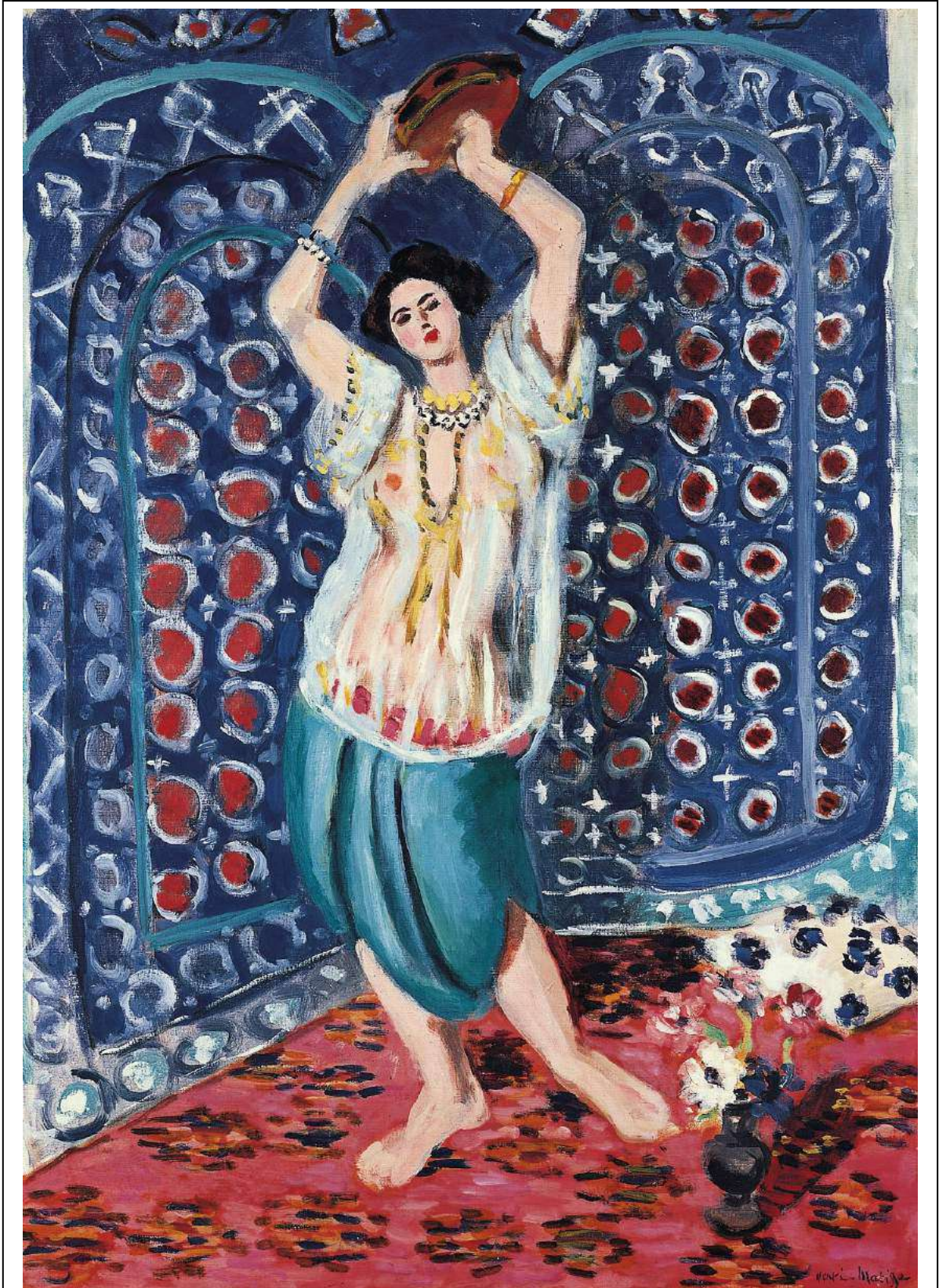


Figure 117.

Odalisque au tambour; Henri Matisse; 1926

10.4. Between introspection and Impressionism

Between the final years of the XIX century and the beginning of the XX, several artists progressively distanced themselves from so-called academic painting, opting instead to experiment with themes and techniques that would later become full-fledged currents. During this transitional period, the Alhambra maintained a prominent role, especially thanks to its versatility as a subject: the Moorish past that fascinated Orientalists allowed those who would later be called Symbolist to explore mystical topics, the ruinous state of the building and its underprivileged residents constituted an element of realism that would appeal to proponents of Naturalism, while the southern light and water feature would become excellent Impressionist focal points. With regards to this latter style, two painters, while not entirely encompassed by the definition, represent a remarkable anticipation:



Figure 118.

Patio de Comares; Santiago Rusiñol; 1895

Santiago Rusiñol i Prats, an artist and writer from Catalunya, and John Singer Sargent, who contributed to influencing American culture with Orientalist elements.

After initially visiting the city in 1887, during the years 1895 and 1897 Santiago Rusiñol i Prats moved for several months to Granada, where he dedicated a vast series of canvases to various types of gardens and courtyards known as the *carmenes*. The works reflect his Parisian experiences of Symbolism and, more importantly, painting *en plein air*. His landscapes veer towards Impressionist themes and techniques, as he concentrated on capturing the play of light and water, especially visible in artworks such as his 1895 depiction of the Patio de Comares (Figure 118). In the oil on canvas, Rusiñol lowers the traditional focal point, even cutting off the upper part of the central archway of the gallery, which the observer can only see reflected in the great rectangular alberca. This subject occupies most of the composition, while on the foreground the canal of the small round fountain highlights the slanted perspective and leads the eye towards the main pool.

A similar unexpected point of view can be appreciated in the 1898 painting titled “Generalife” (Figure 119), in which the canvas is divided in three areas. The lower half of the painting is dedicated to one of the courtyards of the titular palace, in which the ordered and lush vegetation harmonizes with architectural elements such as the round fountain in the lower left and the arches along the right-hand wall. These open onto the panoramic view of the urban nucleus, detailed in the upper right through a series of white buildings interspersed by trees, while the vega extends in the distance. The final third of the painting, in the upper left, is occupied by the Nasrid palaces, well defined as their characteristic reddish color differentiates them from the rest of the environment. From this perspective, the Torre de Comares is the most notable landmark, while the remaining areas hide among the vegetation and other buildings.

The painting also underlines the growing sense of melancholy that marked the artist’s later pieces, more and more focused on intimate, quiet courtyards populated by cypresses. In fact, Rusiñol’s durable bond with Granada, consolidated with two additional trips in 1909 and 1922, determined the creation of a corpus of both pictorial and literary works in which the garden, considered as “landscape written in verses”, becomes a metaphor for reflection and introspection, a vision built on his experiences in the Generalife.¹⁵¹

¹⁵¹ (Prats, 1945), (Fontbona, 1999), (Laplana, 1999)



Figure 119.

Generalife; Santiago Rusiñol; 1898

While sometimes dissimilar with the regards to the nostalgic atmosphere, an analogous technique can be noticed in the work of American painter John Singer Sargent, who visited Granada at least four times, namely in 1867, when he was a young child, in 1879, 1902 and 1912. While he was best known for his portraits, during his travels the artists would often concentrate on quick landscapes depicted in watercolors.

In 1879, the then 23-year-old artist's visit to the Alhambra, where he stopped for several weeks, constituted the start of a series of representations dedicated to the monumental complex, some focused on perspective and spatial relations (Figure 120), while other bright, illusionistic paintings, represented Moorish Spain in a style that, while borrowing from Orientalist tradition, offered some previews of Impressionism. Working with both oils and watercolors, Sargent depicted the most

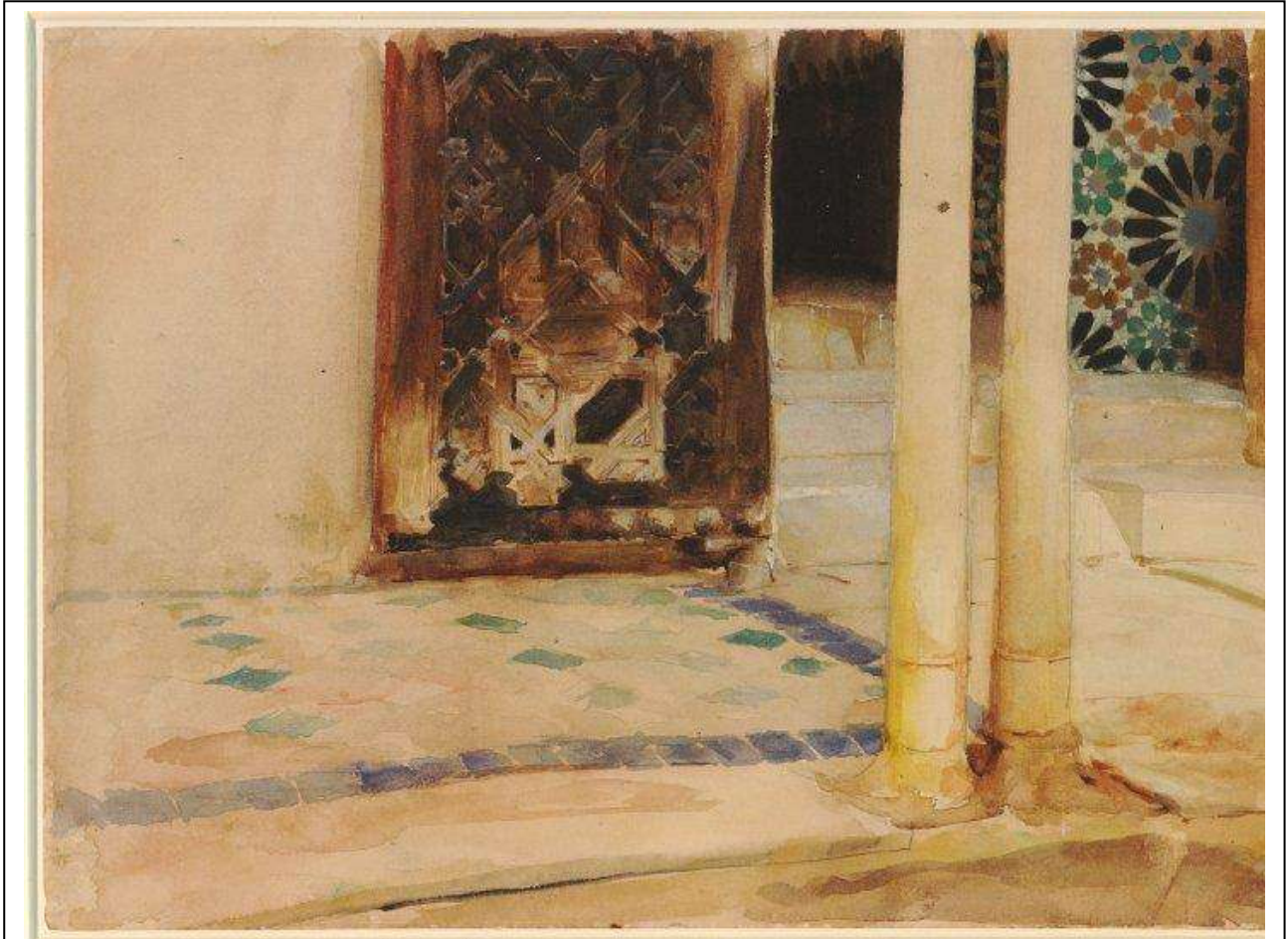


Figure 120.

Patio de los Leones; John Singer Sargent; 1879

significant areas of the Alhambra, such as the Patio de Comares (Figure 121) and the Patio de los Leones (Figure 122Figure 121). His passion for the monument is also demonstrated by a collection of photographs and postcards, compiled between 1874 and 1880.

Thanks to the influence of a number of successful exhibitions by Sargent and his fellow countrymen Frederic Edwin Church, Edwin Lord Weeks and Harry Humphrey Moore, the artists contributed greatly to disseminating the image of the monumental complex across the Atlantic, thus affecting the creation of a demand for Moorish-inspired architecture in the United States. This fascination expanded to decorative arts and design, which included pieces inspired by Alhambra vases, the subject of a watercolor (Figure 123) John Singer Sargent painted in 1870. The painting offers an

accurate although sketched representation of the vase, highlighting the gazelles decorating its front and concentrating of properly capturing the light of the glazed surface.¹⁵²

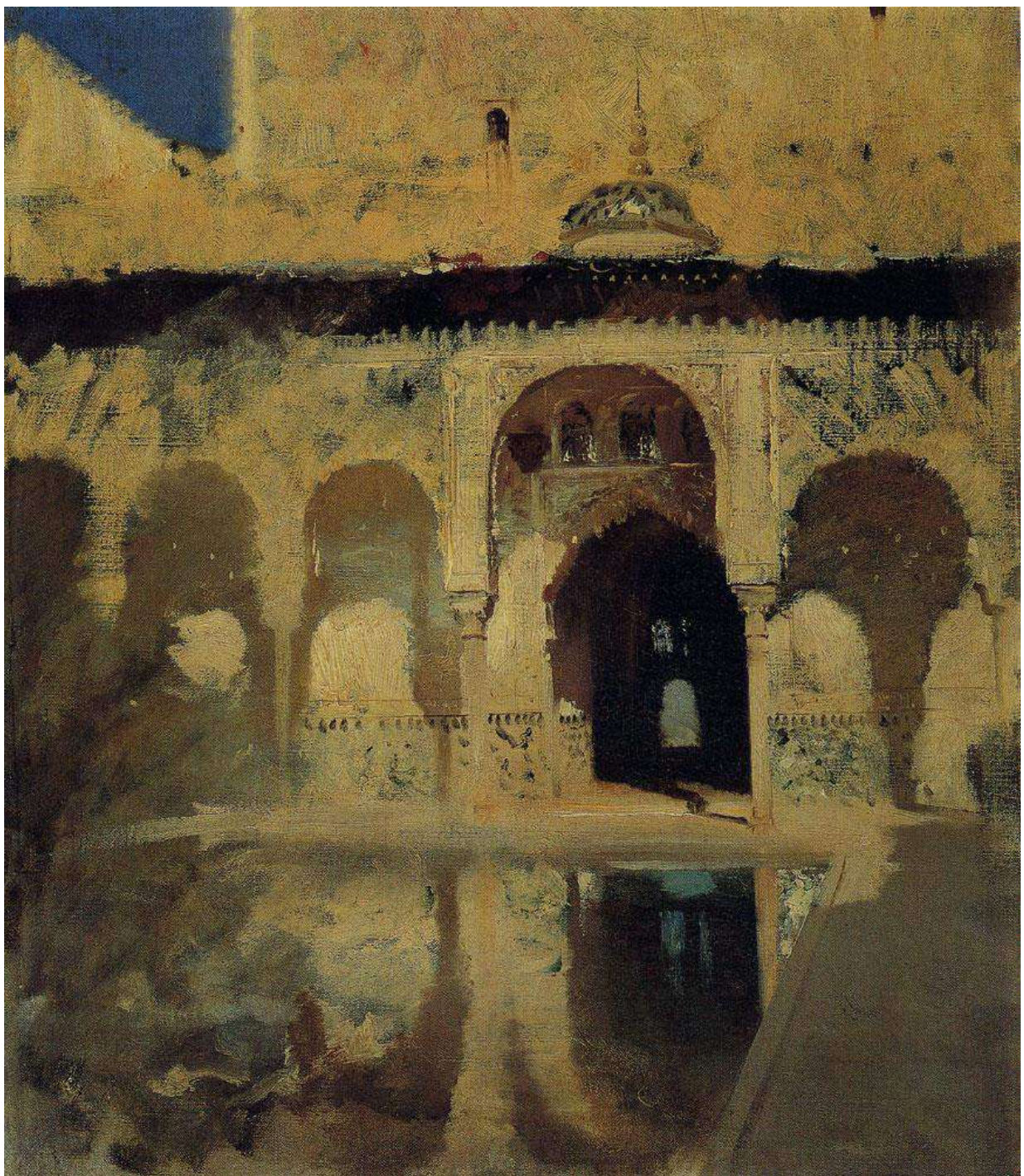


Figure 121.

Patio de Comares; John Singer Sargent; 1879

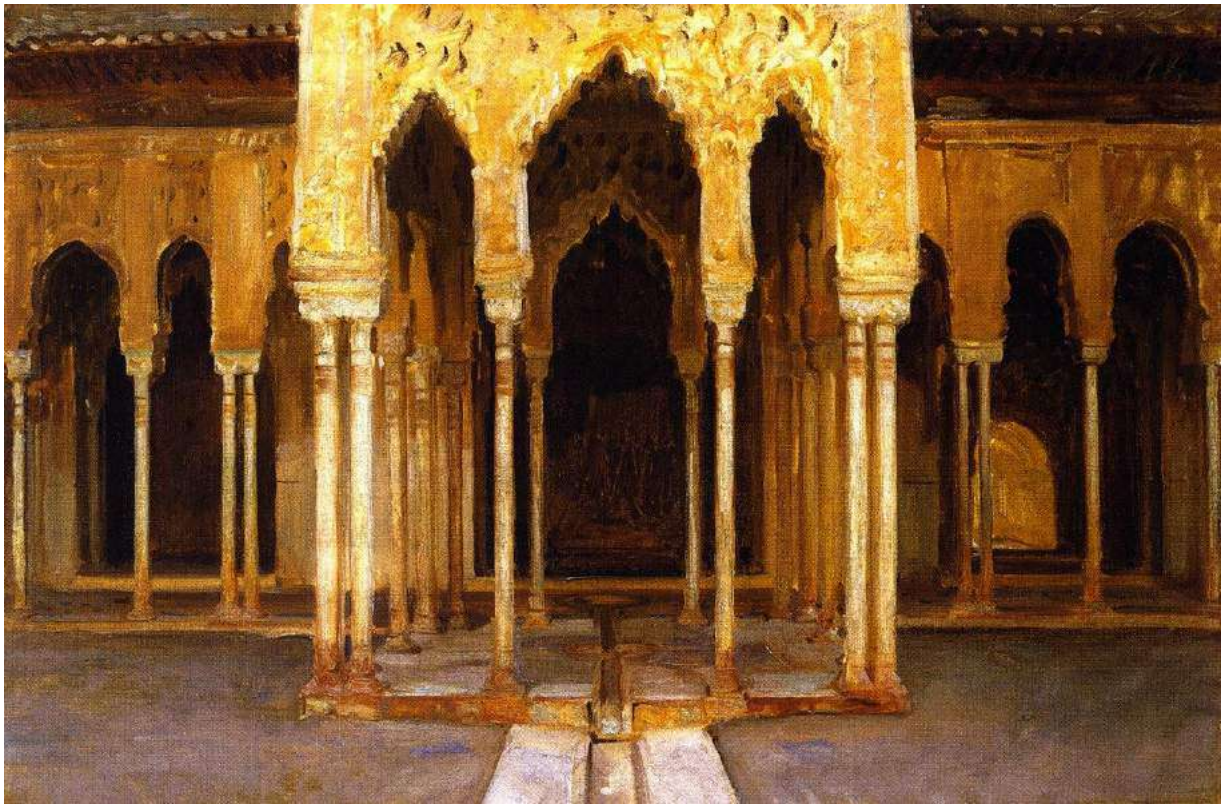


Figure 122.

Patio de los Leones; John Singer Sargent; 1895

¹⁵² (Herdrich & Weinberg, 2000) , (Wickham Curran, 1926) (Humphrey, 2019)



Figure 123.

Alhambra vase; John Singer Sargent; 1870

11. XX century interpretations of the Alhambra

During the XX century, the Alhambra underwent a number of transformations, which concluded its journey from abandoned ruin to world-famous monument, while continuing to exert a powerful fascination on artists.

In 1905 the Comisión Especial de Conservación y Restauración de la Alhambra was constituted in order to regulate the restoration of the monument, guided by Modesto Cendoya y Busquets since 1907. The architect's work included decorative additions in line with those of his predecessors, as testified by the dome applied to the Patio de Comares and by the smaller towers at the sides of the Torre de Comares, added by. Cendoya also highlighted the military aspect of the Alhambra, eliminating several trees and restoring the fortifications, and worked on the hydric system of the palatial complex,

In the same years, tourism became more regulated as the complex, already a national monument, introduced in 1909 more structured entry policies, which included various durations and access to different areas. In 1914 the first Patronato de la Alhambra was funded, while in 1921 the Generalife became part of the public heritage as well, albeit under a different Commission, the Patronato del Generalife.

In 1923 Leopoldo Torres Balbás, architectural curator of the Alhambra until 1936, adopted a radically different approach, basing the restorations on scientific principles and emphasizing the original aspect of the monument as a Nasrid palace. The architect managed to obtain a chronology of the Alhambra, correctly identifying the stratigraphy of its transformations throughout the centuries. Moreover, he distanced himself from Orientalist tendencies and avoided integrating modern elements into the original building.¹⁵³

The tragic chain of events started with the Spanish Civil War and culminating in World War II temporarily halted the study and restoration of the Alhambra during the central decades of the XX century, allowing a slow reprise during the 1960s.

Between 1965 and 1966, the demolition of the archway hiding the Cuarto Dorado and the removal of the additions to the Patio de los Leones finally returned two iconic courtyards of the Alhambra to

¹⁵³ (Eggleton, 2012), (Torres Bálbas, 1953), (Vílchez Vílchez, La Alhambra de Leopoldo Torres Balbás (Obras de Restauración y Conservación. 1923-1936), 1988)

their original aspect. In the same years, the journal “Cuadernos de la Alhambra” was founded, thus offering scholars an instrument of dialogue for all the aspects concerning the monument, as well as publishing archival materials. Gradually, academic research regarding the Alhambra transformed into a general interest in Islamic Spain, leading to a better understanding of the context in which the Nasrid palatial complex had developed.

Finally, in 1984, the uniqueness of the Alhambra was recognized by the UNESCO, which included the monument in the World Heritage list, consecrating it as the definite emblem of al-Andalus.

During the XX century, the image of the monument, already famous thanks to the depictions and descriptions of the previous centuries, was reinterpreted and used as an inspiration for a remarkable and surprising variety of declinations.

From an architectural point of view, the Alhambra represented the most famous point of reference for the Moorish Revival style which, as mentioned, had become a highly popular trend in Europe and in the Americas since the mid-XIX century, with lasting effects on Art Nouveau and Art Deco. Indeed, the style was used in 1910 for the Spanish pavilion of the Universal Exposition in Brussels.

The influence of the monumental complex, however, was not limited to the Orientalist themes it evoked: indeed, its variety allowed it to represent an unending source of inspiration for several exponents of the different artistic currents that became prominent during the XX century. Nevertheless, such influence became more punctual, as it was often confined to single artists rather than entire styles. Therefore, rather than attempting an exhaustive systematization of such a fragmentary landscape, the following paragraphs offer an analysis of the most notable examples of such development.

11.1. Sorolla’s Impressionist Alhambra

More than any of his contemporaries, Spanish painter Joaquín Sorolla encapsulates the transition of the turn of the century with regards to the representations of the Alhambra. In fact, between the end of the XIX century and the beginning of the XX, a few key innovations such as photography and premixed paints in tin tubes, often incorporating vivid synthetic pigments, were developed, leading to new artistic practices: while the mimetic ability of photography drove painters away from their previous efforts to imitate reality, premixed colors freed them of the constraints of the studio. As artists embraced painting en plein air, new subjects were approached and well-known ones were interpreted with different techniques and styles. Such is the context in which Sorolla’s artwork

developed: the influence of French impressionism can be detected in his fascination with light and water, as well as in the fundamental desire to capture on the canvas the fleeting essence of the subject.

Between 2012 and 2013, the exhibition “Sorolla. Jardines de luz”,¹⁵⁴ held at the Gallerie d'Arte Moderna e Contemporanea in Ferrara (Italy), at the Museo de Bellas Artes del Palacio Carlos V of Granada and the Museo Sorolla in Madrid, presented a number of works by the artist: the corresponding catalogue, therefore, constitutes one of the most complete collections of Sorolla’s depictions of the Alhambra.

In the spring 1902, the artist traveled to Granada for the first time, returning in the winters of 1909, 1910 and 1917. Julio Quesada Cañaveral, Duke of San Pedro de Galatino, rapidly became the



Figure 124.

View of the Alhambra and the Sierra Nevada; Joaquín Sorolla; 1920

¹⁵⁴ (Pons-Sorolla, Llorens, Villafranca, Luengo, & Ruiz, 2012)

Sorolla's patron while he produced over forty views of the city, mostly dedicated to the Sierra Nevada and to the Alhambra. His presence is marked in the logbook of artists and photographers, still guarded in the Archive of the monument, and in a 1909 oil painting by Tomás Murillo.

In the letters to his wife Clotilde and in the local papers interested in his presence in the city, Sorolla describes Granada in its duality, composed of sublime greatness and intimate details, and perfectly represented in his choice of themes, the imposing Sierra Nevada (Figure 124 **Errore. L'origine riferimento non è stata trovata.**) and the delicate courtyards of the Alhambra. The Jardín de los Adarves (Figure 125), in the Alcazaba, the Cuarto Dorado (Figure 126), the Patio de Comares in the Nasrid Palaces, as well as the Patio de Lindaraja (Figure 127) and the Patio de la Reja, became some of the areas most appreciated and illustrated by Sorolla. These subjects provide a source of interest for the artist due to the key role played by light in shaping them: the architecture and the gardens of the monumental complex, in particular, offer countless variation of the interaction between the glow



Figure 125.

Jardín de los Adarves; Joaquín Sorolla; 1919

of the Andalusian sun and the reflections in the pools and fountains, while the vegetation and polychrome tiles add an element of bright color.

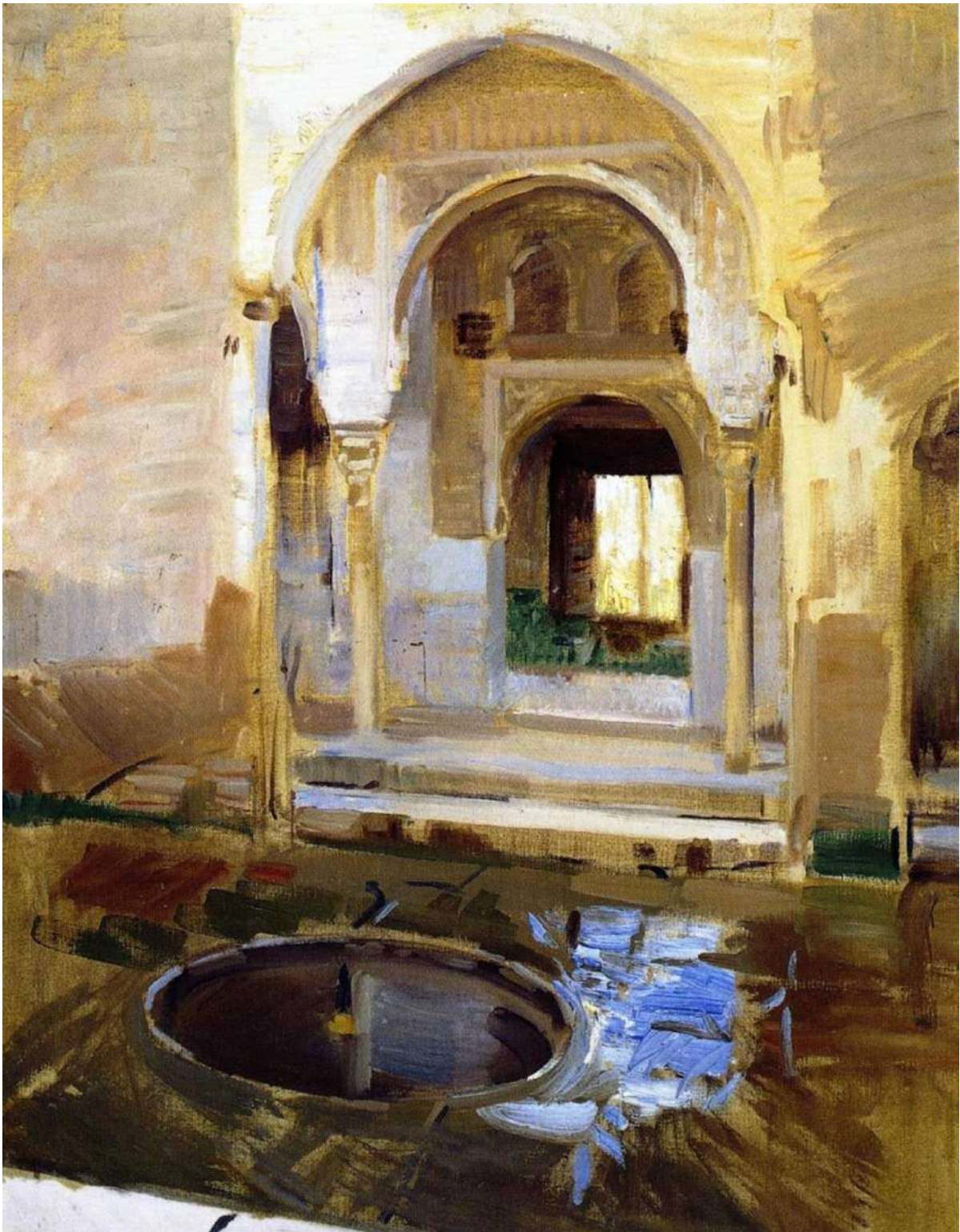


Figure 126.

Cuarto Dorado; Joaquín Sorolla; 1909

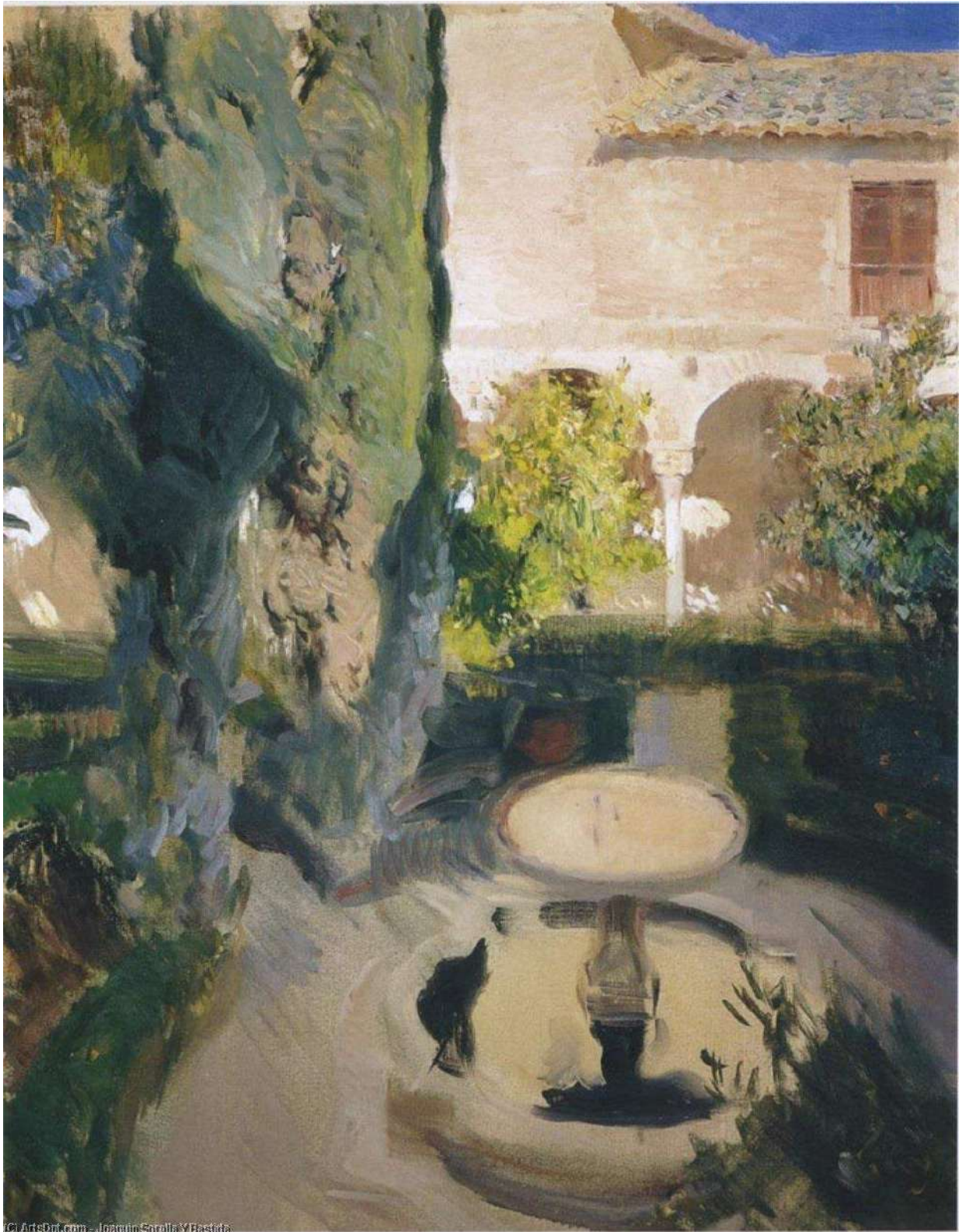


Figure 127.

Jardín de Lindaraja; Joaquín Sorolla; 1909

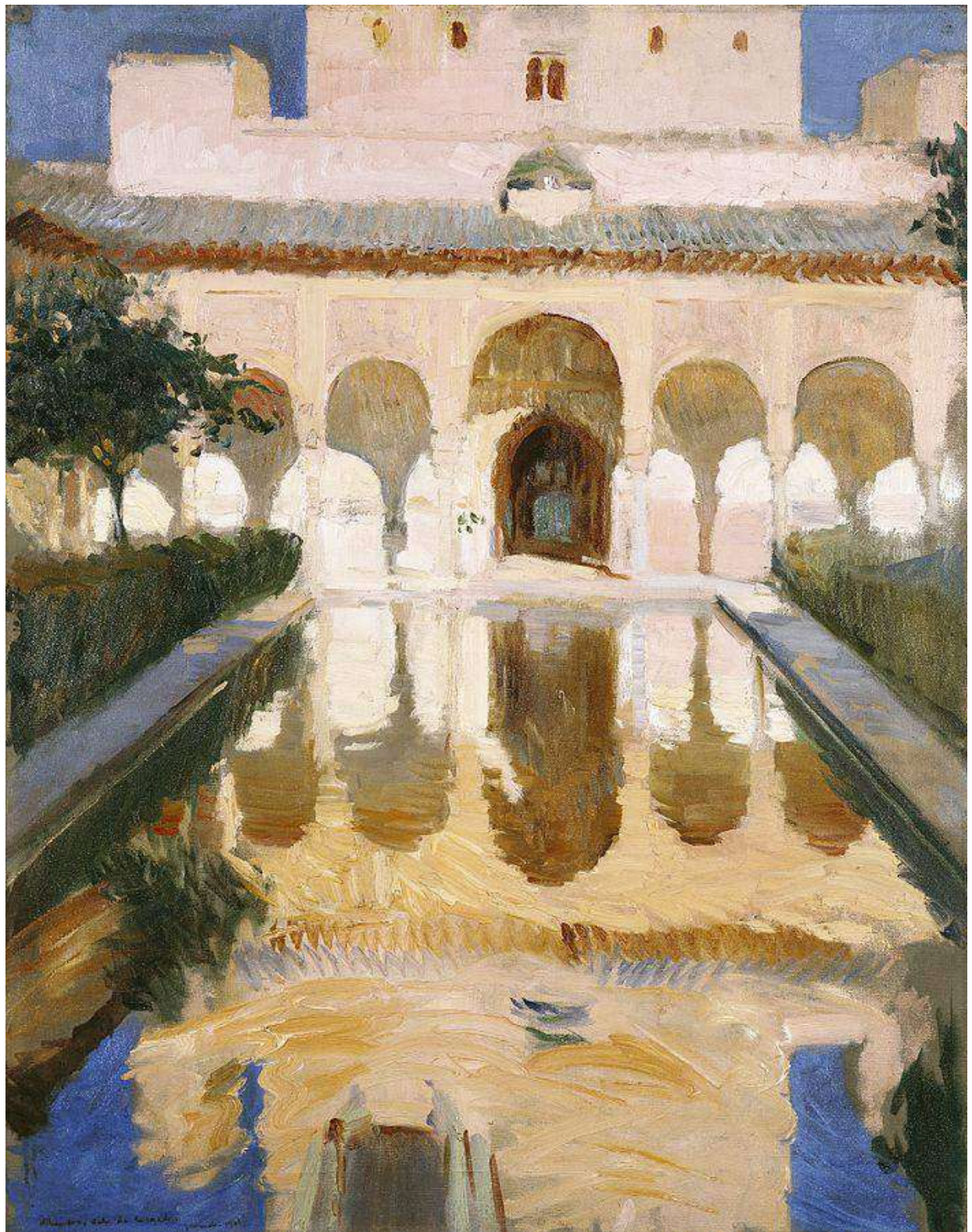


Figure 128.

Sala de Embajadores, Alhambra, Granada; Joaquín Sorolla; 1909

One of the views from Sorolla's visit in 1909, titled "Sala de Embajadores, Alhambra, Granada" (Figure 128), concentrates on the northern side of the Patio de Comares. The representation shows a perspective of the courtyard as seen from the opposite side of the rectangular pool: the Torre de Comares is only partially depicted, as the composition centers on the gallery, the biggest arch of which is highlighted by a small, tiled dome. The leftmost arch, instead, is hidden behind a tree, which breaks the symmetry of the image. The architectural and natural elements are reflected in the water, masterfully depicted by the artist as the ripples from the fountain closer to the point of view spread and, lessening the distortion as the eye reaches the northern side.

The same subject recurs in a later artwork, titled "Patio de la Alberca, Alhambra, Granada" (Figure 129), painted in February of 1917. Once again, a mostly symmetrical composition shows the lower colonnade of the northern side across the decorative pool, albeit in a horizontal frame. Similarly to the earlier image, the clear winter light is showcased by brilliant colors and definite shadows cast by

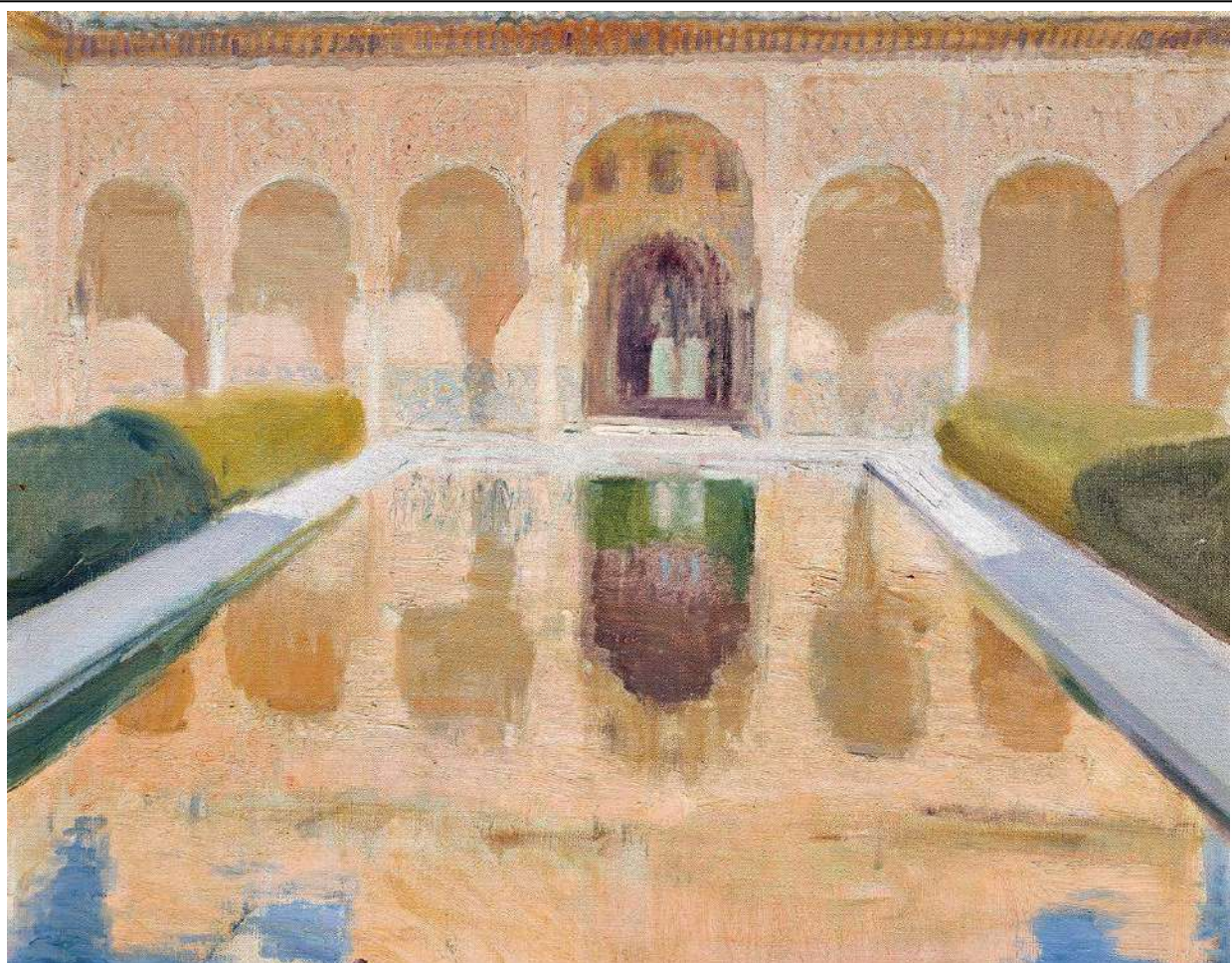


Figure 129.

Patio de la Alberca, Alhambra, Granada; Joaquín Sorolla; 1917

the arches of the gallery, while the central one frames a darker area with a bifora, the Salón de los Embajadores. The painting focuses on the architecture as much as it centers on its reflection: indeed, the elongated pool allows the artist to depict even more of the Torre de Comares, of which the small side towers appear upside down in the water, flanking the base of the central bastion. The mirror image is completed by a touch of bright blue sky which, together with the green bushes of the courtyard, livens the ivory tones of the palace. Compared to the previous depiction, the image from 1917 no longer shows the dome on the central arch, nor the tree among the myrtle shrubs.

Sorolla's depictions of the courtyards and gardens of the Alhambra easily parallel Claude Monet's artwork, not only because of the Impressionist style both painters adopt, but for their choice of themes as well. Like the French artist, Sorolla focuses on nature and its relationship with humankind, as exemplified by the interplay between artificial and environmental elements in the paintings mentioned above. Moreover, his use of brilliant, unadulterated colors proves instrumental to properly capture the nuanced and ethereal essence of those that are Sorolla's true subjects: light and water.

11.2. Escher's tessellations

In October 1922, while travelling throughout Spain and Italy, Dutch graphic artist Maurits Cornelis Escher visited the Alhambra, which he described as a sublime and aristocratic work of art. Unlike most, however, the engraver was not enticed by the Orientalist fantasy of the monument, further highlighted by the recent restorations; rather, the aspect that most fascinated him were the majolica tiles.

Attracted by the complex geometry of their regular patterns, he reproduced some of them in his sketches (Figure 130, Figure 132, Figure 131, Figure 134 and Figure 133), such as those of the Mexuar, in order to analyze the basic principles of their creation and organization. In this initial phase, his approach was similar to



Figure 130.
Patterns from the Alhambra; Maurits Cornelis
Escher; 1936

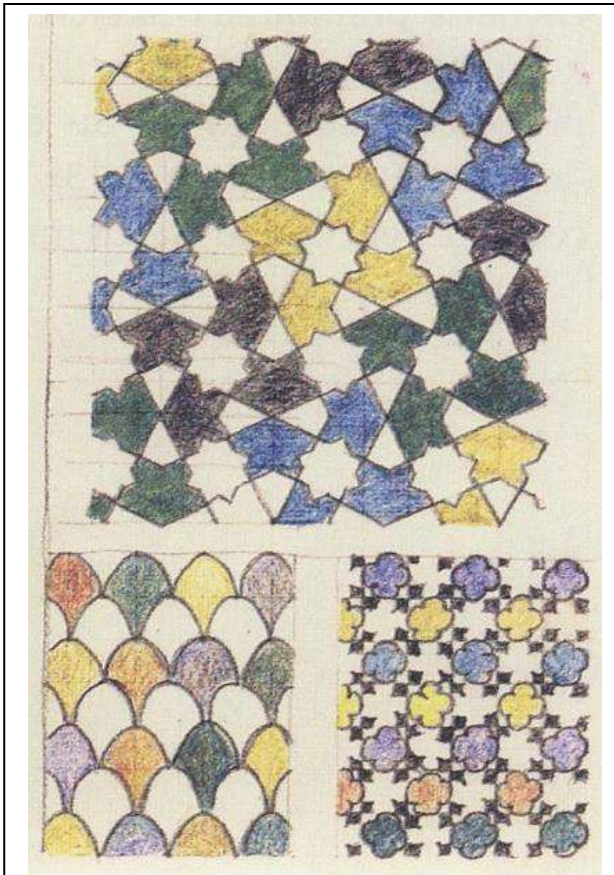


Figure 132.

Patterns from the Alhambra; Maurits Cornelis

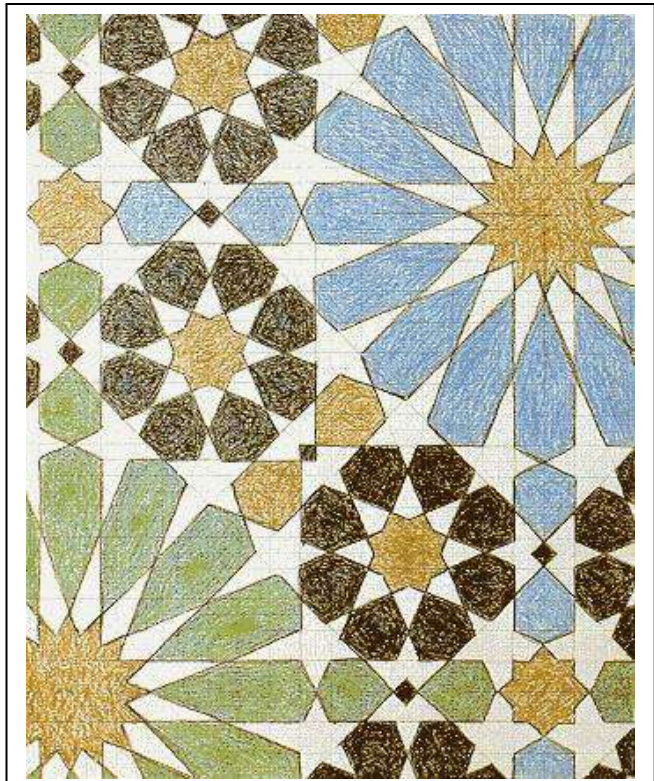


Figure 131.

Pattern from the Alhambra; Maurits Cornelis

that of Jones and Goury, aiming to catalogue the decorations he encountered. In his writings,

Escher notes how the Islamic artists had become masters of dividing the plane and how such work had been meticulously applied to several areas of the Alhambra. These motifs left a lasting impression and became a fundamental characteristic of Escher's artwork, so much so that he declared himself in love with this geometric problem. Through synthesis and abstraction, the application of the rules he derived allowed the engraver to develop his own periodic mosaics, characterized by regular motifs that could often be interpreted as animals and other natural shapes.

Escher returned to the Alhambra in late May in 1936: he and his wife spent three days carefully sketching and coloring a number of the ceramic tile patterns, a systematic activity which would determine a change in the artist's work.

While until then his artwork focused on naturalistic elements, Escher transitioned to subjects that would be found in his imagination, creating so-called mindscapes. The study of the Alhambra sketches allowed him to note profound geometric relationships among the interlocking tiles, which

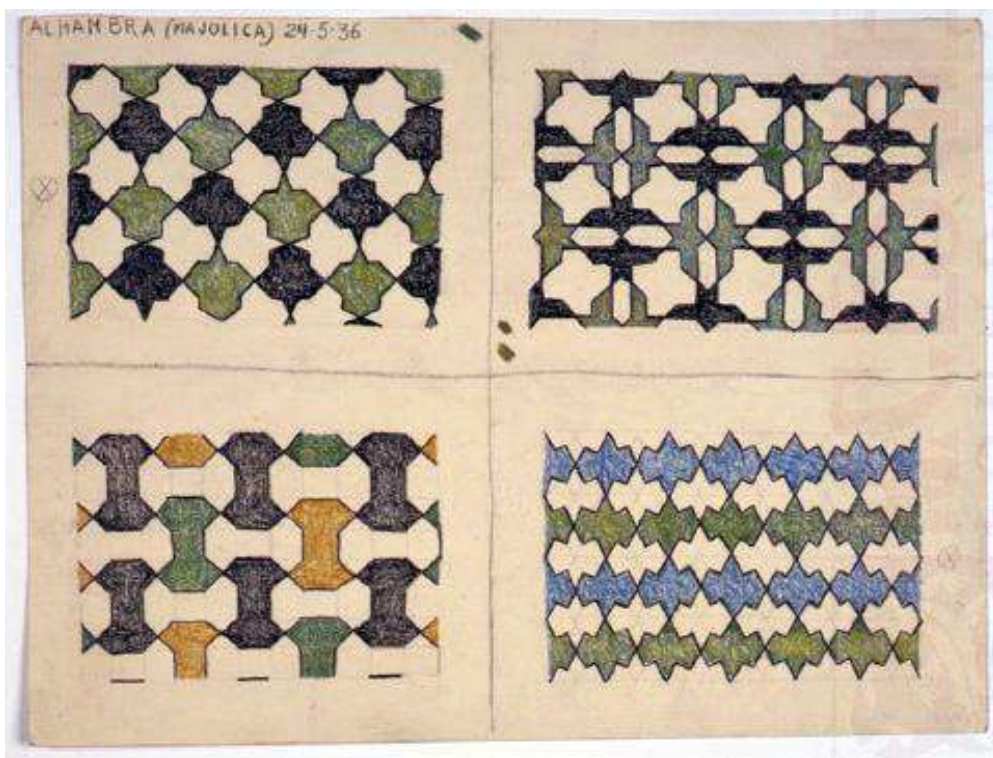


Figure 134.

Patterns from the Alhambra; Maurits Cornelis Escher; 1936

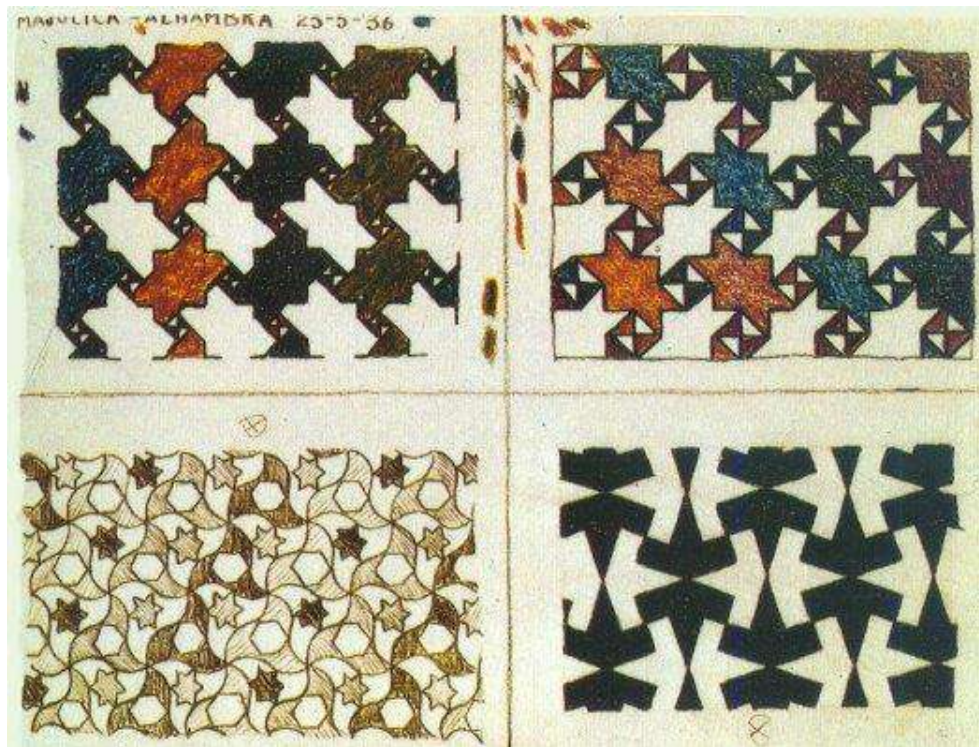


Figure 133.

Patterns from the Alhambra; Maurits Cornelis Escher; 1936

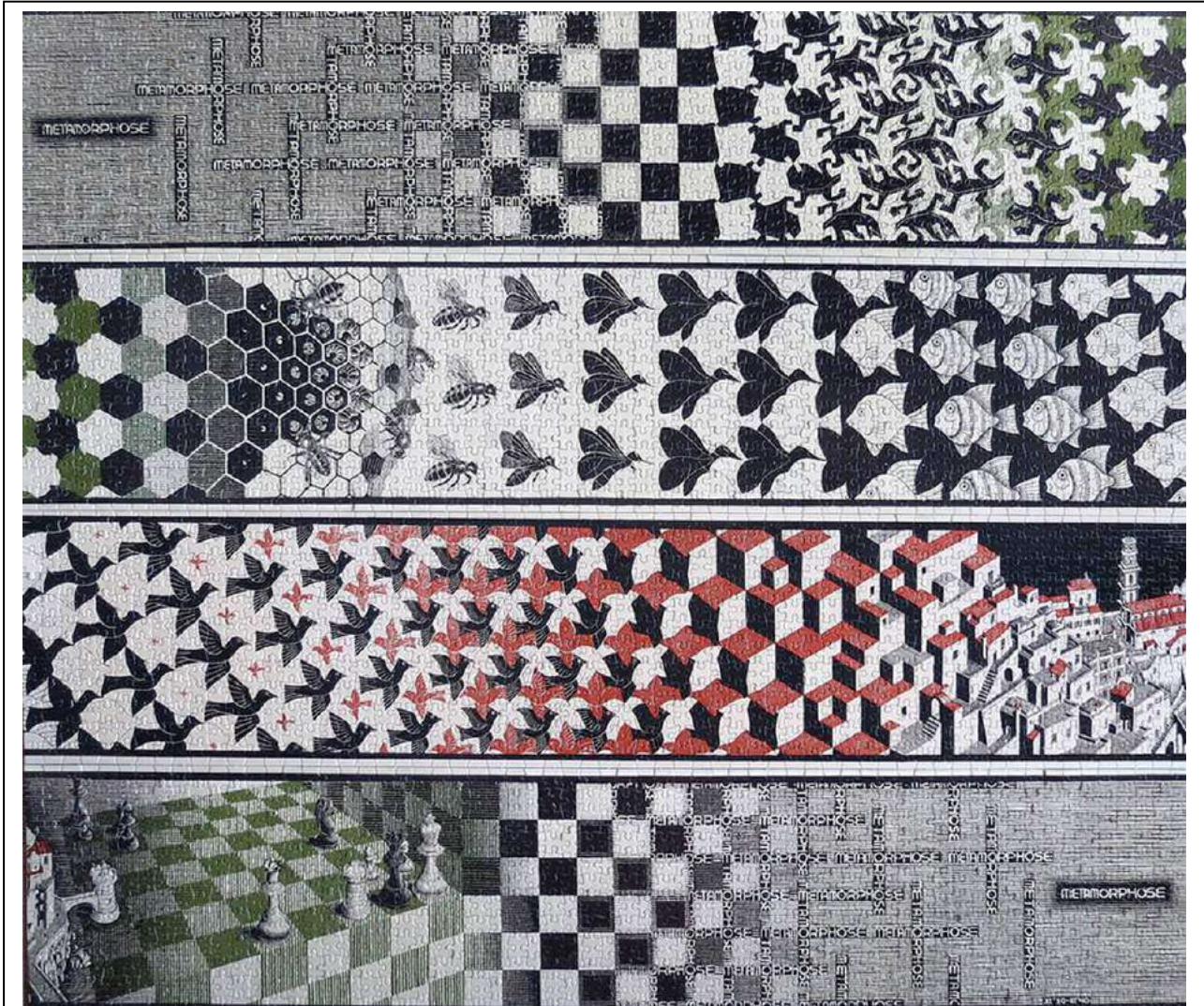
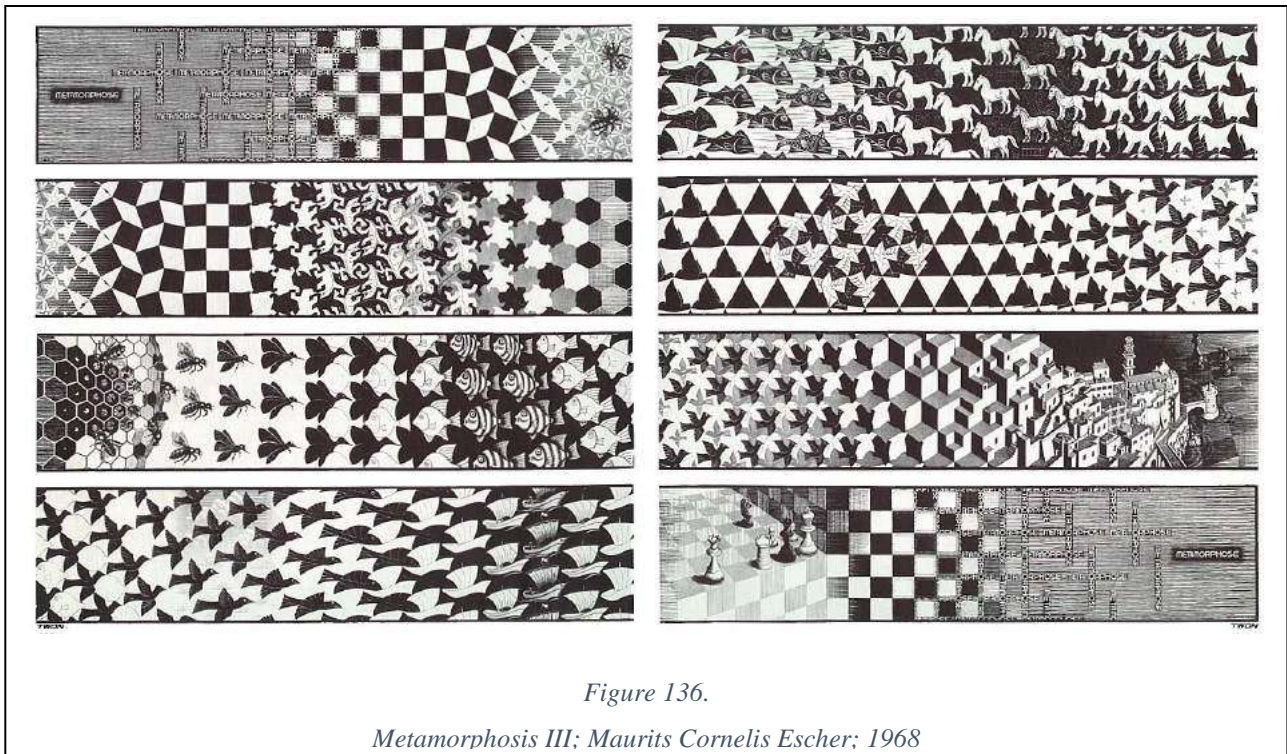


Figure 135.

Metamorphosis II; Maurits Cornelis Escher; 1968

calligraphy interlocked and converted into natural elements, led him to the panels of the “Metamorphosis” (Figure 135 and Figure 136) series, in which the shape of the motif gradually changes, transforming into a series of different subjects. In these artworks, Escher describes continuity as constant infinitesimal changes and approaches a new subject: infinity and its geometrical representations, such as Moebius strips, knots, spirals and fractals.

Once more, Escher’s visit to the Alhambra proved essential to his artistic research, as he noted in a 1941 article appeared on the magazine “De Delver”.



The exhibition “M.C. Escher. Universos Infinitos”,¹⁵⁵ held in Granada at the Parque de las Ciencias and at the Alhambra between 2011 and 2012, presented a number of works by the artist, highlighting the relation with the Islamic monument, and its catalogue provides a fundamental bibliographical resource for exploring such connection.

Escher’s regular plane-fillings, or tessellations, divide a surface into polygons arranged in a precise pattern, a mathematical concept showcased in the ceramic decorations of the Alhambra and a tool to investigate isometry, congruence-preserving transformations and the seventeen plane symmetry groups. Indeed, the relationship between the monumental complex and such geometrical concepts was explored in “Application of Group Theory and Structural Analysis to the Moorish Adornments of the Alhambra in Granada” by mathematician Edith Alice Müller, whom Escher met in order to discuss the topic.¹⁵⁶

The artist’s works maintain a ludic aspect, a desire to play with shapes, to break them down to their essential parts and piece them together again in new ways in order to create fantastical scenes and landscapes unbound by the limits of reality. At the same time, his prints are an enthusiast’s

¹⁵⁵ (Villafranca, Ferrater, Santos, & Ferrater, 2011)

¹⁵⁶ (Schattschneider, 2009)

interpretations of scientific phenomena, a proposed visualization of mathematical laws such as those governing curved spaces.¹⁵⁷

11.3. Towards Abstractionism

During the second half of the XX century, some painters found in the Alhambra as a source of inspiration by concentrating mainly on its peculiar light. While this aspect had already been touched upon by a number of previous artists, most notably Sorolla, the rediscovery lead towards embracing a novel, near-abstract approach to the monumental subject, reducing it to essential shapes defined by the interplay of luminous and shaded areas. Such vision, possible thanks to the influence of the avant-garde art movements, was interlinked with a search for the absolute, for an extreme synthesis that, through opposite mechanisms, managed to elicit sensations similar to the Romantic sublime.

A primary example of such novel tendency is represented by the artworks of José Guerrero, Miguel Rodríguez-Acosta Carlström, Joan Hernandez Pijuan, Manuel Ángeles Ortiz, Sean Scully and Soledad Sevilla.



Figure 137.
Solitarios; José Guerrero; 1972

¹⁵⁷ (Ferrater & Santos, 2012)



Figure 139.
Penitentes rojos; José Guerrero; 1972



Figure 138.
Alcazaba; José Guerrero; 1973

José Guerrero, born in Granada, dedicated part of his earlier paintings to the city and therefore to the Alhambra, inspired by painters such as Fortuny, Rusiñol, Sargent and Sorolla. The 1932 watercolor “Escalera del agua” depicts one of the staircases to the Generalife, but the artist would soon abandon such figurative style in favor of a more synthetic approach marked by vivid colors, initially reminiscent of Paul Klee and Henri Matisse, which then morphed into action painting and abstract Expressionism thanks to his experiences in Paris, Rome, London and New York.

Despite this departure from mimesis, Guerrero maintained a connection to the Alhambra, one of his great sources of inspiration, by the frequent employment of an architectural and decorative feature which connotes the monument, namely the arches (Figure 137, Figure 139 and Figure 138), occasionally reflected as though in the great alberca. The relationship with the Alhambra is also marked by a series of notable photographs by Francisco Fernández in which the artist is portrayed in the Patio de Comares (Figure 140) and in the gardens of the Generalife. His work, similarly to that of other contemporary Spanish artists, greatly contributed to renewing the image of the Alhambra, offering novel interpretations of the monumental complex.¹⁵⁸

¹⁵⁸ (Vallejo Delgado, López-Vílchez, Medina Flórez, & Martín-Vivaldi Caballero, 2014)

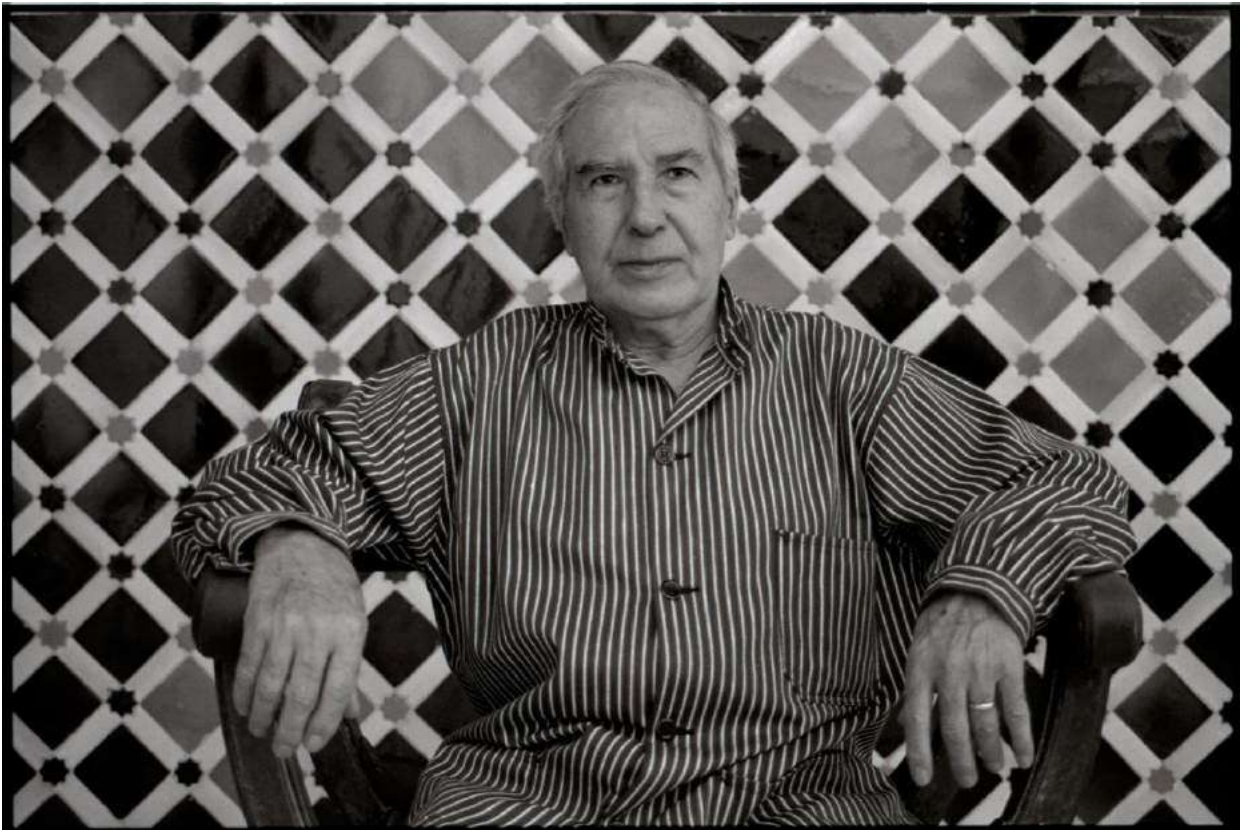


Figure 140.

José Guerrero in the Patio de Comares; Francisco Fernández; 1989

Miguel Rodríguez-Acosta Carlström was born in 1927 in Granada, where he received his education and where he centered most of his work, tightly connected with the Andalusian landscapes and with the city's most prominent monument.

The artist created a number of canvases (Figure 141, Figure 142 and Figure 143) in which the juxtaposition of color is the only focus, offering essential geometrical compositions. In such abstractions, however, an echo of the original subject, the Alhambra, still resonates, as the chromatic elements remind viewers of how the light reflects on the pools of the courtyards, how it hits the ceramic tiles and plaster ornaments decorating the walls, how it filters through the lattice screens.

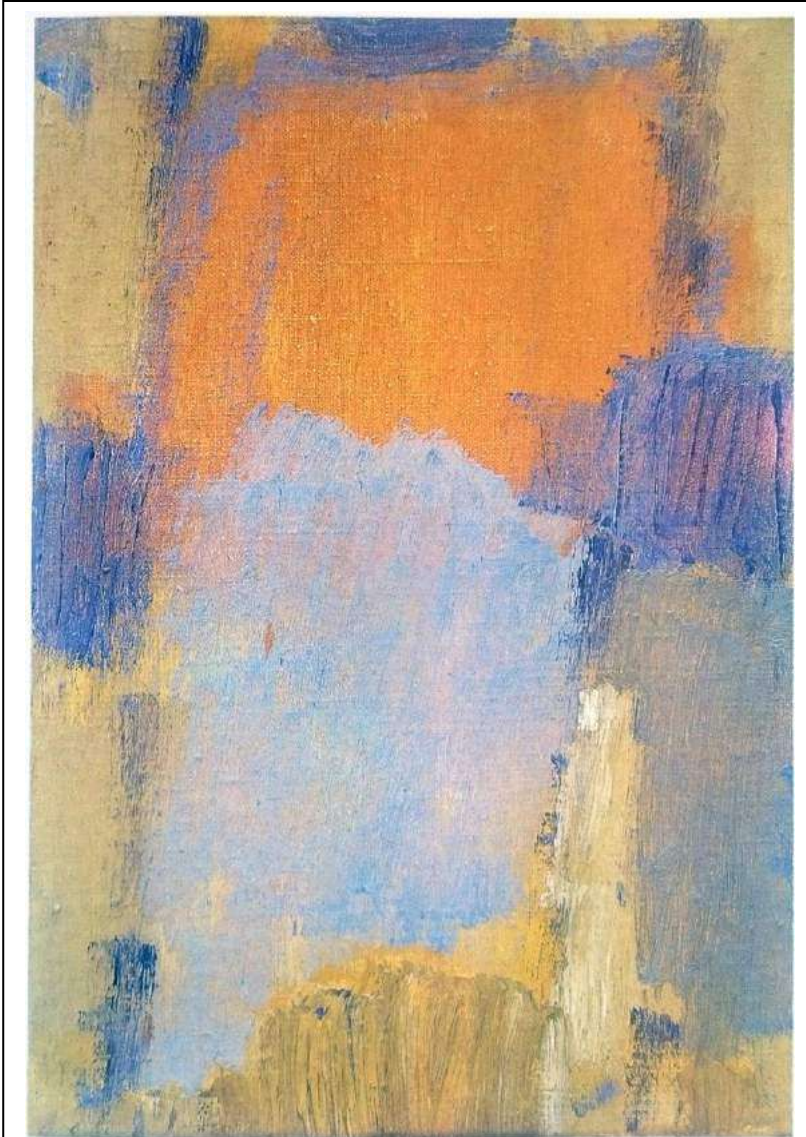


Figure 141.

Sendero de Luz; Rodríguez-Acosta Carlström; 1994

The organic shapes of the brushstrokes, coupled with the dense, nearly tactile texture of the paint, allow observers to experience the pulsating light which permeates both the Nasrid palace and Rodríguez-Acosta's canvases. Analogously, the brilliant oil colors add to such radiance and easily convey the sensations of the pleasures of the Alhambra, conveying the warmth of the southern sun, the fresh murmur of water, the fragrance of the flowering gardens.¹⁵⁹

The relation with the Nasrid palace is best highlighted by the publication "The Alhambra: Cuaderno de dibujos",¹⁶⁰ in which the artist approaches the study of the monument in a more figurative and systematic way, recording his impressions of the subject. The book

opens with views from the Albaicín (Figure 144 and Figure 145), as well as from the western and southern sides, in which only the graphite outlines the vegetation, the towers of the fortress and the background of the Sierra. As the artist enters the perimeter of the palatial city, color starts to seep into the drawings, starting with the earth tones of the Puerta de Justicia (Figure 144) and progressing to the pastels of the courtyards. Here, the already tremulous trace is further agitated to depict the ripples

¹⁵⁹ (Gállego & Nieva, 1995)

¹⁶⁰ (Rodríguez Acosta, 2007)



Figure 142.

Alberca presentida; Rodríguez-Acosta Carlström; 1994

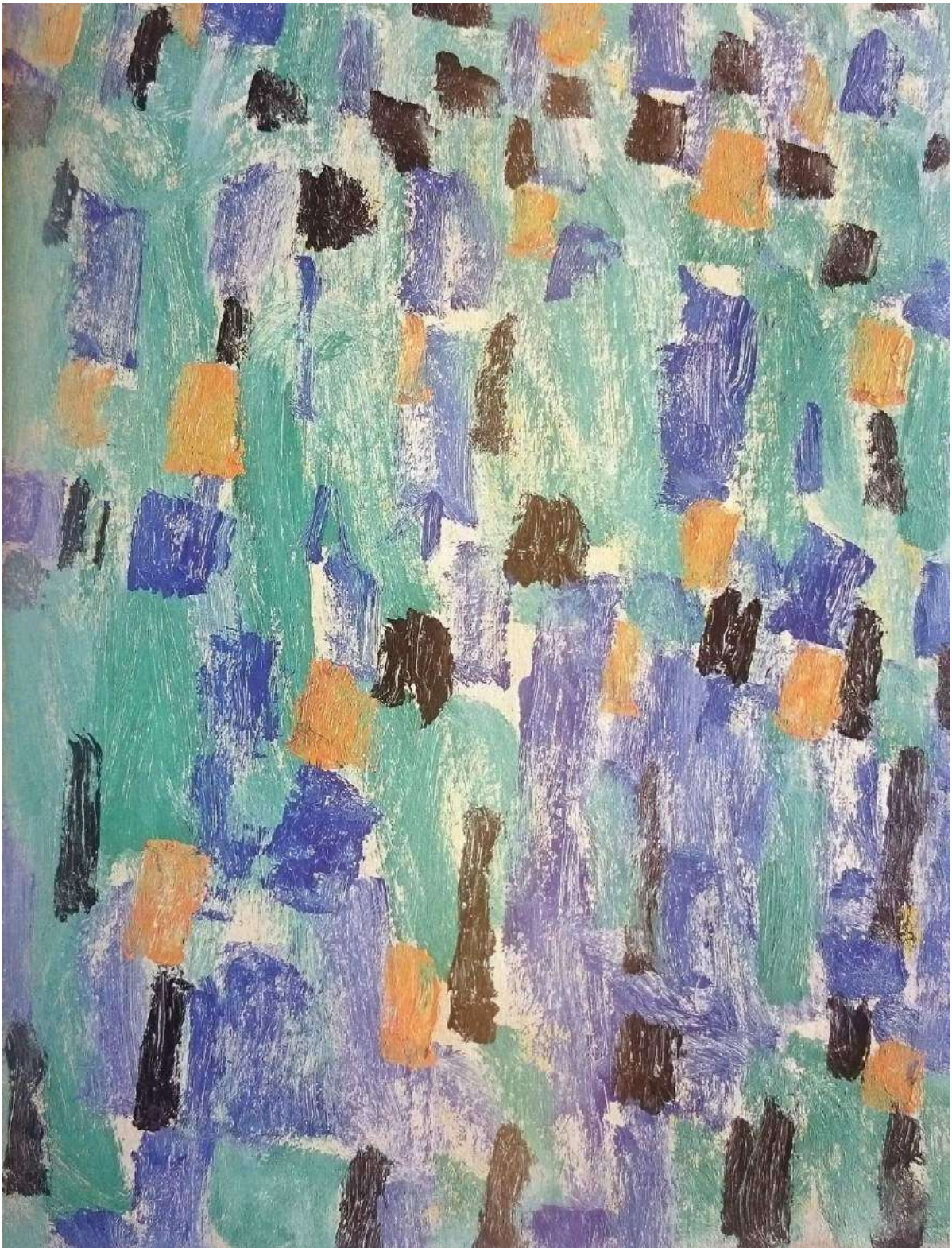


Figure 143.

Lindaraja; Rodríguez-Acosta Carlström; 1994



Figure 144.

View from the Albaicín; Rodríguez-Acosta Carlström; 2007

of the water, especially in the Patio de Comares (Figure 146 and Figure 149). Similarly, the muqarnas (Figure 148 and Figure 150) are represented by wavy lines which capture the rhythm of the decoration as well as the colorful interaction of light and dark areas. Rodríguez-Acosta focuses on details such as the golden lions (Figure 151) of the eponymous fountain, the capitals and the ceramic tiles patterning the walls, in a trajectory that leads from figurative sketches to abstract drawings resonant with the light, the color and the liveliness of the Alhambra.

This approach to the monument as an object of preliminary study that would develop into abstract artwork was not exclusive to Rodríguez-Acosta: indeed, contemporary artists such as Manuel Ángeles Ortiz, Joan Hernandez Pijuan, Sean Scully and Soledad Sevilla can be analyzed through a similar lens.



Figure 145.

View from the Albaicín; Rodríguez-Acosta Carlström; 2007



Figure 147.

Puerta de Justicia; Rodríguez-Acosta Carlström; 2007



Figure 146.

Patio de Comares; Rodríguez-Acosta Carlström; 2007



Figure 149.

Patio de Comares; Rodríguez-Acosta Carlström; 2007

(Rodríguez Acosta, 2007)



Figure 148.

Muqarnas; Rodríguez-Acosta Carlström; 2007



Figure 150.

Muqarnas; Rodríguez-Acosta Carlström; 2007



Figure 151.

Lion from the Fuente de los Leones; Rodríguez-Acosta Carlström; 2007

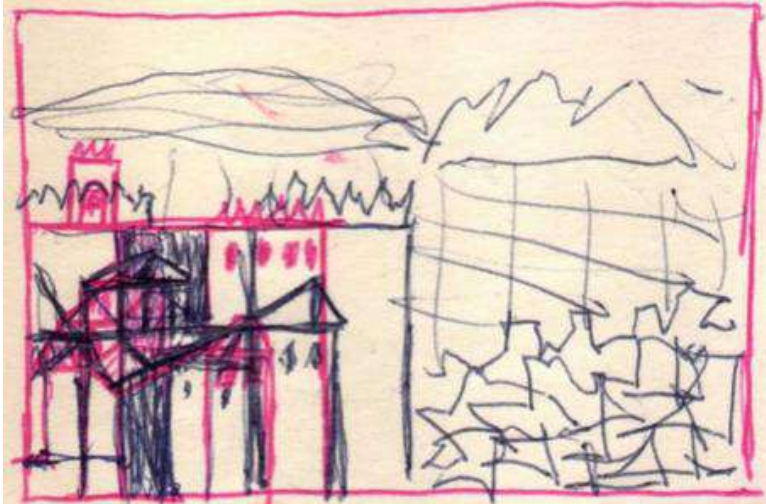


Figure 153.

View of the Alhambra; Manuel Ángeles Ortiz; 1968



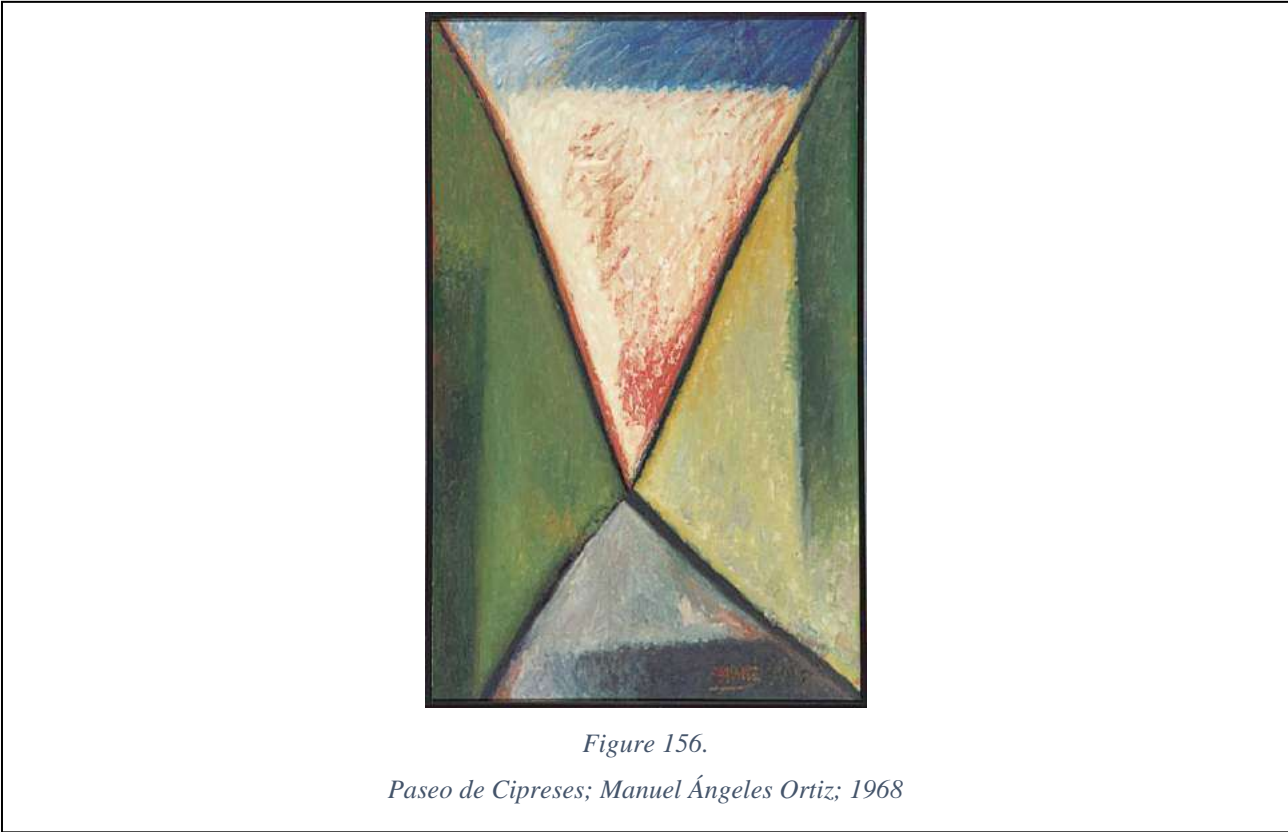
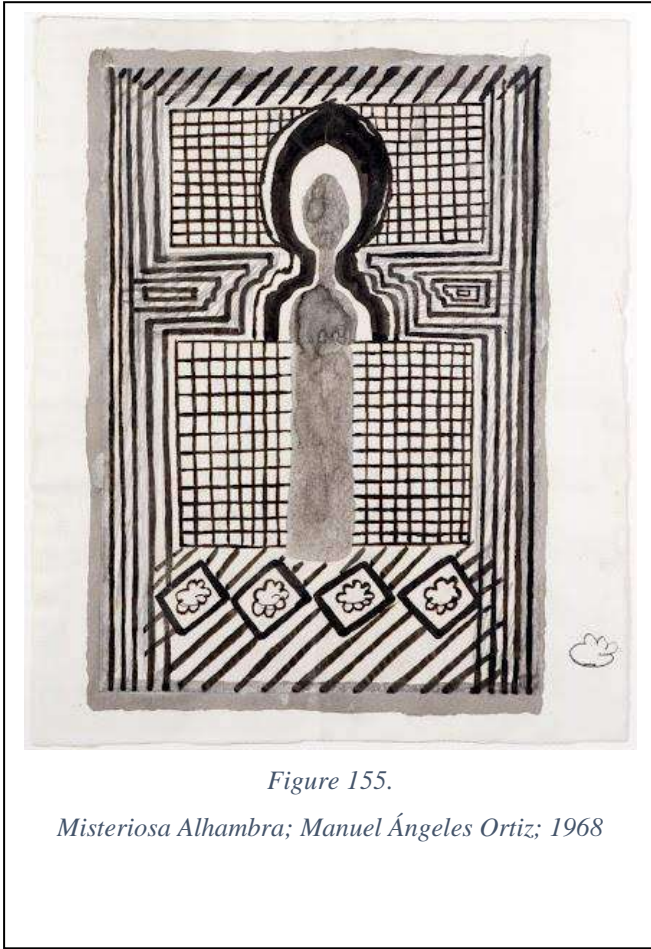
Figure 152.

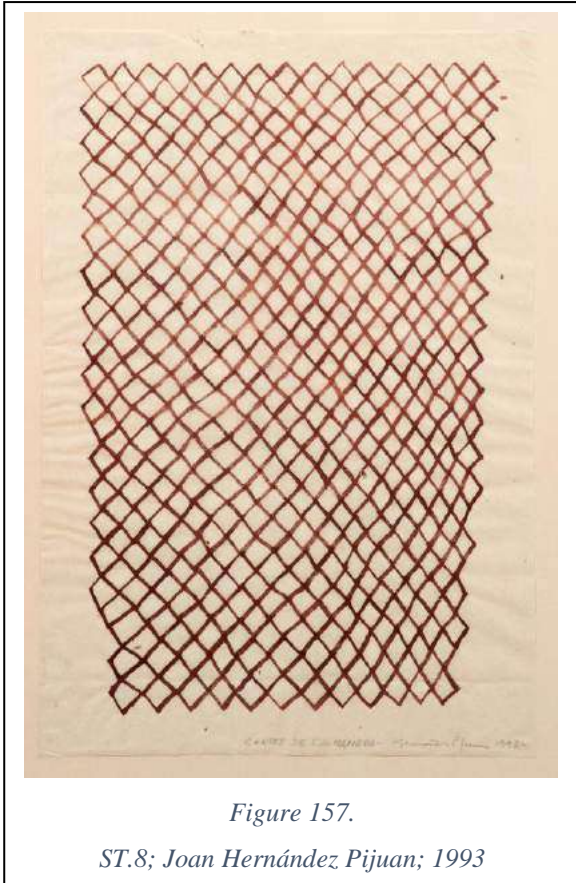
View of the Alhambra and the Sierra Nevada; Manuel Ángeles Ortiz; 1968

Manuel Ángeles Ortiz, a Spanish painter raised in Granada, was influenced by Cubism and Fauvism (Figure 153 and Figure 152), who in 1975 dedicated a series titled “Misteriosa Alhambra” (Figure 155 and Figure 154) to the monument, tracing with ink arches, towers and geometric patterns which gradually distance themselves from their physical counterparts. Other artworks dedicated to the Alhambra are a series of views and that of the “Paseo de Cipreses” (Figure 156), started in 1958, offering geometrical interpretations of the palatial gardens. Ángeles Ortiz distilled what he perceived to be the essence of the Nasrid palace, providing a graphical representation that synthetized

through color and composition the atmosphere he experienced during his visits.¹⁶¹

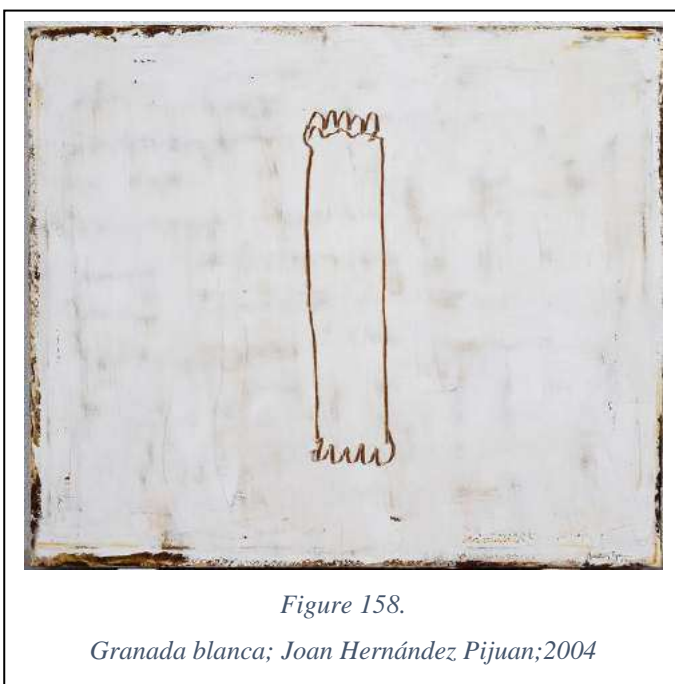
¹⁶¹ (Giralt-Miracle, 2009)





In 1992, Joan Hernandez Pijuan visited Granada and was inspired by the geometric motifs: he adopted a severe abstraction, focused on hand-traced simple monochromatic patterns (Figure 157), often composed of rhomboids, influenced by Franz Kline and by the alicatado of the Mexuar and the Patio de Comares. In later works the influence of the monument remains visible, as in “Granada blanca” (Figure 158), a 2004 oil on canvas in which the observer could detect the silhouette of the castellated Torre de Comares and its symmetric reflection.¹⁶²

More recently, painter and photographer Sean Scully’s visit to the Alhambra yielded analogous results in terms of focus on geometry, rhythm and light, themes already explored during previous trips to



Morocco. The aniconic, highly geometrical paintings (Figure 159, Figure 160 and Figure 161) focus on the use of color as a way to capture Mediterranean luminosity, according to a minimalist and abstract expressionism. In 2012, a year after the artist’s visit, the Patronato of the Alhambra and Generalife organized the exhibition “Sean Scully: Luz del Sur”,¹⁶³ in which great canvases and watercolors are accompanied by several photographs (Figure 162) centered on the decorative patterns of the monument.

¹⁶² (García Bascón, 2004)

¹⁶³ (De Barañano, 2012)



Figure 159.

Watercolor and graphite on paper; Sean Scully; 2011

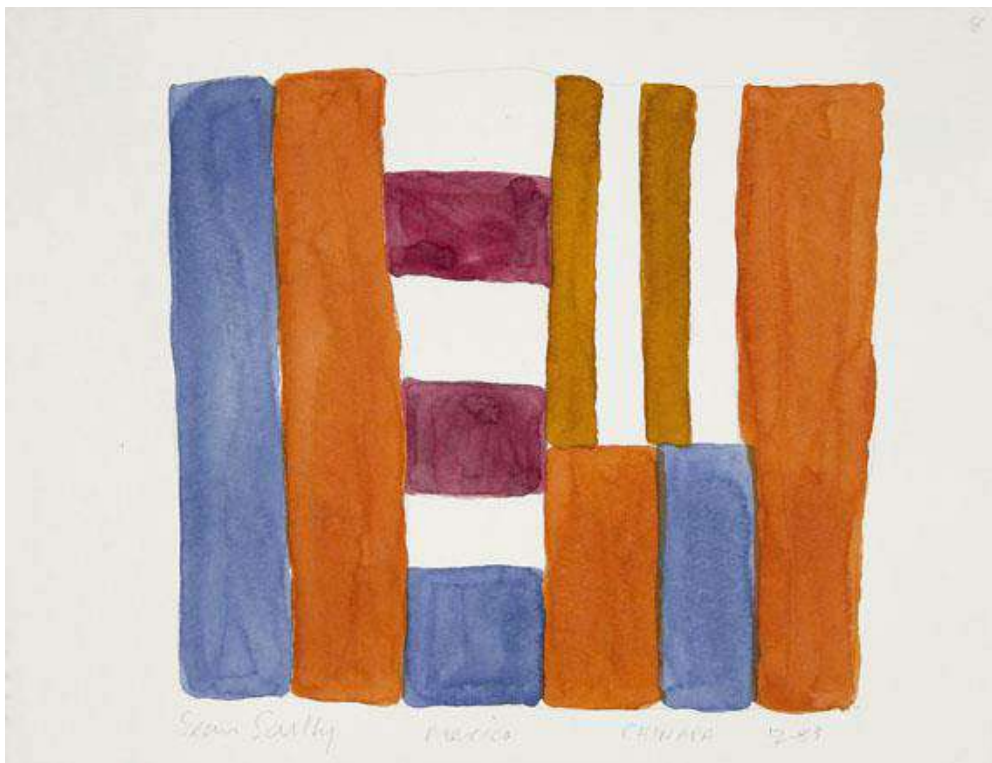


Figure 160.

Watercolor on paper; Sean Scully; 2011



Figure 161.

Wall of Light Mediterranean; Sean Scully; 2011



Figure 162.

Patterns of the Alhambra; Sean Scully; 2011

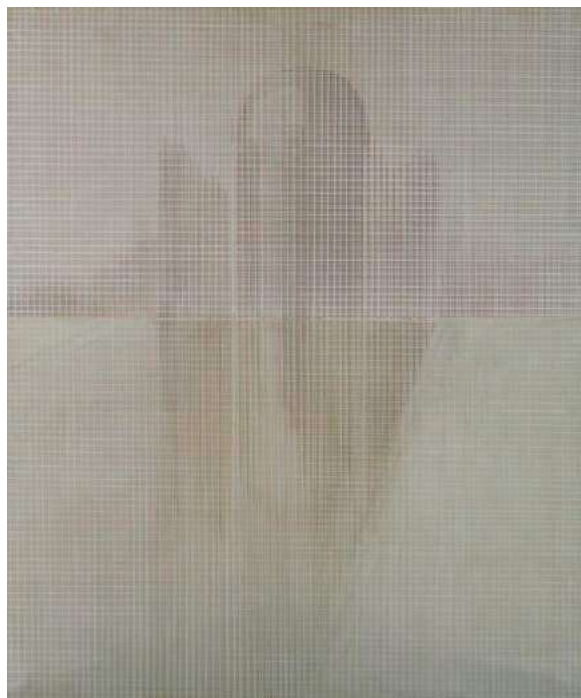


Figure 164.

Sin tener hora de ocaso; Soledad Sevilla; 1985

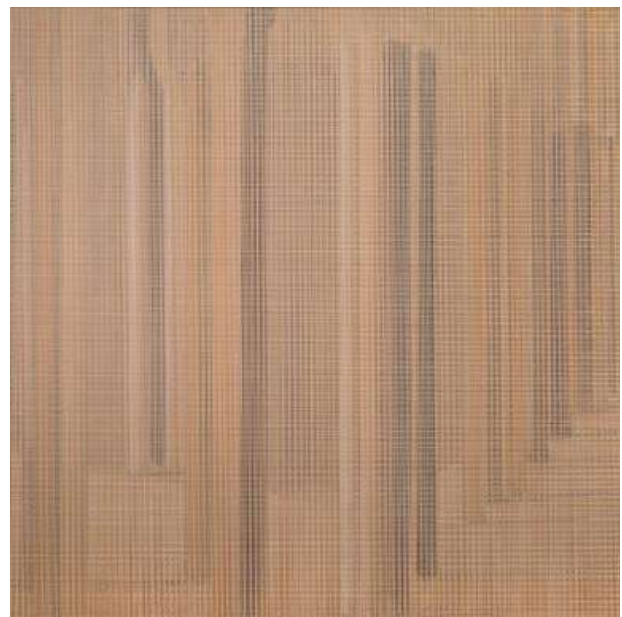


Figure 163.

Patio de los leones (diurno); Soledad Sevilla; 1986

In fact, it is such repetition and stylization that constitutes the main common factor between the Islamic palace and Scully's work: the artist concentrates on the regular distribution of rectangular elements in order to offer a sense of spirituality, providing union through multiplicity according to an Islamic architectural principle.

Even more prominently, the work of Valencian artist Soledad Sevilla is marked by her relationship with the city of Granada and the Alhambra, to which she dedicates a series of pieces, "Alhambras". Her abstractionism is based on the importance of geometry as a rectangular architecture, however she also focuses on light and spatial conception, while her use of color reminds observers of Rothko. Moreover, the vibrant quality of her pieces transmits the ephemeral condition of art as an unrepeatable phenomenon. In fact, in series such as "Variaciones de una línea", the use of multicolored threads creates a weave that transforms the linear element into a moving, pulsating plane, able to convey light and shadow, which in turn involve the observer and play a key role in the configuration of the artwork. This interest in light extends to the fascination for reflections and therefore the interplay with water elements, especially evident in the 1984 series of works inspired by the Alhambra and Islamic architecture (Figure 164 and Figure 163), analogous to the 2015 installation "Casa de Oro" (Figure 165). In this artwork, copper threads fill the courtyard of the Islamic Casa del Horno de Oro, in the



Figure 165.

Casa de Oro; Soledad Sevilla; 2015

Albaicín, as a black rectangle placed on the ground reminds observer of an alberca in which the environment is reflected.¹⁶⁴

It must be underlined that Soledad Sevilla is not the only female contemporary artist whose work has been influenced by the most emblematic monument of Granada. Indeed, the exhibition organized in 2019 by the Patronato de la Alhambra y Generalife titled “La Alhambra interpretada: sonidos, imágenes y palabras” proposes the vision of forty women inspired by the Nasrid palace: among them, visual artists include Concha Jerez, Rosa Brun, María Ángeles Díaz Barbados, Ángeles Agrela, Marina Núñez, Marité Martín Vivaldi, Marisa Mancilla, Asunción Lozano, Laura Pintado, Leonor Solans, Asunción Jodar, Belén Mazuecos, Mercedes de Bellard and Marina Rodríguez Vargas. The new perspective sheds light on the often ignored or forgotten female presence in the Alhambra,

¹⁶⁴ (Rodríguez Cutillas, 2017)

populated not only by queens and princesses but also by women who were poets and composers, while at the same time employing a variety of techniques to approach contemporary subjects, tied to feminist issues such as gender identity (Figure 166) or the relationship between the female body (Figure 167) and the observer's gaze.



Figure 166.

Objects of affection; Asunción Lozano; 2019

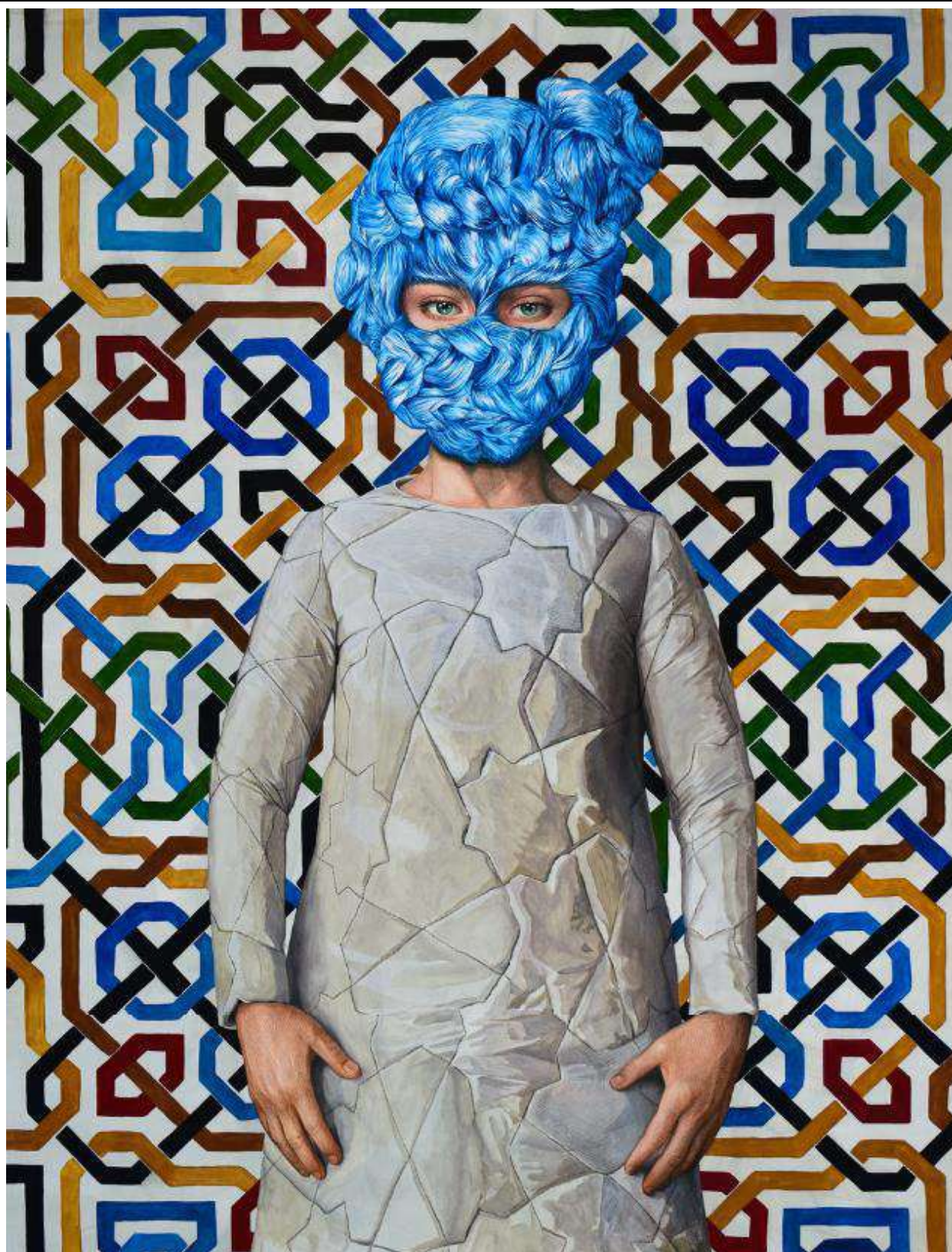


Figure 167.

Retrato N°10, Ángeles Agrela, 2018

12. Communicating artistic interpretations of the Alhambra

Unlike most monuments, the Alhambra presents a stratigraphy that goes beyond the merely physical palimpsest of architectural and ornamental elements: rather, its history is tightly connected to the development and diffusion of its image, as the brief overview offered in this section demonstrates. Since its foundation under the Nasrid sultans, the palace has been the object of voyagers' descriptions, a symbol of the Islamic rule and an emblem of the Reconquista. Its depictions have undergone cyclical oscillation between rational mimesis and imaginary interpretations, offering artists an endless source of inspiration.

Nowadays, such representations can be studied in order to better understand not only the monument and its visitors, but also the wider socio-political context and its repercussions on the artistic community on a local and global level. Being able to observe these documents while touring the Alhambra would allow a direct and intuitive comparison between the contemporary aspect of the monumental complex and its artistic interpretation, sparking both interest in the general public and insights in academics. A proper tool would also allow for constant updates, aiming to include any remarkable artistic novelty tied to the Islamic palace in an ever-expanding archive.

Because of these reasons, an Augmented Reality application for the Alhambra would provide a valuable instrument, from which visitors and scholars alike would benefit. The following sections explore the details of such application, highlighting its features, its advantages and its complexities, focusing primarily on its use as a way to communicate the numerous works of art influenced by the Alhambra.

IV. An Augmented Reality experience for the Alhambra

1. An Augmented Reality Application for the Nasrid Palaces

In recent years, Augmented Reality has demonstrated its potential as an educational and cultural tool, declined in a variety of applications according to the specific needs of the institutions which employ it. This instrument's international diffusion in museums and exhibitions, as illustrated before, and the versatility of the technology on which it is based suggest how its employment can successfully be further expanded to other contexts, such as the monumental complex of the Alhambra.

The creation of a museum route across the Nasrid Palaces based on an Augmented Reality application would represent a unique opportunity, as it would guarantee a high level of interaction between the users and the subject, allowing visitors to deepen their knowledge of one of the most famous and interesting artistic and architectural testimonies while, at the same time, permitting developers to explore the possibilities offered by this tool.

This research proposes the creation of a similar app and the accompanying virtual museum, approaching such task from the fields of Art History and Cultural Heritage, therefore highlighting the theoretical framework necessary for the ideation and organization of this tool, while offering a brief overview of the more technical aspects, for which further collaborations with coding and information technology experts would be necessary.

1.1. The objective of a personal guide app for the Alhambra

As demonstrated by the aforementioned applications, the success of Augmented Reality, based on striking content, can be measured by the users' involvement, by their level of satisfaction and by the general increase of incoming visitors for the monuments and museums in which it has been adopted. The use of such technology in heritage sites allows to reach certain objectives that can be considered fundamental from both a communicational and conservational point of view.

In the first place, personal guide applications based on this medium greatly facilitate the transmission of information to a general audience. The contents, in fact, can be developed to permit users to learn according to an array of different methodologies: the traditional act of listening to an audio guide can be accompanied by reading texts and visualizing diagrams, videos and animations. Moreover, an Augmented Reality application can further encourage the diffusion of knowledge thanks to an interactive component, which stimulates a direct participation in the learning process.

Augmented Reality also proves useful for users that already enjoy sufficient preparation to access a preliminary reading and understanding of the heritage site, such as students of subjects like archaeology or art history. In this case, virtual reconstructions can be offered to deepen the specific knowledge of the monument, stimulating users to delve into the details of its evolution. Moreover, this type of audiences can benefit from interdisciplinary connections that employ comparisons and relations to encourage a wider focus, engaging with several disciplines and historical periods in order to stimulate intellectual curiosity.

Finally, a similar application represents an important tool to support scholars and experts that are already familiar with the details of the heritage site they are analyzing. In fact, the possibility to access relevant archival resources in an easy, rapid and direct way constitutes a welcome innovation, only permitted if such documents can be found on location as digital copies, thus facilitating research efforts.

It must be noticed that the process of creating an Augmented Reality application provides in itself an opportunity to encourage a study of the specific subject it regards. In fact, the essential element of personal guide apps is the richness of contents, measured not only by their quantity but also by the diverse ways in which they are presented. In order to achieve such variety it is necessary to employ several resources, from a wide bibliography to archival documents and material evidence: this deep investigation of the different aspects of the heritage site must be followed by a phase dedicated to exploring efficient and varied strategies to transmit the findings to the audience, distinguishing the communication methodologies according to the visitors' interest and preparation.

1.2. Advantages of a personal guide application for the Alhambra

The development of personal guides based on Augmented Reality leads to a number of benefits for the visitors of those cultural heritage sites in which they are employed and for the personnel in charge of their conservation, as they facilitate communication, attract a greater public and thus provide an economic gain.

The employment of a similar tool for the Nasrid Palaces of the Alhambra could offer similar advantages, improving the relationship with users and creating an instrument the development of which would increase the study of the monumental complex.

One of the benefits of Augmented Reality can be found in communicating with visitors, especially when applications are compared with other methodologies such as informative panels or audio guides.

More specifically, this technology allows an approach based on visualizing directly on location a number of elements which audio guides can only describe. In the case of monuments with a complex stratigraphy, for example, Augmented Reality is able to provide a clear reconstruction of different historical phases, while thanks to diagrams and animations it can also aid to explain peculiar construction techniques or to simulate the daily life of the monument when it was in use. From this point of view, the technique known as “cultural heritage layers” has already proven its effectiveness, as demonstrated in 2008 with the experiment “Rome Reborn”, as well as with a number of Augmented Reality experiences for archaeological sites, like “ARCHEOGUIDE” e “ARAS”, respectively illustrated in the texts of Ruiz Torres¹⁶⁵ and Fiasconaro and Guiducci.¹⁶⁶

At the same time, visual contents can be accompanied by texts or audio commentary, thus allowing users to approach the information with the methodology they deem best suited to their needs.

Therefore, adopting a personal guide application, the Patronato de la Alhambra y Generalife (the Alhambra and Generalife Trust) would better illustrate the evolution of the monument, increasing the level of understanding among its visitors and thus generating a higher interest in the monumental complex and encouraging passionate users to discover more about it. Furthermore, by using the cultural heritage layers technique, it would be possible to integrate digital copied of artefacts and graphic documents into the physical environment, obtaining the effect of stimulating tourists’ curiosity towards the Museum of the Alhambra and increase scholars’ attention towards and appreciation of its Archive.

One of the greatest innovations offered by Augmented Reality to the field of cultural heritage is represented by interactivity. Thanks to such characteristic, a visitor can easily create a personalized route within the monument, deciding on which aspects to focus during the experience as well as choosing the optimal communication methodologies. The possibility to actively participate to the choice of contents encourages users to interact with the monument on a deeper level, thus incentivizing moments of research about the site different to that of the visit itself.

This quality is further exploited by those personal guide applications which include a gaming component, as they often include the access to new content as a prize for young participants

¹⁶⁵ (Ruiz Torres, 2013)

¹⁶⁶ (Fiasconaro & Guiducci, 2012)

demonstrating an understanding of the information presented in previous phases of the experience, as shown by the application created for the exhibition “Expedition Schatzsuche” del 2007.

It must be noted that the most difficult aspect regarding the employment of an Augmented Reality application for a cultural heritage site is the complexity involved in the programming process.

As previously underlined, the use of such technology requires a deep knowledge of various fields of information technology: due to this reason, the creation of a personal guide is a long and intricate activity, especially when compared to recording the commentary for an audio guide or writing informative panels. Similarly, the need to properly understand and utilize these notions determines the necessity to employ experts who can aid scholars in developing the application, collaborating on the creation of contents and their programming.

Because of this, the initial investment required by the creation of a personal guide app is higher than that of other systems to communicate information to the public.

2. Organization of a personal guide application for the Alhambra

A personal guide application based on Augmented Reality needs to comply with one fundamental objective, namely, the capacity to facilitate communication with the public, in order to properly convey the various cultural, historical and artistic characteristics of the monument or museum which is providing it.

The logical consequence of such aim is that the entire process of creating such experience must be informed by this objective, increasing as much as possible the fruition of the cultural artifact and avoiding those elements that could distract from the visit and frustrate users, such as slow modes of operation, difficult usage and invasive user interface. An ideal application should, instead, be designed to be intuitive enough to become virtually invisible, allowing participants to forget about the fact that they are utilizing it and permitting them to focus exclusively on the information it offers. Contents, in fact, constitute the core of the Augmented Reality experience, with the primary objective of contributing to the valorization of the monument and the transmission of knowledge.

Furthermore, it should be highlighted that a model developed for a specific cultural heritage site could easily be adapted to several others, as is the case for the application presented in this work. Indeed, despite describing the particularity of a personal guide for the Nasrid Palaces of the Alhambra, the

following paragraphs illustrate an application that could also be considered as a paradigm for the employment of Augmented Reality in similar monuments.

The basic architectural structure can be used in a number of different cultural sites by changing the input to which the program responds and by swapping contents relative to the Alhambra with relevant ones. In fact, among the characteristics of the technology here described is the high level of adaptability, which permits the organization of various Augmented Reality experiences through marker libraries linked to different information.

2.1. Tools necessary for the creation and fruition

Several technical tools are employed in the development on a personal guide application based on Augmented Reality.

Firstly, it is necessary to structure the basic architecture of the application by describing through an algorithm which actions must follow any of the specific inputs that can be obtained. The fundamental process required by the application consists in searching and recognizing in the surrounding environment certain markers which have the function of pointing to specific contents: as the program identifies such information, it must retrieve the appropriate content and offer it to the user, who can decide with which to engage. The application, therefore, must employ an environment acquisition software, able to coordinate the various sensors from which it can receive data, in order to obtain coherent indication thanks to the integration software.

The following phase, dedicated to reading the marker and fetching the information, relies on the engine of the application. The information obtained by the integration software can be compared to an address or to the signature mark on a book, for they allow to unambiguously identify a memory storage area where the engine finds the content which the user needs to visualize.

The processor then instructs the rendering software on how to transmit such contents to the user interface, which is deployed to transform code into easily accessible elements.

The tools necessary to create the basic architecture of the application, consisting in the environmental acquisition software, the integration software, the processor and the rendering software, can be partially acquired by using pre-existing libraries available for Augmented Reality projects, while the rest must be created by programmers who can model the structure of the application based on its specific needs.

Besides the personal guide software, while developing the application it is important to consider its interaction with the physical world, which determines the necessity of using tracking sensor and of gathering input from the user. Augmented Reality, in fact, is based on a strong interaction with the surroundings, in which specific markers must be present to permit recognition.

In the context of cultural heritage, the use of such markers must comply with a series of conditions that guarantee a respectful relation with the monument, both by not damaging the site and by avoiding offering a distraction from an aesthetical point of view. As an example, the use of QR codes would not be appropriate in a context such as that of the Alhambra, for their inclusion in the surroundings would pose a twofold problem. In the first place, the methodology employed to affix them could compromise the integrity of the monument; secondly, the contemporary look of the black and white squares would be in jarring contrast with the historical architecture.

Among the technology currently available, a mapping system developed by the University of Oxford allows the use of existing elements, both natural and artificial, as markers, thus providing one of the most appropriate tools for heritage sites. This instrument is based on a combination of GPS and computer vision, which consists in the ability to recognize images captured by the camera. The joint use of these elements allows to determine the visitor's position with a level of accuracy high enough to permit a personal guide app to function properly. Computer vision can be employed to recognize as markers some of the architectural characteristics already present in the monumental complex, while GPS, integrated by accelerometers and gyroscopes, precisely describes the participant's position and orientation.

The creation of georeferenced tridimensional maps of the environment can further aid in programming the application so that it can recognize the user's location. Analyzing the image captured by the device camera, the application can compare it to the digital reconstruction of the heritage site and thus determine the exact point in space from which such picture was taken. At the same time, knowing the GPS coordinates and the device's inclination, the program can precisely pinpoint where the visitor is located within the virtual model, thus determining the point of view. Thus, combining the two technologies allows to cross check the information and guarantees the correct functioning of the app even when one of the systems fails.

Finally, for the experience proposed in this research, the only input-gathering sensor necessary are constituted by the device's touchscreen.

The instruments needed to create the content offered by the personal guide app can vary depending on the cognitive methodology employed to communicate them to the visitor.

One of the main advantages of Augmented Reality when compared to traditional audioguides is the possibility to use visual elements and animations: in order to generate such content, different computer graphics software is necessary, so that an array of digital images can be created and managed correctly. With regards to tridimensional reconstructions computer aided drawing (CAD) and digital modelling programs can be used, while specific instruments and software can prove useful to capture information from the physical world and transform it into digital data. As an example, a laser scanner or a camera coupled with photogrammetric software can be used to digitize an existing manufacture; the model can then be imported into a modelling program to virtually reconstruct its initial aspect and place it in a digital model of its original environment.

These models can also provide the base for video animations, for which specific video editing programs must also be employed. The content offered by the app should be completed by texts and audio, as well as interactive edutainment elements.

The public would be able to use the personal guide app through common devices such as tablets and smartphones, which already include all the sensors necessary to an Augmented Reality experience. The monumental complex can provide the app through its institutional website and those channels dedicated to selling apps for the various operating systems. The devices' limits in terms of memory storage determine the necessity of offering wi-fi access to the users, so that the application can rapidly and efficiently gather the content from the dedicated servers where they are stored, similarly to the procedure employed by "ARCHEOGUIDE".¹⁶⁷

2.2. Visiting route and content creation

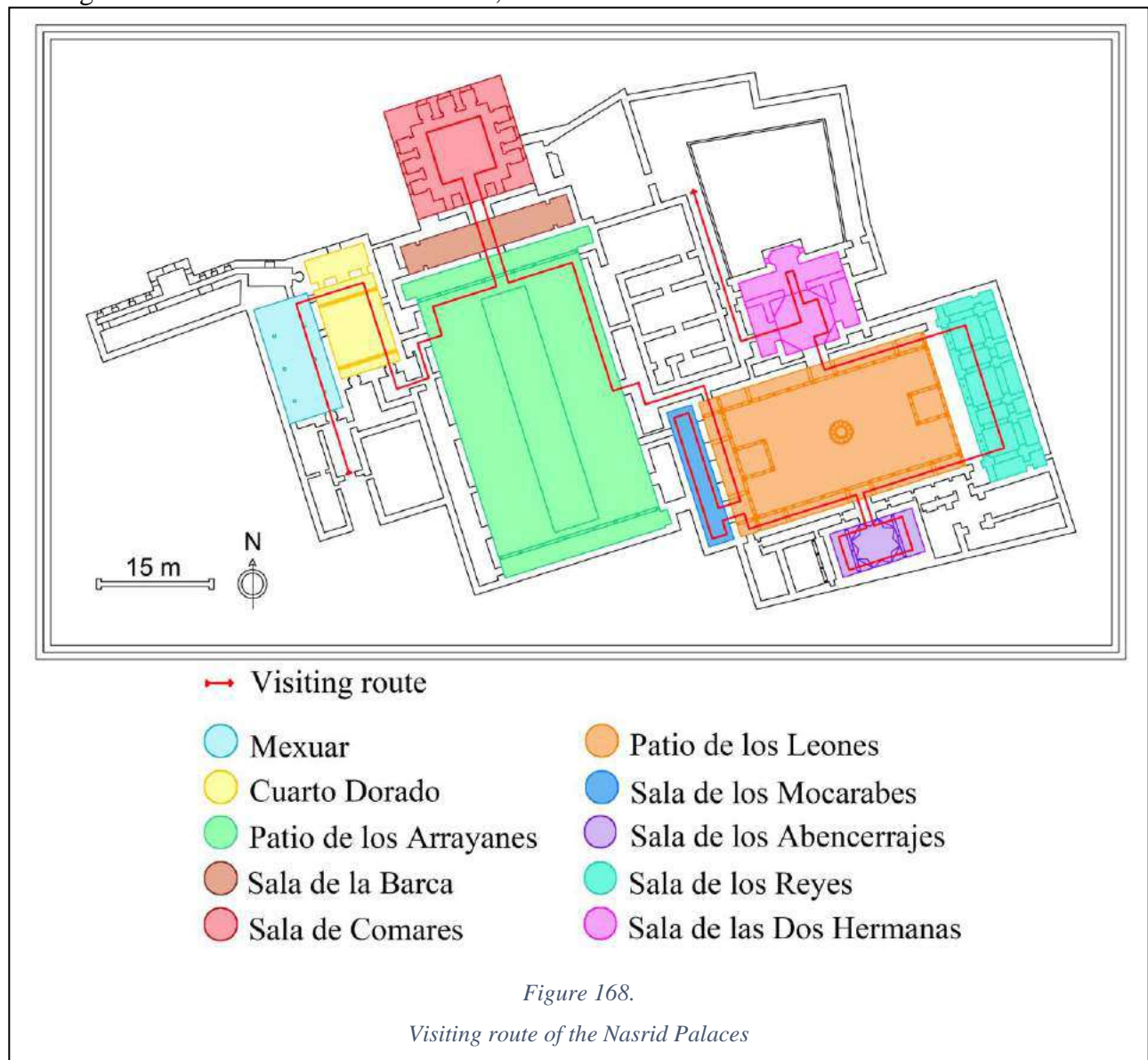
Despite the fact that personal guide applications based on Augmented Reality permit a high level of personalization, not all heritage sites allow such freedom when structuring the app, due to architectural and environmental constraints.

The Nasrid Places in the monumental complex of the Alhambra constitute an example of this category, thus requiring the development of an obligatory route from which visitors cannot deviate

¹⁶⁷ (Ruiz Torres, 2013), (Bonacini, 2014)

(Figure 166). Nevertheless, such route should aim to respect a historical progression, in order to comply with the principles of museology and museum education. The path that is currently offered to visitors of the Nasrid Palaces takes into account these elements and therefore also proves adapt for the proposed Augmented Reality experience.

In the first place, the public enters the only hall of the oldest palace which can still be visited, namely the Mexuar, from which it proceeds to the Cuarto Dorado. Visitors then enter the palaces commissioned by Mohammed V, starting with the Palacio de Comares: the Patio de Comares or de los Arrayanes, focal point of the surrounding structure, leads to the Sala de la Barca, antechamber of the Sala de Comares or de los Embajadores, where the throne room was located. As the public crosses the courtyard again, it arrives to the Palacio de los Leones, accessing the homonymous courtyard and visiting its halls counterclockwise: in order, the Sala de los Mocarabes on the western end is followed



by the Sala de los Abencerrajes on the southern side, the Sala de los Reyes, facing east, and the Sala de las Dos Hermanas. The visit finishes in this northern hall, from which the public continues to the Jardín de Lindaraja.

The application should allow the public to visualize the map of the monumental complex and the museum route, to offer logistic information during the visit and avoid confusion among users.

The process of creating content for an application dedicated to a museum or monument usually involves a series of preliminary studies of the heritage site, in order to identify the key aspects which should be conveyed to the public and the opportune methodologies to do so.

With regards to the Nasrid Palaces, the first phase should be the creation of a virtual georeferenced three-dimensional model of the monument as it looks today. To obtain this model, both photogrammetry and laser scanning can be used, considering that the techniques provide a high level of accuracy, especially when combined. The reconstruction could then be used as both a map for visitors and a point of comparison for the computer vision algorithm searching for architectural markers, while at the same time offering researchers a faithful and exhaustive point of reference for studying future changes determined by damages. Moreover, the model would present a base to allow restorers to digitally test interventions before implementing them, thus permitting the analysis of several options.

The accompanying work is a vast and careful research which aims to gather and compare the information regarding the heritage site, identifying the graphical documents which can be digitally added to the environment and the interdisciplinary connections that can become part of the application.

In the case of the Alhambra, the centuries-long interest in the monument determines an impressive amount of materials from the Museum and the Archive that could merge into the personal guide, combined with the results of academic investigations and scientific analysis necessary for the conservation of the monument, which offer data on its original aspect and the techniques employed to build and decorate the complex. Including all these elements in the application would be challenging, therefore this work primarily focuses on the image of the Alhambra as it was portrayed by artists across five centuries, selecting representative examples for each artistic current.

Nevertheless, it would be possible to consider successive installments with which the application could grow, providing new content and progressively increasing the level of personalization offered

to the public while at the same time gradually transforming it into a repository for any content related to the Alhambra. The digitalization of material evidence from the Nasrid period, in part already organized with the project “CERES, Colecciones En Red España), would permit the digital inclusion of furniture in the palatial halls. Similarly, audio content could be added to provide the public with music both composed during the Nasrid domination and inspired by the monument, as well as offering readings of Irving’s “Tales of the Alhambra” and other famous texts influenced by the palace.

As the content would grow, it should also be made available through a digital museum and repository, in order to allow users to virtually and remotely visit the monument, as well as permitting a more thorough exploration of the materials offered in the app.

2.3. Application functioning

The diffusion of mobile devices such as smartphones and tablets among the general public guarantees a good level of knowledge in the usage of these technologies, a fundamental prerequisite for the personal guide application to be perceived as an easy-to-use tool rather than as an obstacle to the visit. To ensure that all users can properly interact with the application, a brief tutorial can be presented as it is first accessed, so that visitors can be guided in exploring its main features. Notwithstanding, the user interface must be designed as sufficiently essential as not generate any confusion nor distraction, while at the same time offering an intuitive instrument, especially for those who have any modicum of experience with mobile devices.

A preliminary element should provide participants with the option of accessing a brief introduction on the monumental complex, preparing for the visit of the Nasrid Palaces. The device would then automatically track users as they enter each hall, thanks to the afore-mentioned combination of markers and GPS, and provide an opening commentary on the historical and artistic features of the room. Nevertheless, the participant could choose to autonomously explore the environment, selecting the contents they deem most interesting among those suggested. Besides the map on which the museum route is shown, the application should provide contents belonging to various categories, such as tridimensional models of the various architectural phases of the hall, archival documents and museum objects digitally integrated into the palace and interdisciplinary connections, as well as any necessary additional option. The public can thus proceed from one hall to the next, choosing to access the most suitable materials, until they reach the end of the route, where a final page can remind of the opportunity to explore the content remotely from the virtual museum, as well as offer a selected

bibliography and suggestions of similar heritage sites to deepen the knowledge of those elements discovered during the visit (Figure 166).

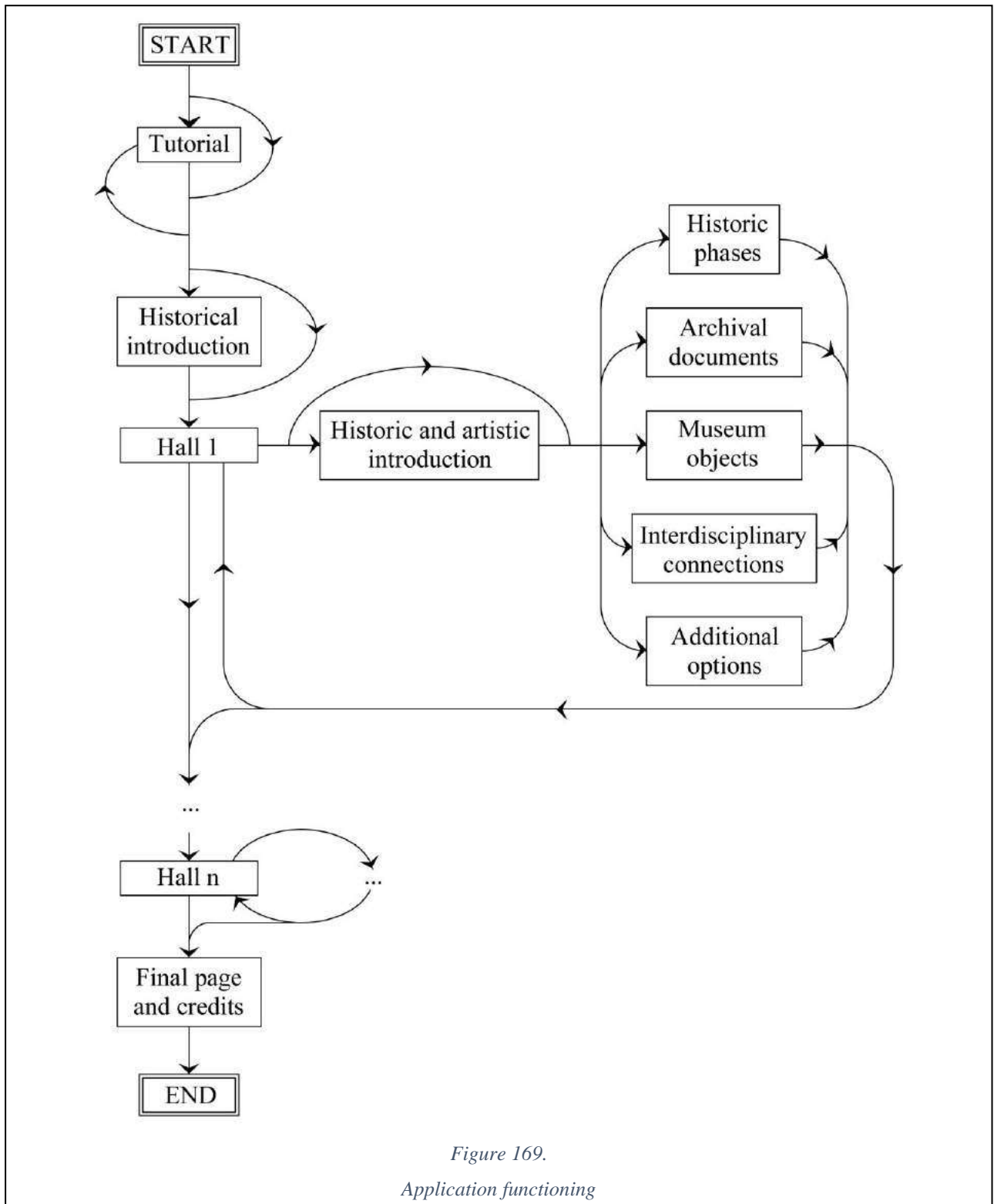


Figure 169.
Application functioning

3. Contents offered to visitors of the Alhambra

As previously mentioned, the key element of a personal guide application is constituted by the variety and quality of content it includes and with which the user can engage. Thus, the focal point of a similar Augmented Reality app dedicated to the Nasrid Palaces would be the information offered to the public, which should aim to represent elements of interest for the various categories of visitors, addressing differences in age, education and background.

The contents, which should be supported by an array of communication methods, could be organized into five categories, as follows. In the first place, the tridimensional reconstruction of the various historical phases, including the nowadays aspect of the monument, allows to visualize the stratigraphy and architectural evolution of the complex. Secondly, the superimposition of archival documents by means of cultural heritage layers would incentivize the knowledge and use of such resources. Similarly, layering digital copies of the museum artefacts would strengthen the relationship between the Alhambra and the museum, as well as other institutions hosting material evidence pertaining to Nasrid Granada and the subsequent history of the city. A series of interdisciplinary connections would highlight the links between the monument and a wide range of subjects, while additional options could offer ulterior elements to delve deeper into the exploration of the heritage site.

While the initial version of the application could include a limited number of contents for each category, as more information is added it would become virtually impossible to thoroughly investigate the entirety of such materials in real time during the visit. In order to permit users to appreciate the content at an appropriate pace, the development of a virtual museum parallel to the app becomes imperative, especially as it would constitute a valuable repository for scholarly resources dedicated to the Alhambra.

3.1. Tridimensional reconstruction of the current state

A virtual reconstruction of the Alhambra constitutes a basic element for an Augmented Reality Application which would guide visitors through the Nasrid Palaces. In order to obtain such model, two techniques can be adopted, three-dimensional laser scanning and photogrammetry.

Laser scans generate clouds of geolocalized points, which can be manipulated with specific software such as AutoCAD, MeshLab or Geomagic, combining them by exploiting the overlapping areas of different scans. The output is a single set of points to be used as the vertices of a polyhedric surface, progressively more faithful to the original environment as the number of acquired points increases.

Furthermore, by selecting appropriate lighting conditions at the time of the scan, the color of each point can be automatically captured with a sufficient level of fidelity, thus providing a more accurate model.

The methodology is similar to that of photogrammetry, which employs a number of partially overlapping shots of the same subject to produce a digital reconstruction, the texture of which can be provided by correctly lighting the subject.

Due to the complex details of the Nasrid Palaces decoration, in particular the latticework and plasterwork ornaments, photogrammetry might prove inadequate, as the number of shots needed to capture the tridimensionality of such elements could be challenging. On the other hand, laser scanning should yield a sufficiently defined cloud of geolocalized points, thus facilitating the modeling work. In either case, the final result is a tridimensional virtual copy of the physical environment, which can be imported in modelling software such as Blender or 3DS Max and modified depending on the final objective.

Digitally reconstructing buildings in their current state responds to several necessities that go beyond the mere navigation tool for visitors, offering the basis for educational and conservational instruments.

In the first place, the virtual model is a key element for the correct geolocalization. As previously illustrated, this procedure permits to match latitude and longitude coordinates to the environment where the Augmented Reality experience takes place, based on a reproduction of the physical world through an oriented digital model.

Thanks to this process, it is possible to know the user's position simply by employing the device's GPS coordinates, therefore calculating the visitor's visual and comparing it to the image data captured by the camera. By knowing this information, the application can provide the user with virtual elements added to the existing environment, as the position of these is coded into the reconstruction thanks to GPS coordinates.

This could allow, for example, to reproduce the original polychrome windows of the Nasrid Palaces by digitally superimposing virtual models of the colored glass pieces to the existing window frames. Besides using satellite coordinates, the application can employ relative spatial registration, which allows to match the virtual objects with elements of the physical world.

The inclusion of a virtual reconstruction within the personal guide application to the Nasrid Palaces can constitute a remarkable advantage for a number of visitor categories.

In fact, users can directly and intuitively interact with the model, manipulating it to visualize desired elements such as plans, perspectives and details of specific areas. In particular, the digital copy proves useful as an orientation tool, guiding the general public along the museum path and highlighting elements that can be difficult to observe due to their location, such as those near the ceiling or in areas that are not accessible during the visit due to conservation or security issues.

Digital modelling also offers scholars a functional tool to accurately document the conservation state of the monument. Indeed, a tridimensional laser scan of the various halls of the Nasrid Palaces permits to record minute details of the environment, reaching a remarkable level of precision that would be impossible to obtain through photography or description. Moreover, the technique automatically registers measurements and allows to automatically compute areas and volumes, a particularly useful feature for restoring and cleaning interventions.

A similar model reveals its full potential in the field of conservation as it becomes necessary to underline changes, damages and restorations. Periodic laser scans can be easily compared to previous ones, thus ensuring the correct documentation of the evolution of the Alhambra, precisely highlighting the changes and facilitating the rapid identification of any element of risk.

In the case that restoration operations prove necessary, a digital model offers a valuable support tool to simulate the intervention and evaluate the benefits and the disadvantages without directly acting on the buildings.

Finally, the tridimensional reconstruction constitutes a fundamental element for the virtual museum, as it would permit users from all over the world to digitally access and visit the monument, as explored further. The model would also provide the basis for any additional content by clearly connecting each element to specific areas of the Palaces.

3.2. Tridimensional reconstructions of previous phases

Within the Augmented Reality application, the most important function of the digital model is arguably its use as a base for the reconstruction of the Nasrid Palaces during various historical phases. In fact, in order for the unspecialized visitor to fully grasp the artistic and cultural significance of a monument, it is fundamental to convey its evolution. Besides allowing the general public to notice

the stratigraphy of the complex, reconstructing the different historical phases constitutes an element of interest for more prepared visitors as well, as they can further deepen their knowledge of the monument through such models, analyzing the details of the changes which highlight the history of the territory in which the heritage site is located.

With regards to the Alhambra, the complex evolution of the monument has been briefly synthesized in the previous chapter and can be broadly divided into the following periods: the early fortification, the 1238 foundation by Muhammad I's ibn Yusuf ibn Nasr al-Ahmar, the construction of the Mexuar by Isma'il I and the modifications and expansions by Muhammad V, followed by the Christian changes during the Reconquista, the XVII century decline, the Romantic refuge and, finally, the series of restorations that led to its current aspect.

Creating these models evidently supposes an increased effort with respect to capturing the existing state of the monument, however it also proves of greater interest from an historical and cultural viewpoint, as well as representing a powerful communication tool.

Based on the contemporary model of the Alhambra obtained through the tridimensional scan, different reconstructions must be created to represent the various historical phases, gradually modifying the existing model by adding and subtracting specific elements for each area. In order to identify which components must be acted upon, it is essential to conduct two parallel studies, one focused on the archival evidence, the other on the chemical and physical analysis of the monument.

In the first place, it is necessary to accurately and thoroughly investigate the architectural development of the monument, reconstructing its history as faithfully as possible. In the case of the Alhambra, the prolific academic literature and archival documentation offer valuable assistance, as texts, illustrations and photographs bear witness to the evolution of the Palaces.

At the same time, scientific research adopting physical and chemical analysis, chosen among the less invasive whenever possible, can provide precious insights on the materials and techniques employed during the construction, in particular with regards to the use of colored pigments, the loss of which can profoundly alter the aspect of a heritage site.

By combining these fields, a high level of accuracy can be ensured while creating the various models corresponding to the different historical periods, providing users with content as faithful to reality as possible.

In the context of the Augmented Reality application, the reconstructions appear layered over the physical environment where the visitor is located. Existing elements would not be entirely hidden by the digital models, rather digital object would substitute real ones pertaining to other periods. The use of a technological device also offers the opportunity to clearly indicate the degree of certainty with which the presence and aspect of each characteristic has been determined.

Several areas of the Alhambra can benefit from such reconstructions since, as underlined in the previous chapters, the history of the monument has led to transforming most of the main halls of the Nasrid Palaces: deterioration, changes of style and restorations have modified various areas, while the original polychrome decorations of the plasterwork and the woodwork is almost entirely lost, but can be shown again thanks to digital models.

3.3. Overlaying archival documents and museum objects

The documental corpus dedicated to the Alhambra and in great part available in its Archive can be used not only for the creation of accurate historical models but also integrated into the Augmented Reality application in a direct way. More specifically, drawings, prints, photographs and other images focused on the monument can be presented in high resolution through the personal guide application. The in situ availability of such documents is a feature mainly aimed at researchers and scholars, as it facilitates the analysis of the Palaces and encourages the use of the archival resources of the Alhambra.

The documents can be employed as part of the museum tour by allowing users to visualize the images as a layer superimposed over the corresponding element of the physical world. The adopted functioning can be similar to that of the Steetmuseum app by the Museum of London, obtained by employing cultural heritage layers and mapping methodologies which allow to match images to precise locations and orientation.

This aspect of the proposed application is the main focus of the following section, as it allows to elucidate the history of the image of the Alhambra as it was seen and represented by artists through the centuries. Despite constituting a key characteristic of the monument, the evolution of this perception, summarized in the previous chapter, is not generally illustrated to the public, who therefore cannot fully appreciate how the fame of the Alhambra is linked with its evolution and conservation.

A process similar to that described for the archival documents can be adopted for the material evidence in the Museum of the Alhambra and other cultural institutions. These objects can undergo laser scans or photogrammetry in order to obtain tridimensional virtual copies that can be georeferenced and incorporated into the digital reconstructions. This approach would permit the public to observe the original aspect not only of the architectural structure but also of the furniture, tools and everyday objects that would occupy such spaces.

Using digital models of existing museal objects guarantees a high level of accuracy from an historical point of view, while at the same time better disseminating knowledge about the material evidence itself and encouraging visitors to engage with the Museum.

3.4. Interdisciplinary connections

One of the most fascinating elements of the monumental complex of the Alhambra is its capacity to synthesize in a single architecture multiple facets of the civilization that created it. The cultural heritage site, in fact, is not only an historical and artistic resource, rather, it proves of great interest to understand the development of science, mathematics, literature and a number of other aspects of the culture of al-Andalus.

Thus, to correctly communicate the value of the Nasrid Palaces to the public, it is necessary to transmit to visitors the distinct disciplines that can be associated to what is observed in the monument. In order to achieve such objective, existing research delving into these characteristics must be properly organized to provide users with a coherent set of complementary resources. The themes discovered through the interdisciplinary connections are mainly aimed to participants with specific interests and with a certain level of artistic preparation, nevertheless, in some cases they can address and involve less expert users exactly because of the range of subjects broached.

In an effort complementary to that of the previously illustrated feature, this element of the application can be used to further highlight the influence of the monument of artists, writers and composers, showcasing how it became a primary source of inspiration. Analogously, this characteristic allows to compare the Alhambra with other architectural endeavors, either pertaining to the same civilization or to the same period in order to compare building techniques from different contemporary cultures.

3.5. *Additional options*

The Augmented Reality personal guide application can be finalized with some additional options which can complete the visitor's experience. The main instrument to achieve such goal is the availability of ulterior information depending on the user's requests, proposed through different media in order to accommodate various accessibility issues. Some examples include texts, audios or videos that offer additional content about the historical context of the monument, the city or the region in general, about building techniques and decorations, about court life under the Nasrid kings or the Catholic Monarchs or about different Islamic art styles.

An element which intrigues the public but generally proves to be difficult to understand and interpret is the epigraphy included as ornamentation in the complex of the Alhambra, often challenging for scholars as well.

The application can offer users the possibility to visualize the translation of the calligraphic decoration included in the plasterwork, allowing visitors to perceive them as they were originally conceived: not as a merely aesthetic feature, but as an encomiastic and political tool created by the Diwan al-Insa to contribute to the experience of the Alhambra as a place of delight in several respects. Moreover, highlighting such elements underlines the importance of epigraphic evidence for academics, art historians and conservation experts, as it offers valuable clues to determine the function and the history of the various halls, such as in the case of the façade of the Palacio de Comares.

3.6. *The virtual museum*

In recent years, a number of cultural institutions have aimed to create virtual museums, as they provide several advantages for the public, who can digitally experience the visit regardless of accessibility constraints. The virtual museum should offer the same content available through the personal guide application and illustrated in the previous paragraphs, proposing it in an easily searchable way that would allow users to navigate the website in an intuitive and effective way.

Employing the official website of the Alhambra to showcase such contents permits a number of users to discover a unique World Heritage site, as more interested users can delve into the information about the Nasrid Palaces while preparing for the visit or afterwards. At the same time, such tool

constitutes an incentive for artistic and cultural tourism, facilitating ways in which the monument can obtain grants and conservational safeguarding by European and international institutions.

Furthermore, academic research is greatly advantaged by a virtual museum. The availability of resources for scholars who cannot operate in situ would assist in obtaining otherwise inaccessible sources, while incentivizing the use of the Archive and Museum of the Alhambra. The information gathered and organized to create the content for the application and virtual museum encourages new studies, promoting the analysis of the monument and the employment of different dissemination methodologies, which can in turn provide new features for the application, fueling a virtuous cycle.

4. An example: communicating the Patio de los Leones

The proposed personal guide application offers the variety of contents divided in categories as illustrated above in order to facilitate users. Properly communicating this information allows to transmit to visitors the extraordinary historic and artistic importance of the monumental complex of the Alhambra, as well as to create awareness about how to protect such heritage, safely increase its fruition and encourage its analysis.

The following paragraphs provide an example of how the proposed application could be employed for a part of the Nasrid Palaces, namely the Patio de los Leones, one of the most emblematic sections of the Alhambra, which inspired several artists.

4.1. Tridimensional reconstructions of the Patio de los Leones

Considered the most impressive and iconic area of the monumental complex, the Patio de los Leones has been relatively well-conserved and unmodified when compared to other halls such as the Mexuar or the Cuarto Dorado. Nevertheless, the employment of virtual reconstructions dedicated to the evolution of the courtyard during the different historic phases would help highlight those details that have changed since it was first built.

The process of creating such digital model starts with either a photogrammetry campaign or a tridimensional laser scan dedicated to the Patio de los Leones in its current state. Due to the intricate details of the lattice and plasterwork, as well as the disposition of the columns, this phase must be undertaken with particular care, as the configuration of the courtyard provides several obstructions, therefore lending itself to lacunary models. Under this point of view, laser scanning could prove to

be the technique yielding the best results, nevertheless achieving an appropriate reconstruction of the Patio de los Leones requires a high level of expertise.

Once the current state of the area is documented and modeled, the virtual reconstruction provides both the final stage of the historic evolution of the courtyard and the base for models of the remaining periods shown through the application. The development of these elements necessitates a twofold effort, consisting of the systematization of both documentary research and scientific analysis and the graphic reconstruction itself. In order to obtain models that prove faithful to the supposed aspect of the courtyard during the centuries, the first step is represented by gathering and organizing the existing material concerning the topic, which would allow to clearly identify the main differences between the contemporary state of the area and how it presented itself in the various historic phases. The information must be integrated and connected in order to graphically reconstruct the environment: during this step of the process, it could be useful to translate the findings into sketches that help the entire team highlight their findings and offer digital modelists a clear idea of how to differentiate the reconstructions. Close collaboration among the various members of the research group is crucial in this phase, as from the systematization of information can arise inconsistencies and contradictions.

When consensus is reached with regards to the aspect of the courtyard across the centuries, the sketches can be transformed into tridimensional digital reconstructions, mainly based on the model of the current state obtain with the initial laser scan and modified where necessary to create a time sequence of reconstructions offered through the personal guide application.

In general, seven main periods can be identified when considering the history of the Nasrid Palaces: Muhammad I's foundation in 1238, the sultanate of Isma'il I, the sultanate of Muhammad V, the Reconquista, the decline, the XIX and XX century restorations and nowadays. Not all these phases yield specific reconstructions for each section of the monumental complex, as different areas have not been homogenously modified. In the case of the Patio de los Leones, the courtyard did not exist at the time of the foundation or of the sultanate of Isma'il I, while it was nearly unchanged by the Reconquista. Therefore, three historic models can be added to the one detailing the contemporary aspect of the area, namely that of the sultanate of Muhammad V, that of the decline and the one highlighting the restorations.

The courtyard was built during the second half of the XIV century as commissioned by sultan Muhammad V, who also expanded the existing structure of the place by adding the Palacio de

Comares and the Palacio de los Leones. His work was furthered by his heirs, especially Yusuf II. The main structure of the Patio de los Leones, with two-story buildings and elegant colonnades, dates back to this period and can therefore be obtained by the initial scan. Similarly, the contemporary aspect of the fountain, with a single polygonal basin resting on the backs of twelve lions is analogous to the original, which followed the Eastern Islamic tradition, probably originated with the temple of Jerusalem. However, the poem inscribed on the side of the basin, composed by vizir Ibn Zamrak, was underlined by a delicate polychrome painting, which could be virtually restored in the model. Moreover, the windows of the Alhambra were decorated with geometric stained glass, which only the Mirador de Lindaraja still presents, and should therefore be included in the reconstruction. Furthermore, the texts of Islamic travelers such as Ibn Saïd al-Magribi, Ibn Battuta and Abd al-Basit include short descriptions that can be employed for the digital model of this period.

When in 1492 the Catholic Monarchs conquered Granada, thus terminating the process of the Reconquista, the Alhambra became one of the Spanish royal palaces and was partially remodeled. While the Nasrid Palaces were integrated with Renaissance and mudejar decorative elements, the Patio de Los Leones remained relatively unchanged, as the modifications concentrated on the Mexuar, the Cuarto Dorado and the Sala de los Reyes.

During the decline that followed the gradual decrease of interest by the sovereigns, the Alhambra underwent a general deterioration and a few of the halls adjacent to the Patio de los Leones suffered grave damages. In 1590, an explosion destroyed the muqarnas ceiling of the Sala de los Mocarabes, on the western side of the courtyard, substituted in 1714 with a plaster vault. During the second half of the 16th century, the Fuente de los Leones was integrated with a pyramidal structure and a second smaller basin that hid the medieval water jet. During the XIII century, an earthquake shattered the stained-glass windows of the complex except for the one in the Mirador de Lindaraja. Additionally, between 1810 and 1812, the sacking of the monument operated by the invading Napoleonic troops determined a drastic acceleration of the ruin, furthered by the fact that the lower classes of the population found refuge in the halls of the Nasrid Palaces, often selling spoils of the majolica and plaster ornaments to tourists.

As mentioned, the Romantic interest in the Alhambra led to a series of academic studies and restorations started during the XIX century. The initial interventions followed the principles of Viollet le-Duc's theory, often discarding accuracy in favor of spectacle: in the Patio de los Leones, Rafael Contreras coronated the eastern pavilion with spherical domes recalling Turkish and Persian architecture. Only after the ideological change proposed by Leopoldo Torres Balbás, the courtyard

was restored according to a correct stratigraphic analysis and in 1966 both the second basin of the fountain and the domed structure of the pavilion were dismantled, restoring the original aspect of the courtyard, similar to that it has today.

From the short excursus above, it appears evident that the Patio de los Leones presents a complex stratigraphy, albeit less so than many other areas of the Nasrid Palaces, thus properly communicating this evolution to the public can prove challenging for traditional museum education tools such as audioguide descriptions and illustrations on panels. Visitors can greatly benefit from digital reconstructions of the various historical phases, as they offer a powerful tool for directly and intuitively understanding the intricacies of the architectural and artistic changes the monument has undergone.

The employment of Augmented Reality allows users to see the virtual models as superimposed over the physical environment they occupy. For each phase, the reconstructions would not hide the entirety of the existing monument, rather, they would only substitute with virtual objects those elements that have been modified. As an example, the model of the Patio de los Leones showcasing the restorations would digitally add the second basin and the water spout to the fountain, while allowing the public to still observe the original base as captured by the device's camera. Moreover, this technology allows to easily convey to the visitors which characteristics of the aspect of the monument through its evolutions constitute documented facts and which represent plausible hypotheses.

4.2. Overlaying archival documents: depictions of the Patio de los Leones

As previously mentioned, in order to obtain accurate digital reconstructions of the historical phases of the architecture, a thorough archival research is fundamental and can yield graphical documents of great interest. These images should be included in the Augmented Reality personal guide application as a tool to not only better understand the original aspect of the Nasrid Palaces, but also how it was viewed by artists during its history. In fact, as briefly summarized in the previous chapter, since its foundation the Alhambra has represented a source of amazement and inspiration, leading to drawings, etchings, paintings and photographs that encapsulate a particular vision and sensitivity of those who represented the monument.

In the case of the Patio de los Leones, since most of the earliest images of the Alhambra focused on its exterior and its position in the context of Granada, the first depictions can be found in planimetric drawings. In the *Planta grande*, which portrays the Alhambra as it appeared around 1532, the central fountain in the Patio de los Leones is illustrated as a single basin supported by twenty-one lions; while Vico's *Plataforma de Granada*, created between 1612 and 1614, does not offer a trustworthy representation of the monument as a whole. Indeed, the artist skews the proportions of the fountain to enhance its visibility and adds a façade to the western side of the Palacio de los Leones.

The most ancient view of the courtyard is offered in 1668 by Louis Meunier, as the French illustrator is the first to depict the interior of the Nasrid Palaces. His work is far from faithful to the original in terms of proportions, which appear exaggerated due to the minuscule human figurines. Nevertheless, the architectural representation appears fundamentally correct despite lacking detail and documents an important change operated to the fountain, namely, the addition of the second basin.

A century later, new images of the Patio de los Leones are provided in “*Las Antigüedades Árabes de España*”, which include plans highlighting the colonnade, the fountain and the articulation of the connected basins, elevations of the courtyard and the adjacent halls, and a number of architectonic details.

A plate by Juan de Villanueva offers a longitudinal section of the Palacio de los Leones as it appears cut along the east-west axis and facing the southern side: the central area of the image is occupied by the courtyard, flanked by the Sala de los Reyes on the left and the Sala de Mocarabes on the right. The accurate depiction allows to underline key decorative elements such as the rhythm of the columns and the shape of the roof of the pavilions, as well as document once again the presence of a smaller basin on top of the original one in the Fuente de los Leones.

This is further described in an image by José de Hermosilla representing both the plan and the elevation of the fountain. The twelve lions at the base, more realistic than the original ones, appear distanced from the basin, which is held by different supports rather than resting on the back of the animals. The original dodecagonal basin is surmounted by an articulated pillar topped with the smaller round basin, ornated with a simplified version of the pattern decorating the Nasrid one.

In other plates, the author also concentrates on the inscriptions adorning the fountain, as well as on the columns of the southeastern corner of the Patio de los Leones and on their capitals. These decorative elements were a subject of interest for other artists who contributed to the publication, in

particular Diego Sánchez Sarabia, who included in his depictions hypotheses about the original polychrome aspect of the epigraphical ornaments

While the images of the Patio de los Leones mentioned up to this point can mostly be regarded as attempts at objective, albeit sometimes rather imprecise, descriptions of the courtyards, the illustrations of the Picturesque and Romantic travelers aim to go beyond the mere documentary purpose and provide a peculiar view of the subject as it appeared to those who observed it with the sensitivity of the time.

Henry Swinburne's 1775 view of the Patio de los Leones can disappoint in terms of objectivity, accuracy and precision, but its value can be found in the novel perspective experimented by the artist, who selected it in order to imbue the image with a sensation of grandeur and sublime to evoke the emotions felt at the time of his visit. The point of view, probably from the northeastern corner of the colonnade, distorts the proportions, which appear greater than the original, unfortunately while also creating a number of problems in terms of perspective, summarily solved by eliminating or displacing existing elements. In particular, the longitudinal axis of the courtyard is skewed, resulting in an off-center fountain and missing canals leading to the pavilions. At the same time, Swinburne includes elements such as the tall water jet on top of the fountain and the alternating tile pattern on the floor. It should be noted that the latter is absent in other images, which leads to consider it an invention created by the artist to emphasize the rhythmic procession of columns.

Distorted and exaggerated proportions can also be found in James Cavanah Murphy's "A perspective View of the Court and Fountain of Lions", included in the 1816 publication "The Arabian Antiquities of Spain". Observed by one of pavilions, the Patio de los Leones appears impossibly elongated, as the colonnade towers over small figures in Moorish attire. As previously mentioned, choosing to add such verticality to the representation conveys a common XIX century hypothesis which considered Islamic architecture as a precursor of Gothic art.

Contemporary to Murphy's images, Alexandre L. J. de Laborde's album "Voyage pittoresque et historique de l'Espagne" presents the Patio de los Leones as viewed from the north-eastern corner. Offering more realistic proportions, the plate proves useful to document the conservation of the courtyard in the early XIX century: plants intersperse the roof tiles and surround the forefront columns of the eastern pavilion, while the ground appears to have lost its marble flooring cover and be constituted of simple dirt, except for a trapdoor on the lower right of the image. Construction materials such as wooden beams can be seen in the foreground and behind the colonnade, where the decoration

seem to have partially fallen or been removed. Besides the fountain's second basin, another important detail from the Reconquista can be seen in the central area of the depiction, as the imperial double-headed eagle is included in the plaster ornaments of the western pavilion, just beneath the roof.

A novel point of view is adopted by T. H. S. Bucknall Estcourt, who in "Alhambra 1827" depicts the Patio de los Leones from the corner of one of the galleries on the shorter sides. The exaggerated dimensions of the architecture, accentuated by the low perspective, as well as the inclusion of a flourishing garden peeking through the colonnade show that the author's main aim was to convey the emotions that the Alhambra had elicited rather than accurately representing the monument, according to a Romantic sensitivity that can be found in later artists as well.

Elements tied to the sublime, such as the contrast between the opulent Islamic past and dire present of Granada as a whole and the Alhambra in particular, were highlighted by the works of Romantic travelers. Philibert Joseph Girault de Prangey's representation of the Patio de los Leones exemplifies these characteristics: the courtyard is at the same time richly decorated and suffering from cracks on the columns and floors, while once again some vegetation covers the areas between the fountain's canals. In one of the plates, an Islamic scene livens the perspective, which shows a series of arches progressing from the innermost side of the gallery to the pavilion, as the canal guides the observer's gaze towards the fountain. The other representation of the patio includes a character contemporary to the author lounging at the base of coupled columns. The perspective, close to the corner of the courtyard, allows Girault de Prangey to frame the opposite pavilion in the leftmost archway, as the gallery extends towards the right side of the plate.

In the same years, Harriet Ford née Capel offers a view of the courtyard close to the fountain, including the pavilion on the left and dedicating most of the drawing to the northern gallery and to the garden surrounding the Fuente de los Leones (Figure 166), while David Roberts once again focuses on the western pavilion and distorts the view by populating the plate with small human figures, a strategy adopted by Baron Isidor Justin Severin Taylor as well.

The epitome of Romantic representations of the Alhambra is reached by Gustave Doré's illustrations of the Baron de Davillier's "Le Voyage en Espagne". Doré's Patio de los Leones is a refined exotic fantasy populated by peacocks as a Turkish dome surmounts the pavilion furthest from the observer. The intricate ornaments of the plasters are carefully detailed and the depiction of the fountain includes an element which had recently been added, namely the water spout.

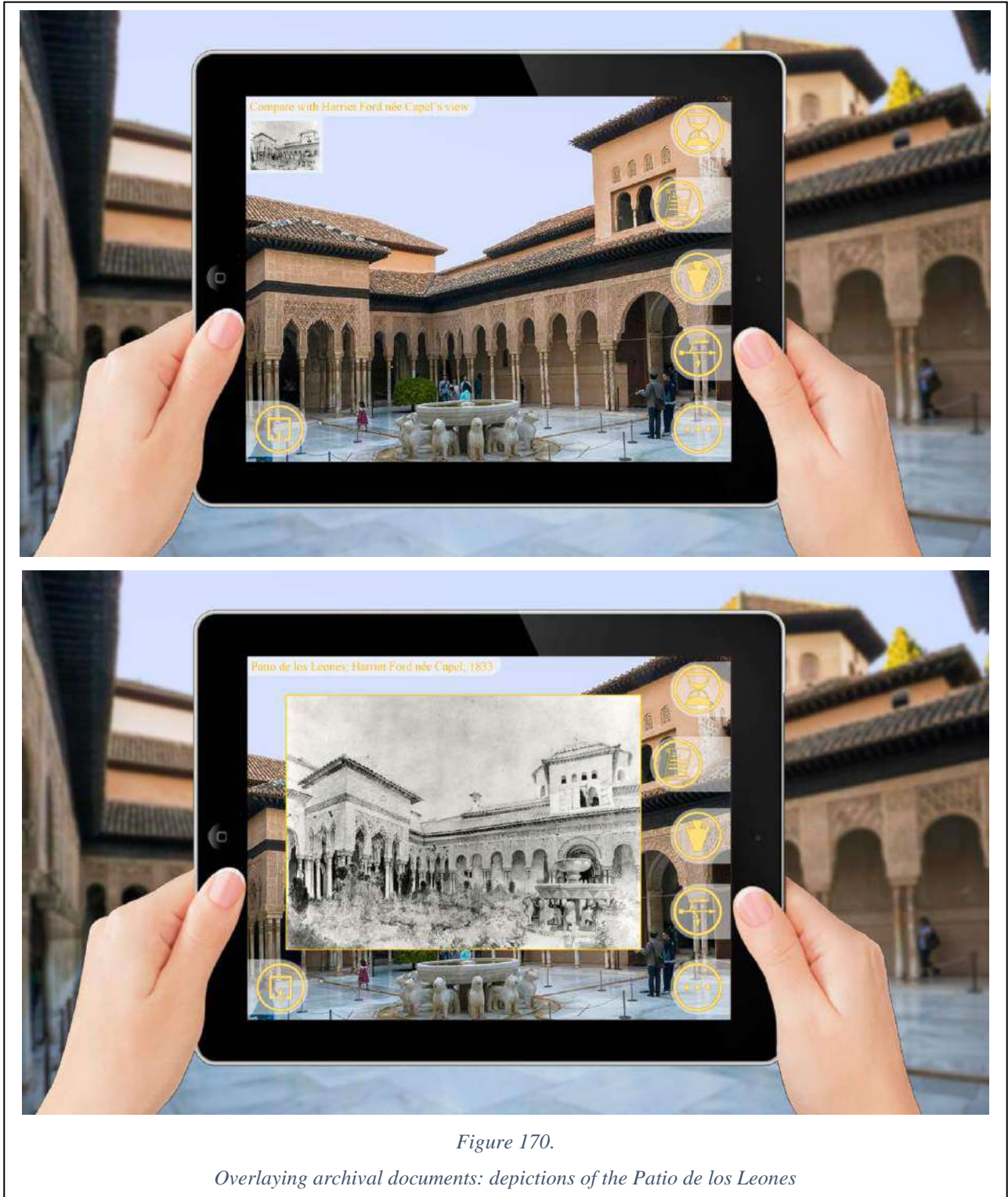


Figure 170.

Overlaying archival documents: depictions of the Patio de los Leones

The next phase of the representation of the Alhambra is that of its analysis as a catalogue of decorations. Owen Jones's publication include the elevation of the Patio de los Leones, details of the decorations on its arches and its fountain, as well as studies of the colors used to paint the plaster ornaments. The interest in objective representations increased as photography became popular at the end of the XIX century and began to be employed as a tool for capturing images of places such as the Alhambra. While the earliest examples for the most part include points of view already perfected by previous artists, photographs offer accurate documental evidence: Clive Clifford's representation of the pavilion provides an exact view of the dome traced by Doré and of the fountain with both the second basin and the water spout. The Patio de los Leones soon became a favorite subject, lending itself to a number of commercial images such as Gaudin's stereoscopic view of the colonnade and Laurent's perspectives and details, while also proving the perfect environment for illustrious guests, such as in the case of the Moroccan Embassy of 1885.

At the same time, the novel technology of the photograph led artists away from mimesis and towards a more interpretative approach to their subjects: impressionists such as Joaquín Sorolla choose the Alhambra as a topic to study the interplay of light on various surfaces, creating the basis for abstractionism. In the case of the Patio de los Leones, this transition can be found in the work of Miguel Rodríguez-Acosta Carlström, who dedicates a few sketches in his "The Alhambra: Cuaderno de dibujos" to the titular lions surrounding the fountain. His rapid drawings highlight the chiaroscuro created by the intense Andalusian light, occasionally underscored by the use of color, and later give way to more abstract pieces in which the juxtaposition of colors is the main subject.

Including the array of images mentioned above in the personal guide application proves beneficial for both the general public and for scholars. The technology would allow to add the depiction as geolocalized files in the same position and with the same orientation as that of the original artist, thus allowing a direct comparison between the existing monument and its interpretation. While researchers would be facilitated in their tasks thanks to in situ documentations, visitors could thus easily understand the importance and influence of the Alhambra while also gaining knowledge about different aesthetical approaches to the same subject, determined by changing times and sensitivities. In the case of the Patio de los Leones, the images mentioned above could be virtually located along the museum route which traverses the courtyard, following its galleries counterclockwise starting

with the northwestern corner. Although some of the representations do not offer enough accurate details to identify the exact point of view of the author, especially considering the symmetry of the architectural subject, it is still possible to formulate hypotheses with respect to this aspect.

Visitors would then first encounter a plate by Girault de Prangey and, as they approach the western pavilion, those by Escourt, Murphy and Doré, as well as the Orientalist scene created by Girault de Prangey. Following the route eastward along the southern gallery, the public would then encounter Meunier's view and explore a number of images surrounding the fountain: José de Hermosilla's plan and elevation, Harriet Ford née Capel drawing, Clifford's photograph and Miguel Rodríguez-Acosta Carlström sketches. Continuing towards the eastern pavilion, Baron Taylor's etching would appear, followed by De Laborde's and Swinburne's views, as Robert's and Murphy's plates conclude the tour on the northern side.

As highlighted by the above description, the existing route does not allow the public to experience the various illustrations in chronological order. Nevertheless, this element should not represent a difficulty when considering opportune measures to ensure that the period of creation of each representation is properly conveyed, for example by adding a timeline. Moreover, in the virtual museum, this aspect could easily be overcome, as physical limitations would be absent.

4.3. Overlaying museum objects: daily life in the Alhambra and the lions of the Maristán

As previously mentioned, the core characteristic of Augmented Reality is the fact that it offers the possibility to include virtual contents within an existing physical environment, allowing the superimposition not only of bidimensional elements but also of three-dimensional objects.

This feature can be exploited by the proposed personal guide application to add museal elements such as those in the Museo de la Alhambra to the Nasrid Palaces. In fact, while the monumental complex presents a rather remarkable state of conservation from an architectural point of view, the empty halls cannot provide the public with a realistic vision of the Andalusian court, as they entirely lack all the ordinary objects of everyday life that would have been found in these spaces at the time of their use as one of the most flourishing Islamic capitals. In order to provide visitors with a more authentic portrayal of the environment, it is possible to digitally add to them a series of finds pertaining to the Nasrid kingdom, many of them part of the collection of the Museo de la Alhambra.

With regards to the Patio de los Leones, the permanent collection includes a number of pieces belonging to the courtyard, such as fragments of the plaster ornaments and wooden brackets used to support the roofs protruding from the galleries. Moreover, parts of the Nasrid wooden ceilings showcase the original polychrome decorations, while some marble memorial stones were also found in the courtyard, partly because of their reuse as flooring.

Among the finds, the museum hosts the XIX century water spout of the Fuente de los Leones, decorated with a number of ridges in order to imitate the smaller ones created by Nasrid artisans and evoke water ripples. The use of the spout is documented in a number of images, some of which included in the overlaid documents mentioned above and significantly changed not only the aspect of the fountain, but also the height of its jet and the noise filling the courtyard, marking a meaningful difference between the Islamic and Christian approach to water.

Other elements from the museum could be included in the Patio de los Leones to highlight its possible functions through the furniture it contained. The collection of the Museo de la Alhambra includes several objects such as plates, cups and glasses, as well as lanterns, animal figurines and the impressive eponymous vases with exquisite decorations: a number of these finds could be used to convey to the public the activities of the daily life of the palace.

Finally, an especially interesting element is represented by the lions of the Maristán, animal sculptures that, while not pertaining to the Patio de los Leones, provide a valuable term of comparison for the figures at the base of the fountain. The lion motif was rather common in al-Andalus and in particular in Nasrid Granada and in the Alhambra, as it can be found in fragments such as the water spouts of the Parador de San Francisco, in small decorative elements of clothes and jewelry, as well as in weapons, equestrian instruments and mural paintings, both with narrative and symbolic functions. The sculptures of lions hosted by the museum, however, decorated the Maristán, a hospital and social institution created by Muhammad V, and therefore were nearly contemporary to the courtyard of the Alhambra.

The rectangular plan of the Maristán was centered on a longitudinal pool, where the sculptures of two crouched lions functioned as water spouts, consolidating a traditional connection of al-Andalus which often saw the animal associated with water. While the statues were initially located in the Partal, in 1994 the Museo de la Alhambra restored and hosted them to avoid further deterioration, nevertheless, including a digital copy in the Patio de los Leones would facilitate direct comparisons between the lions of the Maristán and those of the Alhambra (Figure 166).

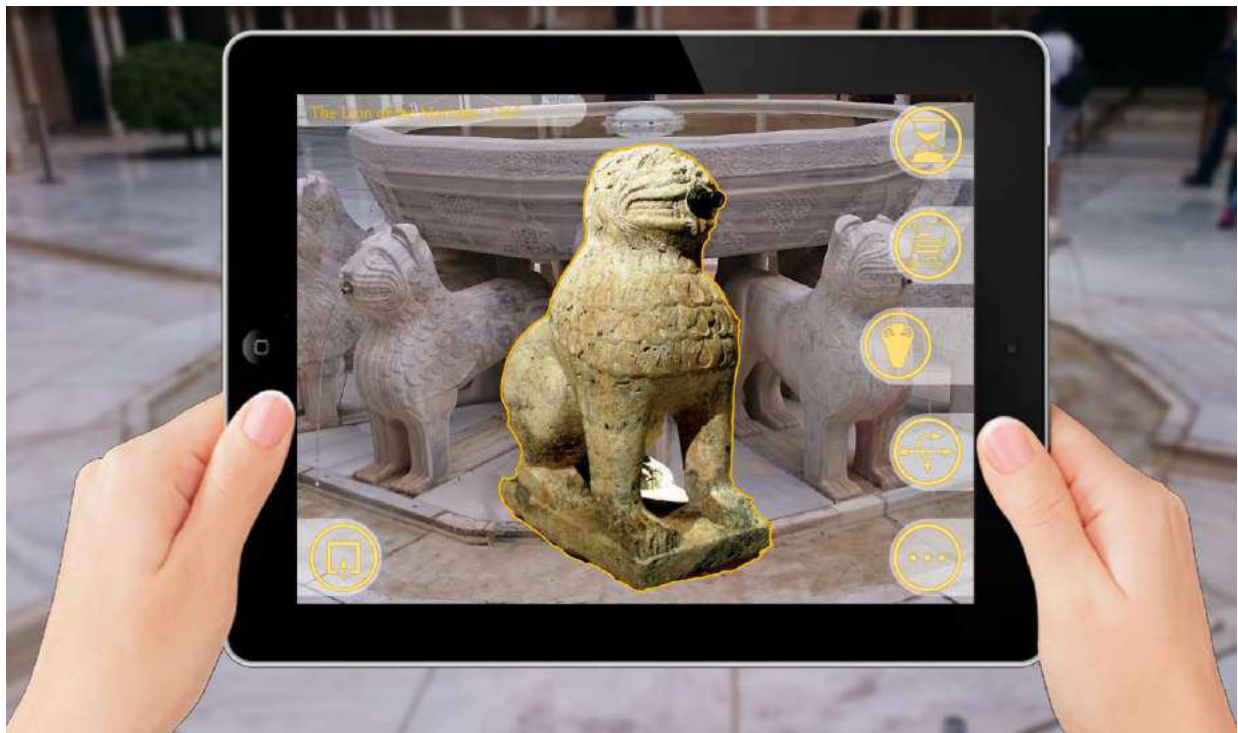
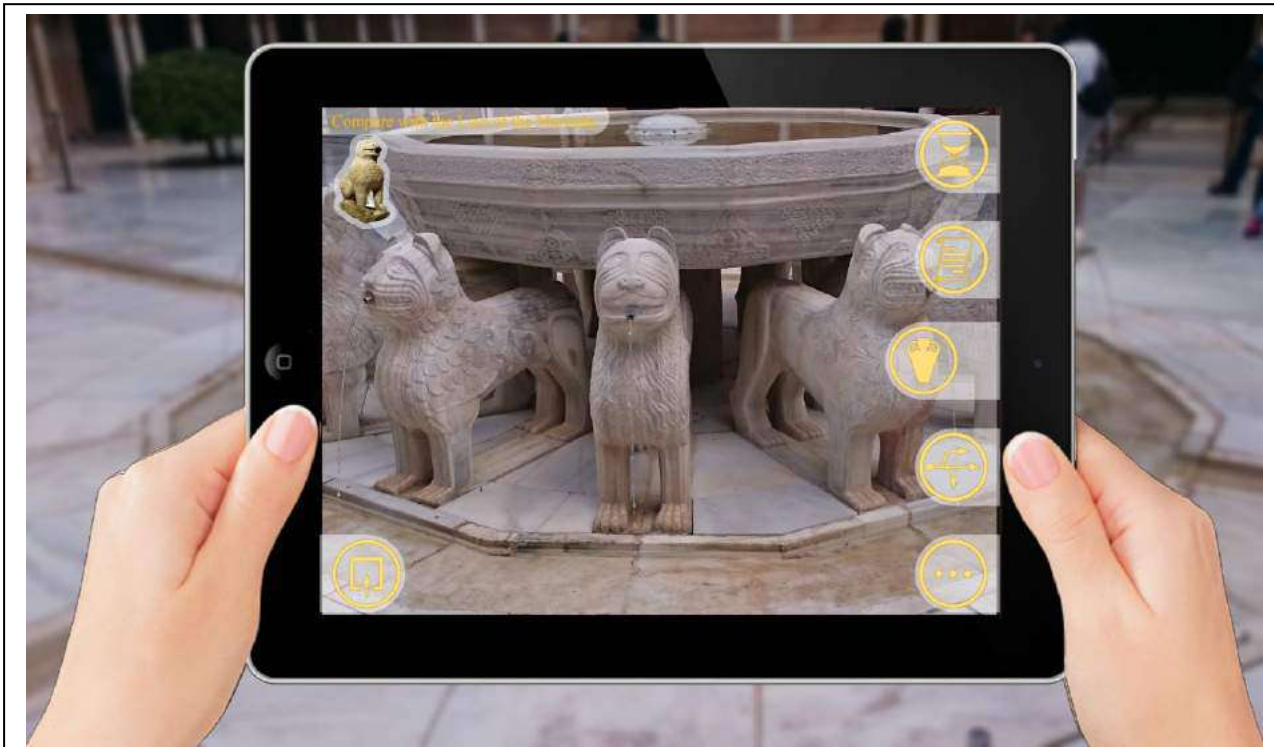


Figure 171.

Overlaying museum objects: the Lion of the Maristán

In particular, through the personal guide application, users could analyse the iconography of the different lions, noticing how, despite adopting similar styles for delineating the faces and manes, the sculptures have different poses closely related to the surrounding space. In fact, while the lions of the Maristán are sitting and could be employed to guard a pool or a door, the statues of the Fuente de los Leones are standing, ready to attack, a posture much more appropriate for an open space such as the courtyard and mentioned by Ibn Zamrak in the poem inscribed on the basin, where it is stated that only the will of the sultan stops the animals from attacking. Other differences can be found in the materials and chronology, as the lions of the Maristán were made of limestone and date back to approximately 1365, about a decade earlier than those of the Alhambra, which are made of marble. Nevertheless, the symbolic meaning of the lion is similar in both cases, as the animal was closely associated with power and, by extension, with the sultan, a metaphor that can be found in a number of cultures around the world.¹⁶⁸

In order to digitally overlay the chosen objects in the Patio de los Leones, it is necessary to obtain tridimensional virtual copies of the finds through the same techniques previously described to digitalize the environment itself, namely, laser scanning and photogrammetry.

Allowing the public to observe the finds in their original location, as well as completing the courtyard with the furniture it probably included at the time of the Nasrid sultans, permits a deeper knowledge of the palaces as they appeared, offering visitors of any background the opportunity to visualize them and therefore imagine them as a living space rather than merely a monument.

4.4. Interdisciplinary connections: the mathematics of Andalusian architecture

The design and construction of the Nasrid Palaces represents one of the highest expressions of the civilization of al-Andalus, from an architectural, scientific, literary and cultural point of view. In this regard, an especially interesting aspect is represented by the employment of mathematical notions in order to create ornamental patterns.

¹⁶⁸ (museoalhambra & Aranda Pastor, 2016)

According to academics such as Cajori¹⁶⁹ and Crombie,¹⁷⁰ the employment of such geometries as a decorative pattern was possible thanks to the high level of mathematical literacy developed by the Arab civilization and partially based on the scientific knowledge of the ancient Greeks, conveyed by the Byzantine empire and by the Nestorian Christians of eastern Persia, who translated a number of Greek texts to Syrian during the VI century, especially in the city of Jundishapur. When the city was conquered by the Arab troops, it became the greatest medical and scientific center of the Islamic world, soon emulated by Damascus and Baghdad, where the translation continued: by the end of the X century, the majority of Greek scientific texts were available in Arabic. Moreover, the cultural patronage of Islamic monarchs led to the creation of multicultural courts, where scholars were accepted regardless of their origin or faith and significant scientific developments were proposed by Muslim, Christians, Jews and people of a number of other religions.

The commercial relations between Muslims and Christians permitted to convey such knowledge to the Europeans, especially thanks to the translations from Arabic to Latin developed in Spain and Sicily, which allowed to recuperate texts by Aristoteles and Euclid, as well as Ptolemy and Hippocrates. Furthermore, the advantageous position of the Islamic territories represented a bridge between Orient and Occident, so that Europe benefitted from Indian scientific advancements pertaining arithmetic and algebra.

When designing the Alhambra, architects often employed geometrical and mathematical notions, adopted for the plans and the decorations alike. Precise proportions were used when determining how to distribute the halls or the stucco panels on the walls. In most areas of the Nasrid Palaces, such use of geometry is best exemplified by the majolica tile decoration on the lower part of the walls, which unfortunately is not visible in the Patio de los Leones. Nevertheless, the courtyard still offers notable mathematical elements with regards to the distribution of the plaster ornaments as well as to the woodwork ceiling and, most importantly, to the use of the muqarnas.

The most apparent decorative pattern is that of the plasterwork, which employs the repetition of different interlocking palmette motifs, visible both in the latticework above the arches and the ornaments on the interior walls of the galleries.

¹⁶⁹ (Cajori, 1919)

¹⁷⁰ (Crombie, 1959)

The use of such modules allows for a regular division of the plane, according to the rules of tessellation, a technique based on the creation of puzzle-like pieces with which it is possible to cover an unlimited surface without overlaying the elements or leaving empty areas. Such pieces should be reconducted to a limited number of shapes, while the only transformations permitted to develop the decorative pattern are the four isometries, namely translation, reflection, rotation and glide reflection, and their combinations. The key characteristic uniting these transformations is constituted by their ability to avoid any distortion of the original image.

While the patterns in the Patio de los Leones mainly use translation as the isometry that allows the tessellations, the monumental complex of the Alhambra includes all seventeen symmetry groups defined by the theory of plane crystallographic groups, obtained by experimenting with the transformations and combinations of fundamental geometrical shapes.

Another notable mathematical characteristic present in the Patio de los Leones is the use of stellar patterns in the woodwork ceilings of the colonnade. Motifs based on golden eight-point stars are limited by wooden ribbons that cross and interlock to create an array of geometrical shapes, created thanks to the careful choice of where and how such ribbon should change inclination.

Developing from the central sino, the star, the kaleidoscopic designs maintain an attention for the symmetry of the design and at the same time offer a symbolic connection to the nighttime sky. The interlocking woodwork was created by means of set squares and compasses, as the artisans based their work on notions of Euclidean geometry in order to construct basic shapes such as squares inscribed in circles that could be rotated to draw the central stars.

Similar patterns can also be found in the latticework of the windows of the whole monumental complex, as well as in the majolica tiles of areas such as the Mexuar, thus proving their versatility and adaptability to different artistic media.

Finally, a fascinating use of mathematics that is nearly exclusive to Islamic architecture is that of the muqarnas, also known as mocarabes. These plaster elements can be found decorating the lower part of the arches delimiting the pavilions of the Patio de los Leones, as well as decorative motifs for part of the walls and of the arches dividing the galleries.

They originated during the X century in North Africa and in Iran, where they were developed from intersecting vaults and domes, then rapidly diffused in all the territories under the Islamic domain, becoming a predominant architectural feature. The main objective of the muqarnas was to smoothen

the transition from a square environment to a dome, as they divided such passage into several small intervals that reduced the angles and thus proved useful for stellar and polygonal vaults as well. Constructed on rhomboidal and square patterns, the modules were engraved at the bottom and often painted, while the upper part was hidden by other prisms. The fundamental rule regarding their distribution establishes that the junctures of adjacent pieces should follow the same orientation.¹⁷¹ Because of their peculiar shape, the muqarnas remind observer of stalactites, but their distribution follows the regularity of fractal structures, patterns that repeat themselves on different scales. Studying the plans of those areas of the Alhambra decorated by muqarnas, it has been possible to identify how the organization of each single element in relation to its companions depends upon a central symmetry scheme, usually based on star-like patterns. This appears especially clear in those halls surrounding the Patio de los Leones, such as the Sala de las Dos Hermanas and the Sala de los Abencerrajes, however the fragments utilized in the courtyard follow a similar system.

The fascinating connections between geometry and decorations in the Patio de los Leones can be transmitted to visitors thanks to a number of options available through the personal guide application, addressing different types of public.

Besides offering brief descriptions of the history of mathematics in the Islamic world, necessary for contextualizing the geometrical artwork of the courtyard and explaining the creation of complex ornaments, the application could provide a further illustration of the exact geometric notions employed, particularly emphasizing tessellation., as users could choose to visualize animations that would show the procedures used to develop the designs.

Thanks to Augmented Reality, the most interesting geometrical elements would be highlighted as the public observes the monument, superimposing over the physical environment those cultural heritage layers that permit to underscore determinate shapes in order to allow visitors to notice the various symmetries and recognize patterns.

A further exploration could be provided through an edutainment system which would permit the public to create personalized patterns based on the same instruments and techniques used by Nasrid

¹⁷¹ (Grabar, La Alhambra: iconografía formas y valores, 1980)

artisans. By deciding the type of symmetry and drawing shapes on the device's touchscreen, visitors can design their own motifs and choose to share them through social medias.

Analogously, a ludic experience can be employed to deepen the understanding of tessellation, inviting the public to choose a basic shape and explore its transformations and notice how the resulting pattern changes, especially with regards to which combinations manage to both fill the entire plane and avoid overlaying mosaic pieces.

Finally, in order to illustrate the complexity of the muqarnas and offer users a tool to engage with them, the personal guide application can be used to develop fractal patterns based on input from the public, allowing the observation of its gradual development. Moreover, the visitor can digitally build structures composed of muqarnas by employing virtual copies of the basic elements, as the program completes the symmetry to facilitate the task.

Users interested in the geometry of the Alhambra could expand their knowledge of the topic by investigating Maurits Cornelis Escher's visits to the monument and the resulting works. Besides general introductions to the subject underlining Escher's artistic visions and the questions which he researched through his drawings and engravings, the application can provide the public with cultural heritage layers that compare his travel sketches to the corresponding areas of the Nasrid Palaces, in order to better understand the source of his inspiration. Moreover, edutainment experiences regarding his works could be offered by employing technology to gradually transform a shape chosen by the user into another, thus automating the process that led to the creation of the "Metamorphosis" series, which can be considered an evolution of regular tessellation.

4.5. Additional options: decorative techniques and epigraphy

Part of the enchantment of the monumental complex of the Alhambra is given by the rich decorative apparatus, which is articulated through an array of techniques such as ceramic mosaics, plasterwork, paintings and woodwork. Different ornamental methods are used according to precise rules in the entirety of the Nasrid Palaces in order to grant continuity and create a rhythm that repeats throughout the structure.

In most cases, the lower part of the walls is covered by majolica tiles that create geometric polychrome patterns in red, ochre, blue, green, black and white, usually topped with a short ribbon of plasterwork inscriptions integrated with geometrical motifs and arabesques, while the rest of the wall appears plain or ornated with further stuccos. The ceilings can either be built with interlocking wooden panels or be constituted of muqarnas, both originally richly painted.

The ceramics, inspired by Moroccan ones, were first designed according to those geometric principles that allowed artisans to organize the entirety of the ornamental apparatus of the Alhambra, as they developed complex patterns starting from stars and polygons. The tiles were created by cutting each piece from a larger monochrome area of glazed ceramic, in order to guarantee regular and perfectly plane tiles. Each cut was slightly oblique, so that the pattern could then be composed upside down and mortar could be poured over it, thus cementing the pieces together without hiding the design. Once dry, the mosaic was then lifted and attached to the wall with metal hooks and mortar.

The plasterwork, on the other hand, while based on similar geometric patterns, required a different methodology for their creation. Influenced by the Abbasid Caliphate, Nasrid artisans started using molds from which they could obtain perfectly identical stucco ornaments even when adopting elaborate motifs such as those of the Alhambra. They were then painted with egg-based tempera, usually in white, red and blue with golden accents.

Woodwork techniques, instead, were inspired by Roman, Byzantine and Syrian construction and adopted basic shapes as models for the initial design, which then evolved into patterns similar to those of the mosaics. The ribbon that limited the various shapes was cut first, while the other pieces were subtracted from the original board and recreated with other types of wood to add color, although the ceilings could also be painted.

The basis for all decorations can be traced to three fundamental motifs: geometry, nature-inspired patterns, or arabesques, and calligraphy. Purely geometric ornaments, which is employed by itself in the ceramic mosaic, also provides the scheme for the stuccos, offering sequences of polygons, stars and knots, replicated in the woodwork ceilings. Plants and flowers represented a source of inspiration, especially with regards to the shapes of pinecones, acanthus leaves and palmettes, themes that had already been adopted by classical art, while the symbolic meaning attributed to such ornaments is tied to growth, fertility and paradise.

However, in the monumental complex of the Alhambra, one of the decorative elements that is perceived as most typical of Islamic art is the use of epigraphy, which can be found in a number of areas within the Nasrid Palaces.

Although calligraphy is used less than other ornamental motifs, it is still present in ribbons on the walls, usually above the majolica tiles that cover the lower part, as well as in medallions and shields of varying shapes and sizes. The majority of writings are accompanied by a secondary ornamental

theme, either geometrical or inspired by nature, which is used as a background thanks to a difference in the depth of the relief. Moreover, the epigraphy can be included as part of another decorative pattern, for example to create the shape of the leaves in the arabesques. The styles can be grouped into two main categories, namely nashki or kufic script: while the first is akin to a cursive and has a number of regional variations, the latter is highly geometrical, appearing rigid and often without diacritical marks, which would allow to differentiate similar letters.

The inscriptions found in the halls of the Alhambra, besides providing a striking pattern, have been instrumental in the effort to interpret the function of each space: some writings have been categorized as informative, as they include basic data as the year the area was built or the name of the patron who commissioned it. Other calligraphic elements are recurring formulas that refer to verses of the Quran and are often repeated several times in the same hall. Part of the epigraphy, however, consists of poetical compositions created ad hoc by the court chancellery, called the *Diwan al-Insa*, and in particular by viziers Ibn al-Yayyab (1274-1349), his successor Ibn al-Kathib (1313-1375) and Ibn Zamrak (1333-1393). The employment of poetry added a layer of refinery to the royal palace, adding literature to the aesthetical pleasure of art and architecture.

Because of the strong connection between the epigraphy and the environment in which it is located, the ability to convey its translation to the public becomes an important aspect of the personal guide application. Indeed, the knowledge of its meaning would greatly help in bridging the gap between the public experience of the Nasrid Palaces and that of the original inhabitants, for whom the poetry was an essential part of the decoration and its symbolism.

In the case of the Patio de los Leones, the inscription along the rim of the fountain has long been considered a fascinating element by a number of travelers. In his twenty-four verses, evenly distributed on the dodecagonal basin, Ibn Zamrak starts by blessing Allah and the monarch, Muhammad V, and proceeds to highlight the beauty of the gardens, comparing them to precious pearls and silver. He further equates the water of the fountain to a lover's tears and lingers on the lions, finally wishing the noble king to be accompanied by God's peace, to live long and happily as his enemies are defeated.

The short poem includes a series of themes typical of the literature of al-Andalus, such as the use of elegant metaphors that underscore beauty by recalling valuable gems and metals and that evoke emotions by comparing various elements to a lover's behaviors and gestures. It also provides clues to the historical context, such as naming the sultan and his ancestors, within the wider cultural

framework of Islamic civilization. Finally, the poetry highlights one of the most important characteristics of Islamic spaces, namely, the relationship with water: the liquid, a symbol for life in several cultures, becomes even more essential for a civilization originated in a deserts area, taking on meanings such regarding opulence, beauty, meditation and ultimately connection with the spiritual and the divine.¹⁷²

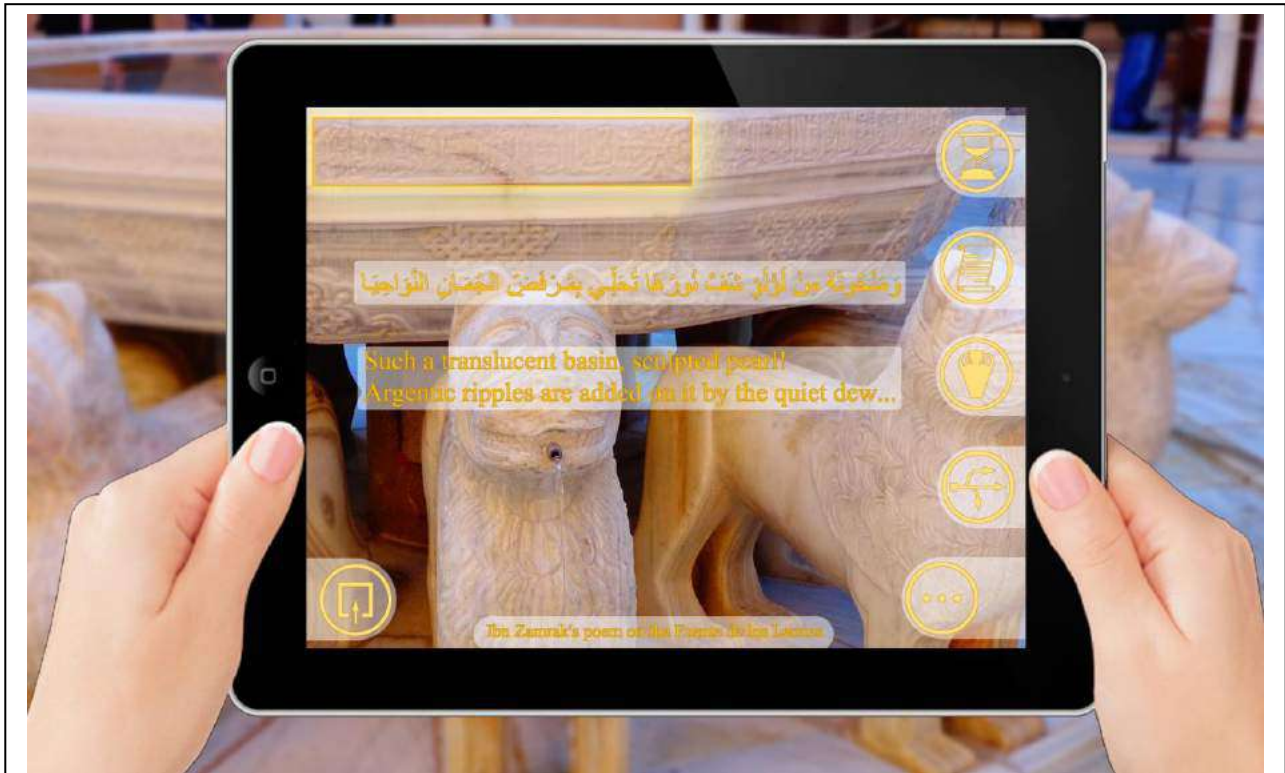


Figure 172.

Additional options: the epigraphy of the Fuente de los Leones

Evidently, the general public's inability to read and understand Arabic precludes most visitors from appreciating the layers of meaning with respect to the epigraphy of the Fuente de los Leones. Rather than stopping at a superficial level by merely enjoying the aesthetic rhythm of the script, the public could employ the personal application guide to visualize a translation of the poem which, thanks to Augmented Reality, could appear overlaid on the original text or could use different colors to create a correspondence between Arabic and translated words. Furthermore, the application can

¹⁷² (Barker, 2016)

provide a series of deeper analysis of the specific inscription, of Ibn Zamrak's life and works and of Arabic writing and calligraphy in general.

Similar advantages can be exploited when adopting a personal guide application based on Augmented Reality to showcase decorative techniques such as the majolica mosaics, the plaster ornaments and the woodwork. The different methodologies can be illustrated through a series of animations and by highlighting notable elements of the surrounding environment. Younger users could also benefit from edutainment activities such as games in which the phases of each technique should be put in the correct order, as well as programs that encourage the creation of personalized patterns, employing the same instruments used by Nasrid artisans.

5. Future perspectives for the Alhambra

As previously highlighted, the quick and pervasive evolution of technology has transformed fields and institutions connected to the cultural heritage, where in recent years Augmented Reality and Virtual Museums are becoming influencing scientific developments for museums and archaeological sites. These technologies are mostly employed to enhance the visitor's experience, proving to be quite successful because of characteristics such as participation and personalization, which are not commonly found in traditional communication strategies for cultural institutions. Moreover, some of these applications encourage interactions with other users, transforming visits into shareable social activities, an element which, like edutainment sections, appeals to younger generations. Despite the fact that the first use of Augmented Reality for the cultural heritage is over twenty years old, its slow diffusion permits it to be still seen as a novel and exciting change when compared to audio-guides and text panels, while the daily contact that the public has with technology allows easy and intuitive interactions.

5.1. Creation and transmission of knowledge

While visitors' positive response has established Augmented Reality as the new benchmark of museum communication, this tool is still largely overlooked as a scholarly resource. Museums and monumental complexes usually present instruments such as digital reconstructions and cultural heritage layers as useful for the general public, yet both can play a valuable role in the advancement of research and in conservation. The clear visual aid offered by virtual models, as well as the introduction of digital scans and photogrammetric analysis as a periodic survey tool, especially useful

in evaluating interventions, represent valuable advantages provided by technology, similarly to direct on-site access to archival and bibliographical materials.

Virtual Museums can be considered companion instruments for personal guide applications, offering remote access to the same content created for the app. While the general public can employ it to plan the visit and to explore the monument, researchers benefit even more from the possibility to digitally experience visiting the cultural institution and accessing the related documents, as it abolishes distances and minimizes costs. Virtual museums permit information to reach academics worldwide and, in turn, increase the chances of finding interesting connections among artifacts with different backgrounds, especially for transdisciplinary studies.

Furthermore, both technologies become self-sustaining sources of knowledge in which research results, shared through these technologies, spark new insights, which can be integrated among the contents of the platforms themselves, in an ever-increasing virtuous circle.

In order to properly communicate to visitors the uniqueness of the monumental complex of the Alhambra and encourage its conservation and valorization, a personal guide application based on Augmented Reality and a companion Virtual Museum for the Nasrid Palaces constitutes innovative, efficient and engaging tools aimed at both the general public and the academic community.

Thanks to the employment of several different didactic methodologies, these instruments can address a diverse public, exploiting the resources already available to explore the history and culture of the civilization that built the Alhambra, as well as the evolution of the palaces and their role as an artistic inspiration. While offering personalized routes for users of different backgrounds and interests, the application also adopts Augmented Reality as an instrument to transmit the articulated stratigraphy of the monument, especially through cultural heritage layers and the inclusion of archival images depicting the Alhambra through the centuries.

The technologies can spark curiosity thanks to the ludic aspect of edutainment features, while also presenting a set of content that encourage a deeper understanding of the monument, such as detailed historic reconstructions and interdisciplinary connections, which can prove particularly useful for scholars, especially by adding in situ digital copies of the most important documentation concerning the Nasrid Palaces. Besides offering a number of practical advantages, this characteristic fosters further research and, thanks to the virtual museum, encourages academics from any area of the world to remotely investigate the monument, while also incorporating new findings as novel content for the

application. Finally, the employment of a highly visual medium such as Augmented Reality permits a reevaluation of graphical documents, traditionally overlooked in favor of textual ones.

A monument such as the Alhambra, with a rich history and numerous interdisciplinary relations, allows to fully exploit the potential of novel technologies like tridimensional reconstructions and Augmented Reality, which in turn constitute excellent candidates to accurately transmit to the public the extraordinary cultural and artistic heritage of the Nasrid Palaces, guaranteeing a high didactic and communicative level and encouraging its study.

5.2. *Contemporary challenges of cultural heritage*

With the proposed app for the Alhambra, this project aims to provide a model for the creation of a personal application guide based on Augmented Reality and a companion Virtual Museum. These platforms would prove valuable for both the general public and for scholars, for their role as instruments to grant access would foster high levels of interdisciplinary and potentially global involvement of the academic community, thus playing a significant role in the creation of knowledge. The characteristics of connectedness, accessibility and flexibility, as well as the interdisciplinary and multimedia approach were identified as key factors for Augmented Reality and Virtual Museums since the first studies on the subject, and to this day remain essential to understand the potential of such technology, from both a practical and ethical point of view. By sharing digitized information concerning museum collections or monuments, these tools significantly reduce the influence of any geographical limitation when trying to gain access to cultural resources, as both the artwork and related documents can be made available to any users with an internet connection, an ever-increasing number which virtually grants access to every and any individual.

Furthermore, these technologies can prove especially valuable for users with disabilities, especially through an attentive use of a variety of media. By providing several ways through which the collection can be experienced, these instruments can offer a fairer and more equitable approach to knowledge, reducing the exclusion of disabled visitors sometimes determined by the physical conditions of monuments and museums. Some examples for visually-impaired users include audio files presented as alternatives to texts and websites that can be easily interpreted by screen readers, as well as the possibility to download models of the artwork that can be printed in three dimensions and therefore experienced via touch.

Features such as high accessibility and increased scholarly involvement transform personal guide applications based on Augmented Reality and Virtual Museums into pivotal allies in the development of a sustainable approach to the conservation and valorization of cultural heritage.

They contribute to the democratization of the creation and transmission of knowledge by allowing access to cultural resources minimizing geographical and economical boundaries while responding to the necessities of users affected by disabilities. They also noticeably lower the impact of tourism on monument and museums, offering a sustainability which is crucial for those cultural structures that are trying to reconcile maximum visibility with conservational concerns, such as limited entries due to delicate environmental conditions. In a monument such as the Alhambra, one of the UNESCO World Heritage Site, emblematic of its city and nation, the management of the influx of tourists represents one of the major challenges, as the requirements for safeguarding the structure and opening it to visitors can appear contradictory.

The employment of new technologies, however, can help reconcile these apparently opposing needs and reduce the problem, as for some categories of public it offers a viable alternative to the traditional visit. Moreover, the improved availability of both the artwork and the relative documents would significantly aid research and increase academic attention towards the palatial complex, thus generating in the scholarly community a renewed interest in the valorization and conservation of the Alhambra and, at the same time, helping increase the general public sensibility regarding such themes.

These factors combine with further advantages such as the high level of public engagement, determined by the personalized routes, the interaction and the edutainment elements, thus harmonizing to create a deep personal relationship between the visitor and the artwork and therefore improving the involvement in activities aimed not only to explore the monument or museum, but also to preserve and protect it.

Due to these characteristics, the proposed project posits that both the Augmented Reality personal guide application and the Virtual Museum would represent optimal tools to communicate the multifaceted history of the monument, particularly with regards to the image of the Nasrid Palaces as seen by the many artists inspired by them. The ultimate aim is to create and support a lively scholarly community that, thanks to the information shared through such technology, will be inspired to further delve into the history and art of the monumental complex, thus fostering its conservation and its valorization, transforming the Alhambra into a paradigm for the development of a sustainable and ethical approach to cultural heritage.

V. Conclusions

As one of the defining features of the contemporary age, the digital transformation has extended to cultural institutions which have recognized the potential of technology as a powerful instrument for public engagement and academic research.

In this respect, the field of Digital Humanities, pioneered a little over 80 years ago, is undergoing a quick development. In past two decades, an increasing interest in the discipline has been especially demonstrated by the attention international institutions have dedicated to digitalization projects as well as by the inclusion of technological tools in several of the United Nations Sustainable Development Goals, such as those regarding industry and innovation, education and sustainability.

This support by wider society has accelerated Digital Humanists' efforts to implement research projects that conjugate technology with ethical aspects such as cooperation, environmentalism, accessibility, diversity and inclusivity. Moreover, while maintaining its characteristic emphasis on experimentation and the strong relationship between application and theory, the discipline has grown to encompass a variety of fields, including Art History.

Indeed, the evolution of software has permitted scholars to engage with visual objects through digital methodologies that allow both analysis and creation of images and three-dimensional elements such as those that constitute the subject of Archaeology, Art History and Museum Studies.

While much younger, as the term only appeared at the end of the 1990s, Digital Art History parallels its parent field in both history and values, while addressing the same fundamental questions as the traditional discipline. Nevertheless, a natural consequence of the novel ways to catalogue and share information are the new academic inquiries, fostered by enhanced comparison, mathematical analysis and data mining. The attention to practice has quickly led to a number of projects offered directly to the public, demonstrating both how innovation can provide powerful engagement and conservation strategies and how culture represents an invaluable resource for sustainable growth.

Thanks to interdisciplinary initiatives that range from databases employing image recognition and network analysis to websites and applications focused on virtual models, the field provides institutions with an opportunity to reach broader and more diverse audiences, addressing a variety of accessibility issues, fostering not only knowledge and participation but also emotional connection to the heritage.

While public engagement can be sparked by numerous methodologies, tools such as three-dimensional digital reconstructions and Augmented Reality can prove particularly successful. 3D

models permit to virtually manipulate objects, thus aiding in informing visitors without compromising the conservational aspects. They also allow comparison across time and space, offer an opportunity to visualize the object's history more effectively than descriptions or illustrations, therefore encouraging a sense of familiarity with the artifacts that often leads to an increased desire to engage with the original. Moreover, a virtual reconstruction can be a powerful instrument for research and conservation, as data acquisition through laser scanning or photogrammetry leads to higher levels of precision that in turn can spark new observations, while at the same time digital models can be employed to monitor objects and test restoration hypothesis.

The development of a three-dimensional virtual reconstruction for a cultural heritage site has been the focus of the author's three-month mobility program at the Human Interface Technology Lab New Zealand. Led by professor Bartneck, the project aimed to create a Virtual Reality game dedicate to the history of Fonthill Abbey, a no longer visible grandiose English estate built at the end of the XVIII century. Through an experience-based approach, the team collaborated on both creating an introspective storyline and building the digital reconstruction, based on textual and graphical evidence. These elements were joined in a game development software which allowed to transform the textual narrative into a visual playable experience and the results were made available to the public through a dedicated website.

As mentioned, besides virtual models, Augmented Reality constitutes an attractive tool for Digital Art History initiatives. The technology allows to superimpose digital features over the existing physical world, encouraging interaction with the proposed content without erasing the environment. Applications based on Augmented Reality employ different sensors to gather environmental data and user input, which are integrated by the dedicated software in order to associate and render the appropriate content, then communicated to the users through an interface that can include audio, video and other sensory stimuli.

While they all maintain a strong connection between the virtual elements and the surrounding environment, Augmented Reality applications can be categorized into different types, most commonly designed for mobile devices such as smartphones and tablets. The availability of such technology among the general population, as well as its portability, provide a practical instrument for Augmented Reality experiences, which additionally benefit from the familiarity that users have with the devices.

Both three-dimensional digital reconstructions and Augmented Reality have been employed by Western museums and monuments focused on Islamic art, analyzed by the author of this thesis in the 2016 conference Digital Art History and Artistic Culture – IV international meeting, held in Malaga. Indeed, the high potential for knowledge transmission offered by such tools proves valuable in contexts where visitors have little previous information about the culture that created the artifacts. Exhibitions such as the one organized by the Louvre-DNP Museum Lab in 2008, the “In Harmony: the Norma Jean Calderwood Collection of Islamic Art” at the Sackler Museum in Harvard and the one held in 2014 at Metropolitan Museum of Art offer valuable examples of the employment of Augmented Reality and virtual models to explore artistic processes and conservation challenges in a participative manner.

Analogously, the “Digital Munya project” takes advantages of a gaming platform to virtually explore reconstructions of Islamic villas near Córdoba, while in Granada part of the heritage sites along the “Dobla de Oro” route through the Albaicín include geolocalized digital models, and the Alhambra temporarily hosted the “Tag Cloud” project, focused on social interaction among visitors.

However, besides representing the emblem of al-Andalus, the monumental complex of the Alhambra constitutes an excellent subject for the development of an Augmented Reality application, as its rich history and art offer a vast corpus of fascinating content which can prove challenging to communicate to the public through traditional guides. In particular, the proposed app focuses on the evolution of the image of the monument as seen by artists along the centuries, from its earliest years to the contemporary interpretations.

Founded in 1238 as the center of the Kingdom of Granada, the Alhambra was a fortress, a city and a royal residence hosting a court of intellectuals and artists who contributed to transform it into a luxurious palace which impressed numerous Islamic travelers. When in 1492 the Catholic Monarchs conquered the city and exiled the sultans from the Iberian Peninsula, concluding the Reconquista, a series of interventions partially changed the aspect of the monument, which became a symbol of the triumph of one religion over the other.

Indeed, the first representations of the Alhambra can be found in the context of sculptures depicting the events of the war, most notably the surrender of Boabdil, last Nasrid sultan, and the Battle of Higuera. These images offer an extremely synthetic vision of the monument, indicated by its towers and presented as a landmark and a symbol rather than the subject of precise representation.

In the XVI century, the growing interest in geography sparked by the great exploratory voyages led to the diffusion of plans and atlases documenting the Alhambra, such as the Gran plano, the “Civitates Orbis Terrarum” and Anton van der Wyngaerde’s views. While the levels of accuracy vary, these images offer documentary evidence of the conditions of the monument, especially considering the modifications operated by the monarchs, most notably the construction of the Palace of Charles V, before their interest in the Alhambra faded.

In fact, the following century saw Granada return to a city of regional importance, while the no longer strategic monumental complex decayed quickly. Although numerous views pertaining to this time were copied from the previously mentioned ones, some novelty is offered by Vico’s *Plataforma*, De Sabis’s depictions from the banks of the Darro and the Genil and Baldi’s illustration of Magalotti’s “*Relazione del Viaggio di Spagna*”. The most remarkable, however, is Meunier’s work as the artist is the first to immortalize the interiors of the Nasrid Palaces, highlighting the symmetry of the courtyards and exaggerating their extension, a recurring trend in later authors as well.

In order to benefit from a higher level of accuracy with respect to the representations of the Islamic monuments of Spain, one must turn to “*Las Antigüedades Árabes de España*”, the catalogue published by the Real Academia de Bellas Artes de San Fernando of Madrid in 1787. As the result of the Illuminist culture of the time, the volume includes faithful plans, elevations and details of the Alhambra, as well as views from the traditional perspectives and reconstruction hypotheses.

Nevertheless, it was Romanticism which afforded Granada’s most important monument its fame. At the end of the XVIII century, the Alhambra became one of the destinations of the Gran Tour, a fabled Near East safely and comfortably located in Europe and thus easily reached by aristocratic Western travelers. Quick sketches, initially influenced by Picturesque aesthetics, were concentrated on capturing the emotion of a visit to the monument and rarely concerned with faithful representation. British artists such as Twiss and Swinburne searched for novel audacious perspectives, Murphy conveyed feelings through exaggerated proportions and de Laborde tried to link Islamic and Gothic art while focusing on intimate spaces marked by light gradients.

As their vision transformed into a Romantic one, travelers visiting the Alhambra marveled at the sense of sublime it expressed through the contrast between an opulent past and ruinous present. Imaginary elements were featured both in texts such as the publications of Washington Irving and Victor Hugo and in depictions such as those of Ford, Roberts and Taylor, while de Prangey’s and Lewis’s works conjugated Romantic aesthetics and truthful portrayal of the poor conservation state.

The most remarkable and famous XIX century depictions of the Alhambra, however, are Doré's illustrations, created for Davillier's volume and dedicated to creating folkloristic scenes with strongly emphasized chiaroscuro. From detailed views of the complex to caricatures, the images communicate the variety of emotions felt by the artist during his visit to the Alhambra, while also providing documentary evidence in terms of the relationship between the monument and the local population.

During the same period, a different approach also arose, encouraging artists to concentrate on objective portrayals of reality and thus leading to Jones's representations of the Alhambra, a veritable catalogue of its decorative elements. The employment of chromolithography added to the volumes' success, as the ornaments influenced a variety of industrial and artisanal production, culminated in the construction of the Alhambra Court of the Crystal Palace for the 1851 Great Exhibition.

The development of photography contributed to the accurate depiction of the monumental complex which remained a favorite subject despite the change of medium. Since the 1840s, voyagers like Gautier, Piot, Tenison and Lorent built a corpus of photographs dedicated to the Nasrid Palaces, while a decade later Clifford immortalized the artistic heritage of the complex and its lacking conservation state, as well as documenting part of the restorations.

At the turn of the century, the Alhambra represented one of the main sources of inspiration for Orientalist art and architecture. While rooms and courts copying the Nasrid Palaces could be seen in residences across Europe and the Americas, painters included its details in exotic scenes and were influenced by the anecdotes of its Islamic history, such as the slaying of the Abencerrajes, depicted by Fortuny, Regnault and Clairin. Similar architectures are features in the background of paintings dedicated to odalisques, a recurrent motif adopted by Orientalists and Symbolists, as well as contemporary artists like Matisse.

In the same years, however, for painters such as Rusiñol and Sargent, the Alhambra also represented a space for personal and artistic reflection. Focused on the protected alcoves of the gardens and courtyards, the authors unite introspective atmospheres with techniques that anticipate Impressionist elements, focused on capturing light in its numerous variations.

The natural evolution of this approach is represented by Sorolla, who visited the Alhambra during the first two decades of the XX century. Fascinated by light and water, he found in the monumental complex an array of subjects depicted with bright, vivid brushstrokes and a style similar to Monet's.

A few years later, in the 1920s, the visit to the Alhambra provided M.C. Escher the inspiration to embark on a lifelong endeavor dedicated to exploring geometric patterns known as tessellations. The highly mathematical nature of his work was influenced by Islamic tile motifs, as documented by his sketched representing the alicatado of the Nasrid Palaces, which gradually transformed into original periodic mosaics depicting animals and identifiable objects. A second visit to the monument offered new insights and led the artist to delve into the geometric relationship underlying the patterns and develop mindscapes in which the tiles metamorphosize from one shape to another in a seamless succession. Escher's departed from portraying the Alhambra, focusing instead on a singular aspect of the monument and transforming it into an entirely different yet recognizable subject, a methodology common to many following artists inspired by the monument.

Indeed, the palace has influenced the abstractionism of several contemporary authors. José Guerrero's action painting and Expressionism has often maintained the arches of the Alhambra and its bright colors, an aspect explored by Miguel Rodríguez-Acosta Carlström through vibrant geometrical compositions and a book of sketches that highlights the process from figurative to abstract drawing. Manuel Ángeles Ortiz's, influenced by Cubism, provided a synthetic interpretation of the monumental gardens, while Joan Hernandez Pijuan furthers this approach in his canvases traced with monochromatic patterns reminiscent of the alicatado. Sean Scully dedicated a series of painting to how the Mediterranean light underlines the bright colors of the Andalusian environment, concentrating on those of the patterns of the Alhambra, also depicted in one of his photographic cycles. The vibrant light is also the subject of Soledad Sevilla's works, rigorous in its geometry and focused on the ephemerality of art.

Finally, a recent exhibition dedicated to female interpretations of the Alhambra demonstrates both how the monument can be interpreted in infinite ways and how, after centuries, it still provides and invaluable source of inspiration. The rich stratigraphy not only of the physical palace but also of its image constitutes an uncommon peculiarity and should be transmitted to the public through appropriate tools which could both grant accuracy and foster engagement.

The proposed project proceeds from previous technological experiences employed in cultural heritage institutions, particularly Western Islamic art museum and monuments, aiming to create an Augmented Reality application based on a route through the Nasrid Palaces that would underline different aspects of the Alhambra, with particular focus on the evolution of its image. Different aspects of this proposal have been discussed by the author in 2017 at the conference Digital

Encounters with Cultural Heritage, held in Dresden, and at the VIII Associazione Italiana di Storia Urbana (AISU) Congress held in Naples the same year, as well as the following year at the VI International Conference on Heritage and Sustainable Development, held in Granada, and at the III Congreso de la Sociedad Internacional Humanidades Digitales Hispánicas (HDH), held in Malaga. The main objectives of such tool are increasing visitors' involvement and knowledge thanks to the employment of different and interactive media and supporting scholarly research, especially by facilitating on site access to relevant documents and artifacts. The benefits of using visualization techniques such as three-dimensional models and cultural heritage layers are accompanied by the advantages of participatory experiences and games, while also fostering greater accessibility. This research presents a theoretical paradigm for organizing such application, offering a methodology and that can be adapted to various cultural heritage sites. In terms of basic functioning, the environmental acquisition software would gather data from the sensor before it is processed by the engine, which would fetch the corresponding content to be presented through an intuitive and unintrusive interface.

The application should be populated by an array of contents, created thanks to different techniques such as laser scanning and photogrammetry, as well as digital modelling, traditional archival research and chemical analysis, thus necessitating the collaboration of an interdisciplinary team. Such content should be varied in terms of target audience, as the elements should address visitors of different characteristics and from different backgrounds, but can be categorized and systematized into several kinds, an operation that can help the public navigate the application.

Firstly, geolocalized tridimensional reconstructions of both the current state and previous phases in the history of the Alhambra should be presented to offer an understanding of the basic stratigraphy of the monument, while also providing a scholarly tool for analysis and conservation. However, instead of simply visualizing entirely virtual models, Augmented Reality allows to digitally layer over the physical environment only the specific features from past times that are no longer visible, immersing the visitor in the reconstruction without losing the connection with reality.

Similarly, digital copies of both archival documents and museum objects can be included in the application and virtually placed in the original environment. This option allows the general public to understand the value of such documentation while also contextualizing both the artifacts and the physical space that originally hosted them, restoring a connection that is often severed due to historical and practical reasons. Moreover, academics would greatly benefit from direct comparison

between archival materials and its subject, as the in situ availability would foster comparison and analysis. Such overlaying can prove particularly useful when aiming to convey the rich history of the image of the Alhambra as seen by artists, an extensive evolution which is rarely transmitted to the public.

The monument also provides several opportunities for exploring various aspects of al-Andalus as well as other civilizations and cultures. The connections between the Alhambra and other disciplines such as science, literature and music are the focus of an autonomous category, dedicated to offering participants with different interests a way to relate such passion with the monument and discover a wide range of topics.

Finally, the additional options complete the visitor's experience with additional content regarding the wider context of the city and region, the systems employed to build and ornate the palace, other Islamic styles, as well as providing translations for the epigraphs that decorate many areas of the monument.

The application is accompanied by a virtual museum, which proposes the same content remotely, thus increasing accessibility and allowing users to both prepare for the visit and follow up on the aspects that most interested them when discovering the monument. Moreover, the increased visibility that a virtual museum would grant to information about the palace would determine a higher level of scholarly engagement as well, fostering a virtuous cycle of knowledge creation and diffusion.

As an example, these categories have been applied to the most emblematic area of the Alhambra, the Patio de los Leones.

While fairly well preserved, the courtyard could benefit from the use of virtual reconstruction to highlight the different conservation states and the modifications it underwent after the Reconquista, especially with regards to the central fountain and to the restorations. Even greater advantages would yield from digitally superimposing archival documents on the environment of the patio, as it represents one of the most often depicted areas of the monument.

Several artistic images discussed above could be virtually layered in front of the corresponding subject, matching the correct perspective in order to underline the differences between the illustration and the contemporary state of the monument, thus highlighting both architectural evolution and artistic interpretation. Similarly, objects such as the water spout exhibited in the Alhambra Museum can be overlaid to show their original location, while digital copies of the lions of the Maristán, as

well as of other Nasrid depictions of the feline, would provide an opportunity to compare different occurrences of the animal and delve into its cultural significance.

In terms of interdisciplinary connections, the Patio de los Leones offers a chance to discuss the mathematics of architecture in al-Andalus, briefly relating how Greek geometric notions were transmitted to the Arabic world and eventually back to Europe, as well as highlighting the rules underlying decorative majolica, plaster and wooden patterns. The creation of such motifs in terms of artisanal technique can be further explored in the additional options, which would also allow visitors to focus on the epigraphy on the fountain, decorated with the verses especially composed by Ibn Zamrak.

With regards to future development, further research into this topic would be represented by prototyping the application and the virtual museum.

Such endeavor would require an interdisciplinary team composed of digital humanists, art historians, cultural heritage experts, information technology scholars and programmers, and could initially aim for the short-term objective of focusing on a single area of the monumental complex, like the exemplified Patio de los Leones. The realization of a demonstration of the application would entail two main categories of tasks, namely the creation of the infrastructure and that of the content, thus necessitating bibliographic and archival research, photogrammetric operations, laser scanning, virtual modelling and coding. Among the various tasks, it would be especially important to identify the precise location and orientation of the point of view adopted by various artists in their depictions of the monument. In fact, such effort would be crucial to allow a precise comparison between the representations and the monument.

The final step in the process would be testing the prototype with a sample audience composed of both tourists and scholars of different ages and backgrounds, gathering their comments through questionnaires and interviews in order to modify the application as needed to better respond to the planned objectives.

An Augmented Reality experience such as the proposed one, accompanied by a virtual museum, would constitute an important asset for communicating to the public in an engaging and fruitful way, as the perception of such technology as new and exciting yet intuitive would increase visitor engagement and facilitate the transmission of more complex topics through the employment of different strategies. Furthermore, these instruments would support and assist scholars investigating

various facets of the Alhambra, granting greater access to the monument and the related documents and artifacts. Such aid would foster further research, which, in turn, could become part of the application and virtual museum database and easily adapted to be communicated to the wider public. Such project would allow users to truly grasp the uniqueness of the monumental complex not only as an impressively magnificent palace, but also as the result of the collective efforts of diverse intellectuals and as a source of endless artistic inspiration. This understanding would lead to a stronger emotional bond with the heritage site, aiding its conservation and valorization by engaging the public while also addressing contemporary challenges such as sustainability and accessibility of knowledge, thus proposing the Alhambra as a leading model for ethical cultural heritage.

Realidad Aumentada para la Alhambra

Una revisión del monumento a través de la mirada de los artistas

Considerada como una de las características definitorias de la era contemporánea, la transformación digital se ha extendido a las instituciones culturales que han reconocido el potencial de la tecnología como un poderoso instrumento para la participación pública y la investigación académica.

En este sentido, el campo de las Humanidades Digitales, fundado desde hace poco más de 80 años, está experimentando un rápido desarrollo. En las últimas dos décadas, un creciente interés en la disciplina ha sido especialmente demostrado por la atención que las instituciones internacionales han dedicado a los proyectos de digitalización, así como por la inclusión de herramientas tecnológicas en varios de los Objetivos de Desarrollo Sostenible de Naciones Unidas, como los relacionados con la industria e innovación, educación y sostenibilidad.

Este apoyo de la sociedad en general ha acelerado los esfuerzos de los Humanistas Digitales para implementar proyectos de investigación que conjugan la tecnología con aspectos éticos como la cooperación, el ambientalismo, la accesibilidad, la diversidad y la inclusión. Además, manteniendo su característico énfasis en la experimentación y la fuerte relación entre la aplicación y la teoría, la disciplina ha crecido hasta abarcar una variedad de campos, incluida la Historia del Arte.

De hecho, la evolución del software ha permitido a los académicos interactuar con los objetos visuales a través de metodologías digitales que permiten tanto el análisis como la creación de imágenes y elementos tridimensionales como los estudiados en las áreas de Arqueología, Historia del Arte y Estudios de Museos.

Aunque mucho más joven, ya que el término solo apareció a fines de la década de 1990, la Historia del Arte Digital es paralela a su campo principal tanto en historia como en valores, al tiempo que aborda las mismas preguntas fundamentales que la disciplina tradicional. Sin embargo, una consecuencia natural de las nuevas formas de catalogar y compartir información son las nuevas investigaciones académicas, fomentadas por la comparación mejorada, el análisis matemático y la minería de datos. La atención a la práctica ha llevado rápidamente a una serie de proyectos que se ofrecen directamente al público, demostrando cómo la innovación puede proporcionar poderosas estrategias de participación y conservación y cómo la cultura representa un recurso invaluable para el crecimiento sostenible.

Gracias a iniciativas interdisciplinarias que van desde bases de datos que emplean reconocimiento de imágenes y análisis de redes hasta sitios web y aplicaciones enfocadas en modelos virtuales, el campo brinda a las instituciones la oportunidad de llegar a un público más amplio y diverso, abordando una variedad de problemas de accesibilidad, fomentando no solo conocimiento y participación, sino también conexión emocional con el patrimonio.

Si bien la participación del público puede ser provocada por numerosas metodologías, herramientas como las reconstrucciones digitales tridimensionales y la Realidad Aumentada pueden resultar particularmente exitosas. Los modelos 3D permiten manipular objetos virtualmente, ayudando así a informar a los visitantes sin comprometer los aspectos de conservación. También proporcionan la comparación en el tiempo y el espacio, ofrecen la oportunidad de visualizar la historia del objeto de manera más efectiva que las descripciones o ilustraciones, por lo tanto fomentan un sentido de familiaridad con los artefactos que a menudo conduce a un mayor deseo de interactuar con el original. Además, una reconstrucción virtual puede ser un poderoso instrumento de investigación y conservación, ya que la adquisición de datos a través del escaneo láser o la fotogrametría conduce a niveles más altos de precisión que a su vez pueden generar nuevas observaciones, mientras que al mismo tiempo se pueden emplear modelos digitales para monitorear objetos. y probar la hipótesis de la restauración.

El desarrollo de una reconstrucción virtual tridimensional para un sitio del patrimonio cultural ha sido el tema central del programa de movilidad de tres meses de la autora en el Human Interface Technology Lab New Zealand. Dirigido por el profesor Bartneck, el proyecto tenía como objetivo crear un juego de Realidad Virtual dedicado a la historia de Fonthill Abbey, una grandiosa finca inglesa que ya no es visible construida a finales del siglo XVIII. A través de un enfoque basado en la experiencia, el equipo colaboró tanto en la creación de una historia introspectiva como en la reconstrucción digital, basada en evidencia textual y gráfica. Estos elementos se unieron en un software de desarrollo de juegos que proporcionó transformar la narrativa textual en una experiencia visual jugable y los resultados se pusieron a disposición del público a través de un sitio web dedicado.

Como se mencionó, además de los modelos virtuales, la Realidad Aumentada constituye una herramienta atractiva para las iniciativas de Historia del Arte Digital. La tecnología permite superponer características digitales sobre el mundo físico existente, fomentando la interacción con el contenido propuesto sin borrar el entorno. Las aplicaciones basadas en la Realidad Aumentada

emplean diferentes sensores para recopilar datos ambientales y los entrados por el usuario, que son integrados por el software dedicado para asociar y renderizar el contenido apropiado, luego comunicado a los usuarios a través de una interfaz que puede incluir audio, video y estímulos para otros sentidos.

Si bien todos mantienen una fuerte conexión entre los elementos virtuales y el entorno circundante, las aplicaciones de realidad aumentada se pueden clasificar en diferentes tipos, más comúnmente diseñados para dispositivos móviles como smartphone y tabletas. La disponibilidad de dicha tecnología entre la población general, así como su portabilidad, brindan un instrumento práctico para las experiencias de Realidad Aumentada, que además se benefician de la familiaridad que los usuarios tienen con los dispositivos.

Tanto las reconstrucciones digitales tridimensionales como la Realidad Aumentada han sido empleadas por museos y monumentos occidentales centrados en el arte islámico, analizados por la autora de esta tesis en el congreso 2016 Digital Art History and Artistic Culture – IV international meeting, celebrado en Málaga. De hecho, el alto potencial de transmisión de conocimiento que ofrecen tales herramientas resulta valioso en contextos donde los visitantes tienen poca información previa sobre la cultura que creó los artefactos. Exposiciones como la organizada por el Louvre-DNP Museum Lab en 2008, la “In Harmony: the Norma Jean Calderwood Collection of Islamic Art” en el Sackler Museum de Harvard y la celebrada en 2014 en el Metropolitan Museum of Art ofrecen valiosos ejemplos del empleo de la Realidad Aumentada y de los modelos virtuales para explorar procesos artísticos y desafíos de conservación de manera participativa.

De forma análoga, el “Proyecto Munya Digital” aprovecha una plataforma de juego para explorar virtualmente las reconstrucciones de villas islámicas cercanas a Córdoba, mientras que en Granada parte del patrimonio de la ruta de la “Dobla de Oro” por el Albaicín incluye modelos digitales geolocalizados, y el Alhambra acogió temporalmente el proyecto “Tag Cloud”, centrado en la interacción social entre los visitantes.

Sin embargo, además de representar el emblema de al-Andalus, el conjunto monumental de la Alhambra constituye un excelente tema para el desarrollo de una aplicación de Realidad Aumentada, ya que sus ricas historia y arte ofrecen un vasto corpus de contenido fascinante que puede resultar difícil de comunicar al público a través de guías tradicionales. En particular, la aplicación propuesta se centra en la evolución de la imagen del monumento visto por los artistas a lo largo de los siglos, desde sus primeros años hasta las interpretaciones contemporáneas.

Fundada en 1238 como centro del Reino de Granada, la Alhambra fue una fortaleza, una ciudad y una residencia real que acogió a una corte de intelectuales y artistas, los mismos que contribuyeron a transformarla en un lujoso palacio que impresionó a numerosos viajeros islámicos. Cuando en 1492 los Reyes Católicos conquistaron la ciudad y exiliaron a los sultanes de la Península Ibérica, concluyendo la Reconquista, una serie de intervenciones cambiaron parcialmente el aspecto del monumento, que se convirtió en símbolo del triunfo de una religión sobre la otra.

De hecho, las primeras representaciones de la Alhambra se pueden encontrar en el contexto de esculturas que representan los acontecimientos de la guerra, entre las que destaca la rendición de Boabdil, último sultán nazarí, y la batalla de Higuera. Estas imágenes ofrecen una visión extremadamente sintética del monumento, indicado por sus torres y presentado como un hito y un símbolo más que como un tema de representación precisa.

En el siglo XVI, el creciente interés por la geografía suscitado por los grandes viajes exploratorios llevó a la difusión de planos y atlas que documentaban la Alhambra, como el Gran plano, el “Civitates Orbis Terrarum” y las vistas de Anton van der Wyngaerde. Si bien los niveles de precisión varían, estas imágenes ofrecen evidencia documental de las condiciones del monumento, especialmente considerando las modificaciones operadas por los monarcas, más notablemente la construcción del Palacio de Carlos V, antes de que se desvaneciera su interés por la Alhambra.

El siglo siguiente vio a Granada volver a ser una ciudad de importancia regional, mientras que el conjunto monumental, ya no estratégico, decayó rápidamente. Aunque numerosas vistas pertenecientes a esta época se copiaron de las mencionadas anteriormente, ofrecen alguna novedad la Plataforma de Vico, las representaciones de De Sabis desde las orillas del Darro y el Genil y la ilustración de Baldi de la “Relazione del Viaggio di Spagna” de Magalotti. Sin embargo, lo más notable es el trabajo de Meunier, ya que el artista es el primero en inmortalizar los interiores de los Palacios Nazaríes, resaltando la simetría de los patios y exagerando su extensión, una tendencia recurrente también en autores posteriores.

Para beneficiarse de un mayor nivel de precisión con respecto a las representaciones de los monumentos islámicos de España, es necesario acudir a “Las Antigüedades Árabes de España”, el catálogo publicado por la Real Academia de Bellas Artes de San Fernando de Madrid en 1787. Fruto de la cultura iluminista de la época, el volumen incluye fieles planos, alzados y detalles de la Alhambra, así como vistas desde las perspectivas tradicionales e hipótesis de reconstrucción.

De todas formas, fue el Romanticismo el que dio fama al monumento más importante de Granada. A finales del siglo XVIII, la Alhambra se convirtió en uno de los destinos del Gran Tour, un legendario Cercano Oriente situado de forma cómoda y segura en Europa y, por tanto, fácilmente accesible para los aristocráticos viajeros occidentales. Los bocetos rápidos, inicialmente influenciados por la estética pintoresca, se concentraron en capturar la emoción de una visita al monumento y rara vez se preocuparon por representarlo fielmente. Artistas británicos como Twiss y Swinburne buscaron perspectivas novedosas y audaces, Murphy transmitió sus sentimientos a través de proporciones exageradas y de Laborde intentó vincular el arte islámico y gótico mientras se enfocaba en espacios íntimos marcados por gradientes de luz.

A medida que su visión se transformaba en romántica, los viajeros que visitaban la Alhambra se maravillaban de la sensación de sublime que el conjunto expresaba a través del contraste entre un pasado opulento y un presente ruinoso. Los elementos imaginarios aparecieron tanto en textos como las publicaciones de Washington Irving y Victor Hugo como en las representaciones de Ford, Roberts y Taylor, mientras que las obras de De Prangey y Lewis conjugaron la estética romántica y la descripción veraz del mal estado de conservación. Las representaciones más notables y famosas de la Alhambra del siglo XIX, sin embargo, son las ilustraciones de Doré, creadas para el volumen de Davillier y dedicadas a crear escenas folclóricas con claroscuro fuertemente enfatizado. Desde las vistas detalladas del complejo hasta las caricaturas, las imágenes comunican la variedad de emociones que sintió el artista durante su visita a la Alhambra, al tiempo que aportan evidencia documental en cuanto a la relación entre el monumento y la población local.

Durante el mismo período, también surgió un enfoque diferente, que alentó a los artistas a concentrarse en representaciones objetivas de la realidad y, por lo tanto, condujo a las representaciones de la Alhambra de Jones, un verdadero catálogo de sus elementos decorativos. El empleo de la cromolitografía ayudó al éxito de los volúmenes, ya que los ornamentos influyeron en una variedad de producción industrial y artesanal, que culminó con la construcción del Alhambra Court del Crystal Palace para la Gran Exposición de 1851.

El desarrollo de la fotografía contribuyó a la descripción precisa del complejo monumental que siguió siendo un tema favorito a pesar del cambio de medio. Desde la década de 1840, viajeros como Gautier, Piot, Tenison y Lorent construyeron un corpus de fotografías dedicado a los Palacios Nazaríes,

mientras que una década más tarde Clifford immortalizó el patrimonio artístico del complejo y su carente estado de conservación, además de documentar parte de las restauraciones.

En el cambio de siglo, la Alhambra representó una de las principales fuentes de inspiración para el arte y la arquitectura orientalistas. Se podían ver salas y patios que copiaban los Palacios Nazaríes en residencias de Europa y de las Américas, los pintores incluían sus detalles en escenas exóticas y estaban influenciados por las anécdotas de su historia islámica, como el asesinato de los Abencerrajes, representado por Fortuny, Regnault. y Clairin. Arquitecturas similares caracterizan el fondo de numerosas pinturas dedicadas a las odaliscas, un motivo recurrente adoptado por orientalistas y simbolistas, así como por artistas contemporáneos como Matisse.

En los mismos años, sin embargo, para pintores como Rusiñol y Sargent, la Alhambra también representó un espacio de reflexión personal y artística. Centrados en los nichos protegidos de los jardines y patios, los autores unen atmósferas introspectivas con técnicas que anticipan los elementos impresionistas, enfocados en capturar la luz en sus numerosas variaciones.

La evolución natural de este enfoque está representada por Sorolla, que visitó la Alhambra durante las dos primeras décadas del siglo XX. Fascinado por la luz y el agua, encontró en el complejo monumental una variedad de sujetos, representados con pinceladas brillantes y vívidas y un estilo similar al de Monet.

Unos años más tarde, en la década de 1920, la visita a la Alhambra proporcionó a M.C. Escher la inspiración para embarcarse en un esfuerzo durado toda la vida, dedicado a explorar los patrones geométricos conocidos como teselados. El carácter altamente matemático de su trabajo fue influenciado por los motivos de los azulejos islámicos, como documenta su boceto que representa el alicatado de los Palacios Nazaríes, gradualmente transformados en mosaicos periódicos originales que representan animales y objetos identificables. Una segunda visita al monumento ofreció nuevas perspectivas y llevó al artista a profundizar en la relación geométrica subyacente a los patrones y desarrollar paisajes mentales en los que los mosaicos se metamorfosean de una forma a otra en una sucesión perfecta. Escher se apartó de retratar la Alhambra, centrándose en cambio en un aspecto singular del monumento y transformándolo en un tema completamente diferente pero reconocible, una metodología común a muchos de los siguientes artistas inspirados en el conjunto.

De hecho, el palacio ha influido en el abstraccionismo de varios autores contemporáneos. La pintura de acción y el expresionismo de José Guerrero a menudo ha mantenido los arcos de la Alhambra y

sus colores brillantes, un aspecto explorado por Miguel Rodríguez-Acosta Carlström a través de vibrantes composiciones geométricas y un libro de bocetos que resalta el proceso desde el dibujo figurativo al abstracto. Manuel Ángeles Ortiz, influenciado por el cubismo, brindó una interpretación sintética de los jardines monumentales, mientras que Joan Hernández Pijuan promueve este enfoque en sus lienzos trazados con patrones monocromáticos que recuerdan al alicatado. Sean Scully dedicó una serie de pinturas a cómo la luz mediterránea subraya los colores vivos del entorno andaluz, concentrándose en los de los patrones de la Alhambra, también representados en uno de sus ciclos fotográficos. La luz vibrante es también el tema de las obras de Soledad Sevilla, rigurosa en su geometría y centrada en la naturaleza efímera del arte.

Por último, una exposición reciente dedicada a las interpretaciones femeninas de la Alhambra demuestra no solo cómo el monumento se puede interpretar de infinitas maneras sino también cómo, después de siglos, sigue siendo una fuente de inspiración inestimable. La rica estratigrafía no solo del palacio físico, sino también de su imagen constituye una peculiaridad poco común y debe transmitirse al público a través de herramientas adecuadas que puedan otorgar precisión y fomentar la participación.

El proyecto propuesto procede de experiencias tecnológicas anteriores empleadas en instituciones del patrimonio cultural, en particular en museos y monumentos de arte islámico occidentales, con el objetivo de crear una aplicación de Realidad Aumentada basada en una ruta a través de los Palacios Nazaríes que subrayaría diferentes aspectos de la Alhambra, con especial énfasis en la evolución de su imagen. Diferentes aspectos de esta propuesta han sido discutidos por la autora en 2017 en la conferencia Digital Encounters with Cultural Heritage, celebrada en Dresde, y en el VIII Associazione Italiana di Storia Urbana (AISU) Congress celebrado en Nápoles el mismo año, así como en el el año siguiente en el VI International Conference on Heritage and Sustainable Development, y en el III Congreso de la Sociedad Internacional Humanidades Digitales Hispánicas (HDH), celebrado en Málaga.

Los principales objetivos de dicha herramienta son aumentar la participación y el conocimiento de los visitantes gracias al empleo de diferentes medios interactivos y el apoyo a la investigación académica, especialmente facilitando el acceso in situ a documentos y artefactos relevantes. Los beneficios de utilizar técnicas de visualización como los modelos tridimensionales y las capas del patrimonio cultural se acompañan con las ventajas de las experiencias participativas y de los juegos, al tiempo que fomentan una mayor accesibilidad.

Esta investigación presenta un paradigma teórico para la organización de dicha aplicación, ofreciendo una metodología y que se puede adaptar a varios sitios del patrimonio cultural. En términos de funcionamiento básico, el software de adquisición ambiental recopilaría datos de los sensores antes de que sean tratados por el procesador, que buscaría el contenido correspondiente para ser presentado a través de una interfaz intuitiva y no intrusiva.

La aplicación debe estar poblada por una variedad de contenidos, creados gracias a diferentes técnicas como el escaneo láser y la fotogrametría, así como el modelado digital, la investigación archivística tradicional y el análisis químico, lo que requiere la colaboración de un equipo interdisciplinario. Dicho contenido debe ser variado en términos de público objetivo, ya que los elementos deben dirigirse a visitantes de diferentes características y orígenes, pero puede ser categorizado y sistematizado en varios tipos, una operación que puede ayudar al público a navegar por la aplicación. En primer lugar, se deben presentar reconstrucciones tridimensionales geolocalizadas tanto del estado actual como de las fases anteriores de la historia de la Alhambra para ofrecer una comprensión de la estratigrafía básica del monumento, proporcionando al mismo tiempo una herramienta académica para el análisis y la conservación. Sin embargo, en lugar de simplemente visualizar modelos completamente virtuales, la Realidad Aumentada permite superponer digitalmente el entorno físico solo las características específicas de tiempos pasados que ya no son visibles, sumergiendo al visitante en la reconstrucción sin perder la conexión con la realidad.

Del mismo modo, las copias digitales de documentos de archivo y objetos de museo pueden incluirse en la aplicación y colocarse virtualmente en el entorno original. Esta opción permite al público en general comprender el valor de dicha documentación y al mismo tiempo contextualizar tanto los artefactos como el espacio físico que los alojó originalmente, restaurando una conexión que a menudo se corta por razones históricas y prácticas. Además, los académicos se beneficiarían enormemente de la comparación directa entre los materiales de archivo y sus objetos, ya que la disponibilidad in situ fomentaría la comparación y el análisis. Esta superposición puede resultar particularmente útil cuando se pretende transmitir la rica historia de la imagen de la Alhambra vista por los artistas, una evolución extensa que rara vez se transmite al público.

El monumento también ofrece varias oportunidades para explorar varios aspectos de al-Andalus, así como otras civilizaciones y culturas. Las conexiones entre la Alhambra y otras disciplinas como la ciencia, la literatura y la música son el eje de una categoría autónoma, dedicada a ofrecer a los

participantes con diferentes intereses una forma de relacionar tal pasión con el monumento y descubrir una amplia gama de temas.

Finalmente, las opciones adicionales completan la experiencia del visitante con contenido adicional sobre el contexto más amplio de la ciudad y la región, los sistemas empleados para construir y adornar el palacio, otros estilos islámicos, además de proporcionar traducciones para los epígrafes que decoran muchas áreas del monumento.

La aplicación va acompañada de un museo virtual, que propone el mismo contenido de forma remota, aumentando así la accesibilidad y permitiendo a los usuarios tanto prepararse para la visita como seguir los aspectos que más les interesaron a la hora de descubrir el monumento. Además, la mayor visibilidad que un museo virtual otorgaría a la información sobre el palacio también determinaría un mayor nivel de participación académica, fomentando un círculo virtuoso de creación y difusión de conocimiento.

Como ejemplo, estas categorías se han aplicado a la zona más emblemática de la Alhambra, el Patio de los Leones.

Si bien está bastante bien preservado, el patio podría beneficiarse del uso de una reconstrucción virtual para resaltar los diferentes estados de conservación y las modificaciones que sufrió después de la Reconquista, especialmente en lo que respecta a la fuente central y las restauraciones. Incluso se obtendrían mayores ventajas con la superposición digital de documentos de archivo en el entorno del patio, ya que constituye una de las áreas más representadas del monumento.

Varias imágenes artísticas discutidas anteriormente podrían superponerse virtualmente frente al sujeto correspondiente, haciendo coincidir la perspectiva correcta para subrayar las diferencias entre la ilustración y el estado contemporáneo del monumento, destacando así tanto la evolución arquitectónica como la interpretación artística. Asimismo, objetos como el surtidor de agua que se exhibe en el Museo de la Alhambra se pueden superponer para mostrar su ubicación original, mientras que las copias digitales de los leones del Maristán, así como de otras representaciones nazaríes del felino, brindarían la oportunidad de comparar diferentes ocurrencias del animal y analizar su significado cultural.

En términos de conexiones interdisciplinarias, el Patio de los Leones ofrece la oportunidad de discutir las matemáticas de la arquitectura en al-Andalus, relatando brevemente cómo las nociones geométricas griegas se transmitieron al mundo árabe y regresaron a Europa, además de resaltar las reglas subyacentes a los patrones de las decoraciones de mayólica, yeso y madera. La creación de

tales motivos en términos de técnica artesanal se puede explorar más a fondo en las opciones adicionales, que también permitirían al visitante centrarse en la epigrafía de la fuente, ornada por los versos especialmente compuestos por Ibn Zamrak.

Con respecto al desarrollo futuro, la investigación adicional sobre este tema estaría representada por la creación de prototipos de la aplicación y el museo virtual.

Tal esfuerzo requeriría un equipo interdisciplinario compuesto por humanistas digitales, historiadores del arte, expertos en patrimonio cultural, académicos y programadores de tecnología de la información, y podría inicialmente apuntar al objetivo a corto plazo de enfocarse en una sola área del complejo monumental, como el Patio de los Leones ejemplificado. La realización de una demostración de la aplicación implicaría dos categorías principales de tareas, es decir la creación de la infraestructura y la del contenido, por lo que se necesitarían investigaciones bibliográficas y de archivo, operaciones fotogramétricas, escaneo láser, modelado virtual y codificación.

El paso final del proceso sería probar el prototipo con una muestra de público compuesta por turistas y académicos de diferentes edades y orígenes, recopilando sus comentarios a través de cuestionarios y entrevistas para modificar la aplicación según sea necesario para responder mejor a los objetivos planificados.

Una experiencia de Realidad Aumentada como la propuesta, acompañada de un museo virtual, constituiría una herramienta importante para comunicar con el público de una manera atractiva y fructífera, ya que la percepción de dicha tecnología como nueva y emocionante pero intuitiva aumentaría la participación de los visitantes y facilitaría la transmisión de temas más complejos mediante el empleo de diferentes estrategias. Además, estos instrumentos apoyarían y asistirían a los estudiosos en la investigación de las diversas facetas de la Alhambra, otorgando un mayor acceso al monumento y a los documentos y artefactos relacionados. Dicha ayuda fomentaría una mayor investigación, que, a su vez, podría pasar a formar parte de la base de datos de la aplicación y del virtual del museo y adaptarse fácilmente para ser comunicada al público general.

Tal proyecto permitiría a los usuarios captar verdaderamente la singularidad del complejo monumental no solo como un palacio impresionante bajo el punto de vista estético, sino también como resultado de los esfuerzos colectivos de diversos intelectuales y como una fuente de inspiración artística sin fin. Esta comprensión conduciría a un vínculo emocional más fuerte con el sitio patrimonial, ayudando a su conservación y valorización a través de la participación del público y al

mismo tiempo abordando desafíos contemporáneos como la sostenibilidad y la accesibilidad del conocimiento, proponiendo así la Alhambra como un modelo líder para el patrimonio cultural ético.

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