ITU A|Z • Vol 20 No 2 • July 2023 • 429-444

The "configurational analysis" for the study of medieval mosques in al-Maghrib al-Aqṣà: The case of the Qaṣba mosque in Marrakesh

Iñigo ALMELA[1]
[1] inigo.almela@gmail.com • Museum für Islamische Kunst, Staatliche Museen zu Berlin, Berlin, Germany

Received: November 2022 • Final Acceptance: March 2023

Abstract
The present paper attempts to present an analytical method that is suitable, and of great interest, for the study of historical buildings that are still in use or those that do not permit the undertaking of a stratigraphic analysis of their walls. Despite having been conceived almost four decades ago, this method is now being consolidated with the establishment of a set of guidelines that should be considered for its application. Furthermore, this working model has been defined thanks to its experimentation in a specific case study, the Qaṣba mosque in Marrakesh, where it was possible to recognize the twelfth-century Almohad foundational configuration as well as some of its later transformations. Finally, as an example, the results of this study are presented in order to show the capacity of the method as well as to demonstrate the characteristics of this building, a masterpiece of medieval religious architecture in the Islamic West.

doi: 10.58278/0.2023.13

Keywords
Islamic architecture, Mosque, Morocco, Medieval, Configurational analysis.

1. Introduction: Chronology and typology

It has been a traditional practice to deal with historic buildings as if they were immutable structures, except in cases where transformations were evident or reflected on written sources. In fact, historical texts have been the main element determining the dating of medieval buildings over the last century, defining their main phases even in cases where numerous alterations had occurred. Of course, such sources of information are always necessary, but they cannot be relied upon exclusively, since it is the material culture which provides the most reliable data through scientific analysis.

Having said that, there are intrinsic several factors that complicate considerably the material study of the mosques in al-Maghrib al-Aqṣà. On the one hand, their functional continuity means that they are still in use today and, thus, their maintenance is focused on users' comfort. On the other hand, the lack of documentation and archaeological monitoring during the restoration work precludes any kind of stratigraphic analysis. As a result, the Moroccan religious heritage does not allow for any solid archaeological and architectural study, thus discouraging any musealisation and affecting conservation. For the case of al-Qarawiyyīn mosque in Fez a relevant archaeological excavation was undertaken in the year 2006 on the southeast sector (Ettahiri, 2007; Ettahiri, 2014), but after that no archaeological attention was paid to the stratigraphic details of walls and arcades.

Over the last decade, numerous refurbishments have been carried out in the historic centres of Moroccan cities, including interventions in their main congregational mosques. However, we could state there is no collaboration between architectural projects and research. Any kind of initiative for documentation or scientific research is sometimes even blocked by those entities involved in the project.

This hostile panorama represents a serious problem for the study of medieval religious heritage, its evolution and, ultimately, the definition of archetypes. Consequently, it also leads us to maintain traditional dating and to consider buildings, to a large extent, as monophasic structures, which in turn leads to the establishment of erroneous typological patterns, namely specific features of a particular time and society.

In this sense, defining a typology based on a building that has been spatially altered and which contains several phases, is an absolute mistake, as each phase responds to a different conception and planning, even if the most advanced phase may be influenced or conditioned by the previous one(s). It is therefore incoherent to define a specific typology -that is related to historical and social context- by considering a collage in which elements from different periods overlap. The historic building is a multi-typologised object (Caballero, 2009, 12-14).

Typology, as in the case of stratigraphy, is a method specific to archaeology, distinguishing in each stratum materials that belong to their own moment of formation. Thus, the chronological arrangement of materials or types, based on stratigraphic sequency, allows typologies to be established. Thereby, building typologies are based on their own components and characteristics: building materials and masonry; constructive forms and structures; singular elements such as openings, finishes, mouldings, or decoration, as well as tool traces (Parenti, 1988). Hence, the discovery of new types calls for the continual updating of typologies and the creation of more detailed ones. However, the absence of stratigraphy complicates the diachronic order of types, which is why we depend on comparison with typologies that have already been chronologically located.

Nevertheless, as far as the Maghrebi mosques are concerned, the literature of the last century does not always seem to have integrated the theoretical formulations outlined above. Thus, an attempt has been made to constitute a set of models that aim to characterise the morphological and spatial patterns of each period, including their possible evolutions and variants, but in many cases, these models are based on asynchronous approaches in which projects from different phases are intermingled.

Despite this outlook, an exceptional case can be recognised for the Almohad context (12-13th centuries) in which the main compositional guidelines of this period can be found. Although it has never been the subject of an exhaustive archaeological analysis, conservation work on the Tinmal mosque in the 20th century revealed its foundational configuration. For this reason, the Tinmal mosque came to constitute a schematic model that has served to express the essence of mosque design during the Almohad period, being the others a derivation or evolution of it. However, this consideration is independent of its chronology, as it is not the oldest Almohad mosque.

2. Configurational analysis

Even when the general or partial dating of a building is unknown, and it is impossible to carry out a stratigraphic wall analysis because its masonry is not visible, it is still possible to make a provisional analysis based on objective observations and inferences (Mannoni, 1998, 83). Even before resorting solely to written sources and present styles, the building still offers opportunities to be analysed archaeologically in a non-destructive way, through configurational analysis. This, according to the meaning of the term "configuration", aims to recognise the arrangement of the parts that make up a building and give it its particular form and properties.

To this effect, a comprehensive morphological examination of the building as a unit and as an ensemble of multiple structures is carried out to identify homogeneous organisations and anomalies. Finally, these observations are to be put in relation to archetypes and typologies already known from other local and regional buildings, so that common configurations can be recognised. Nevertheless, this analysis has its limitations, and it is almost impossible to provide a detailed order of phases, but a tentative sequence will allow us to identify the main transformations. In fact, these preliminary formulations could be demonstrated and completed in the future by means of a wall stratigraphic analysis.

The following is a work plan outline that we propose to develop this type of analysis, which we have been able to draw from our experience in the study of the Qaṣba Mosque in Marrakesh:

-*Architectural survey.* The fundamental basis for this analysis is building planimetry. First, it constitutes the support on which the observations will be plotted, but its elaboration also represents a preliminary analytical process. The vectorisation process of plans, elevations and sections makes it possible to recognise irregularities and raise questions in advance, as it involves the walls' graphic and cartesian relationship. For this reason, it is considered advisable to carry out an architectural survey of one's own. However, in those cases where this is not achievable, the planimetry to be used should be meticulously revised and suitably updated.

-*Historical graphic material.* Since these are generally buildings that have undergone numerous interventions until the present time, historical cartography and photographs, when available, should be consulted in order to recognise all those elements or alterations that are the result of contemporary actions and, therefore, can be easily classified in the group of more recent transformations.

-*Urban context exploration.* Although the urban fabric also evolves, it is generally more rigid than buildings, insofar as it is a circulation system subordinated to the set of constructions that make up the city. In fact, to a large extent, its transformation is directly conditioned by the mutation of all the adjacent buildings (houses, shops, mosques, and other public facilities such as baths). This means that the surrounding street plan contains a variety of layouts that have necessarily interacted with the different historical phases of the building and may, therefore, reflect details of its previous configuration. Naturally, these observations will focus on the communication between public and interior space (accesses), although other constructive, geographical, and delimiting elements (walls, irrigation channels) also come into discussion.

-*Elemental analysis*. This is the main component of this method, based on morphological, architectural, and ma-

terial aspects that should serve to recognise: discontinuities, sets of differentiated structures, divergences between exterior and interior surfaces of walls, types of masonries, types of openings, structural and compositional conflicts, and irregularities continuously repeated. In particular, we believe that these are the points that should be considered:

-Spatial characteristics (recognition of configuring axes, orientations, distributions, organisations, sectorisations and groups).

-Structural characteristics (layout of bearing walls, pillars, columns, and roofing systems).

-Material characteristics (materials, masonry, floors, roofs).

-Main elements distribution (domes, arches, entrances, windows, fountains).

-Decorative programme distribution (plasterwork, carpentry, domes).

-Complementary elements (hydraulics, furniture, specific functions).

This point constitutes the main basis of this method for revealing the diachronic process of the building. As indicated above, without recognising these alterations, one could fall into the error of determining the whole as a system of elements and spaces that respond to a single configuration and, therefore it would define an adulterated typology. On the contrary, it is an ensemble that brings together numerous phases that start with the foundational configuration, continue with various reconfigurations, adaptations, transformations, destructions and, finally, ends up with the present-day maintenance or abandonment. In addition, the incorporation, when appropriate, of pre-existing elements should not be omitted, as these, although alien, may have influenced its layout.

-Typological definition. Once the previous exploration has been carried out, it is possible to establish synthe-

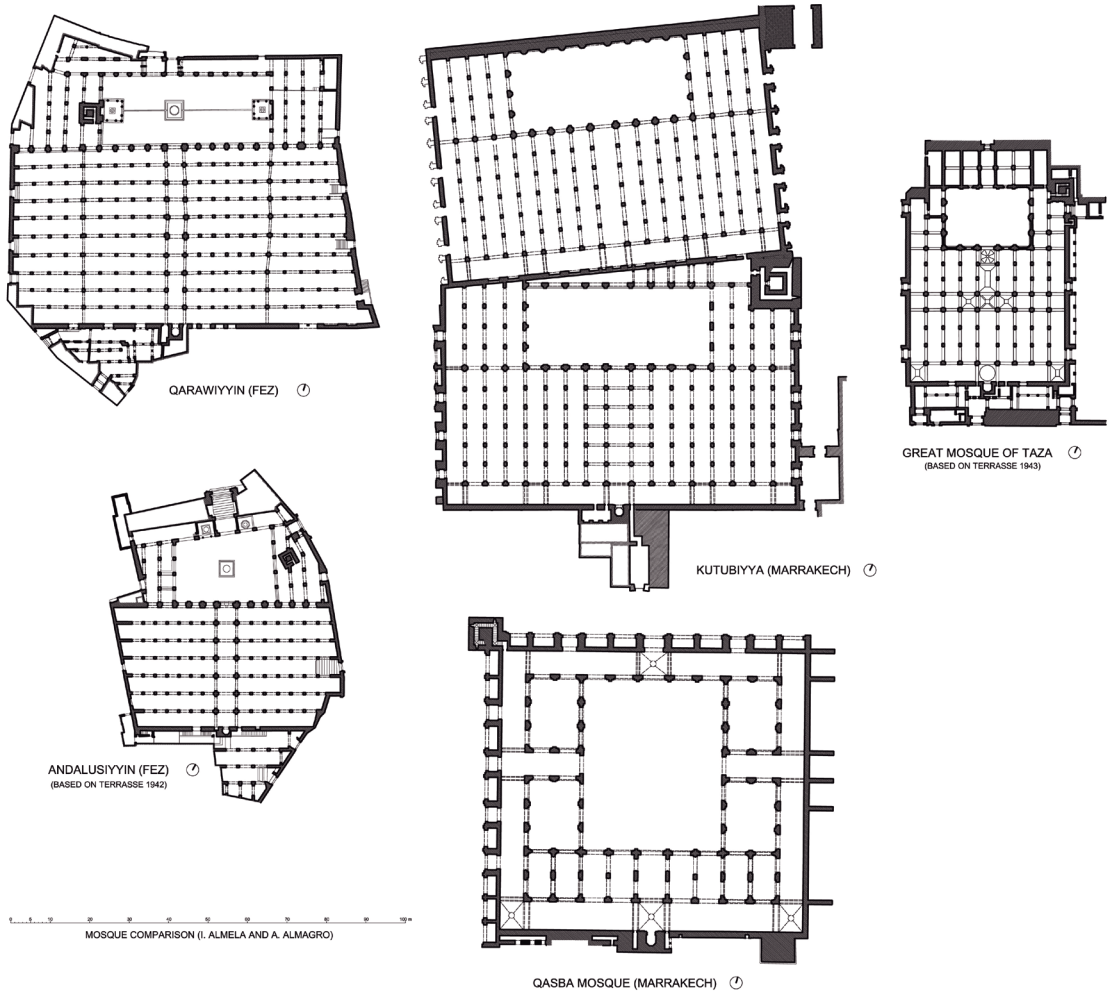

Figure 1. *Comparative plan: al-Qarawiyyīn, al-Andalusiyyīn, Kutubiyya, Great Mosque of Taza and Qaṣba Mosque in Marrakesh (Author).*

sised ideas and recognise some of the configurations that assemble and shape the current building. In this way, the consonance and coherence of elements can associate them to the same moment and facilitate their relative dating. Thus, even if each configuration offers fragmentary and incomplete information, they can be associated with typologies already known in the region. In this sense, for this step to be sufficiently guaranteed, the examples that determine the typology must also offer rigorous analysis results. And finally, the configurations that have been recognised in the building can enrich the general picture of chronotypologies and even define subtypes.

3. The Moroccan Mosque landscape

Nonetheless, configurational analysis is more effective for mosques that have undergone major historical transformations, that is to say, those that are older and predate the 13th century. Among the most prominent cases found in al-Maghrib al-Aqṣà, we can highlight five that are widely known: the al-Qarawiyyīn Mosque (Fez), the al-Andalusiyyīn Mosque (Fez), the Kutubiyya Mosque (Marrakesh), the Great Mosque of Taza and the Qaṣba Mosque (Marrakesh).

The enlargement of mosques is, indeed, a frequent occurrence in the Islamic world, as it is largely subject to the demographic and urban development of cities. The most representative example in the Islamic West is the Mosque of Cordoba itself, whose archaeological excavations began at the end of the 19th century and has continued throughout the first third of the 20th century (Ricardo Velázquez Bosco and Félix Hernández Giménez) until today. As a result, there is a recognised consensus on its evolutionary process consisting of five phases relating to the Umayyad period (8th-10th centuries), starting from an embryo whose architectural codes, orientation and structural design were later reproduced to generate a solution that was as harmonious and homogeneous as possible. In this manner, the oratory underwent three extensions, which involved the relocation of the qibla wall to the south on two occasions, while the courtyard was extended twice (Creswell, 1979, 138-166; Fernández, 2015).

Nevertheless, among all the mosques we have listed, al-Qarawiyyīn (Fez) offers the most attractive picture, since it has constituted the main religious centre of the city by irradiating its cultural reputation beyond Fez. Although the early medieval origin of the building still inspires many unknowns, written sources and some archaeological evidence reveal it was founded in the mid-ninth century, thus evidencing Idrisid phases and materials (Terrasse, 1968, 9-10; Ettahiri, 2007, 103-106; Ettahiri, Fili and Van Staëvel, 2012, 157-160; Ettahiri, 2014, 118-120). However, one of the most remarkable aspects of this mosque is precisely that it has been highly regarded by governors and sovereigns during the Middle and Modern Ages. This special consideration led to several of them to add their own interventions, extensions, and reparations to the building, thus leaving their mark on this glorious and respected monument (Figures 1 and 2). The studies carried out so far have revealed a clear evolution of the building, which has considerably increased its surface area. A first extensive enlargement of the prayer hall took place at the end of the 10th century by the Zenata dynasty, which ruled the territory at the expense of the Cordovan caliphate. This intervention included the renovation of the courtyard and the construction of the minaret (Terrasse, 1968, 12; Ettahiri, 2014, 118-119). Subsequently, the Almoravid ʿAlī b. Yūsuf carried out a second extension to the south, between 1130 and 1144, resulting in the addition of three aisles, the relocation of the qibla wall, the creation of the funerary mosque, and the redecoration of the axial aisle, which was provided with a succession of muqarnas vaults (Marcos, 2015, 172-180; Almagro, 2020, 178-181). Finally, in the 17th century the Saʿdian sultans incorporated some renowned structures such as the two pavilions in the courtyard, the retreat hall, a library, and an external dome (Almela, 2021, 233-258).

Since its medieval origins, the city of Fez was formed by two isolated nuclei separated from each other by the river, an aspect that was further enhanced

Figure 2. *Qarawiyyīn Mosque. View of the roofs with the different extensions (Author).*

by the construction of a congregational mosque for each of them. Thus, the second mosque, known as al-Andalusiyyīn (Fez), was built approximately at the same time as al-Qarawiyyīn, but occupying the central position of the eastern nucleus (Terrasse, 1942, 19). Regarding its evolution, the only research work worth mention is the one carried out by Terrasse, who recognised two phases: the Idrisid foundation and the Almohad reform. From his exploration, the mosque retains around the axial aisle a rather unique typology of pillars, consisting of a lobed section of four attached stone columns (Figure 1). This detail is somewhat consistent with al-Bakrī's description (11th century) and contrasts with the square or rectangular pillars of brick masonry typical of Almoravid-Almohad mosques. In fact, the rest of the al-Andalusiyyīn Mosque has this second type of support, which is attributed to the Almohad extension, although the details of this intervention still require profound study.

The third example, perhaps the best known one, represents an icon of Almohad architecture in the Islamic West. The Kutubiyya Mosque in Marrakesh was founded between 1147 and 1158 by ʻAbd al-Mu'min, founder of the dynasty, in the newly conquered Almoravid capital. However, this mosque consists of two major historical phases, which are adjacent to each other and basically consist of a duplication of the building (Figure 1). The first one was erected parallel to the old Almoravid fortress (Qaṣr al-Hajar) and had its own minaret, which was attached to one of the fortress towers (Almagro and Jiménez, 2022). At a second time, before 1163, the same sovereign undertook the construction of a second mosque next to the first one and following the same spatial scheme, although on this occasion its layout was rotated to amend the orientation (Figures 3 and 4). This phase constitutes the present mosque and includes an imposing new minaret. It has been considered sometimes that the abandonment of the first mosque occurred in order to erect a second one that was correctly oriented, although many scholars differ (Basset and Terrasse, 1932, 102-104; Deverdun, 1959, 183-184; Villalba, 2015, 142-144). In this sense, recent studies have shown that both phases coexisted and should therefore be understood as an extension that doubled the surface area of the oratory and erected the famous minaret (Almagro and Jiménez, 2022).

In addition to the al-Qarawiyyīn Mosque, the Great Mosque of Taza represents a type of mosque whose evolution has been marked especially by the process of enlargement. In this case we depart from an Almohad foundation that was undertaken by ʿAbd al-Muʾmin (1130-1163) around 1142, but this one may have been subsequently extended and renovated in 1291-92 by the Marinid sultan Abū Yaʿqūb (1286-1306). Boris Maslow has already outlined the evolution of the mosque in these two phases and he showed the

Figure 3. *Kutubiyya Mosque (Marrakesh). View of the old qibla with connecting bays between both phases (Author).*

Figure 4. *Kutubiyya Mosque (Marrakesh). Top view of the two juxtaposed mosques (Author).*

characteristics of the extension by means of an illustrative plan (Maslow, 1937, 17). However, despite his proposal seems to be sensible, the details and layouts are less so, as they lack a more archaeological approach. On his part, Terrasse proposed the same transformation in a later monographic work, trying thus to rely on some observations and data extracted from the Marinid foundational inscriptions (Terrasse, 1943, 23-34). The first phase (Almohad mosque) had nine aisles, the depth of which is uncertain, and a courtyard of 4 x 5 bays provided with porticoes on the east and west sides (Figure 1). A second phase (Marinid reform) added four more bays to the south, shifting the qibla and creating a new cross aisle provided with three *qubba*-s and a new mihrab. The extension consisted of prolonging the Almohad aisles while maintaining their width and reproducing the T-shaped layout. In addition, a battery of galleries was added to the north of the courtyard. The scope of the Marinid work suggested by Terrasse was largely based on the typological differentiation of arches. However, a concordance between the two was respected, for example, in the width and continuity of the aisles, as well as the height.

Finally, the last Moroccan example to be listed is the Qaṣba mosque in Marrakesh. This building was erected by the Almohad caliph Abū Yūsuf Yaʿqūb al-Manṣūr in the last third of the 12th century in order to dispose of a congregational mosque within the walls of the Qaṣba that was able to issue the *khutba* apart from the other congregational mosques of the capital city: the Kutubiyya and the ʿAlī b. Yūsuf mosques. As it will be seen in detail below, this building underwent a major transformation that took place three centuries later and caused alteration on its spatial organisation.

As for the later mosques that were built during the Marinid-Wattasid period (last third of the 13th century to mid-16th century) and the Saʿdian period (mid-16th century to mid-16th century), it cannot be said that they did not undergo significant alterations, as we insist that the Moroccan landscape has yet to be studied; however, an examination of several prominent mosques from these periods reveals that the same foundational planning has been maintained.

4. The Great Mosque in the Qaṣba of Marrakesh

The Qaṣba Mosque in Marrakesh -also known as the Mosque of al-Manṣūr (Jāmiʿ al-Manṣūr) because of the ruler who founded it-, belongs to the group of great Almohad mosques and its foundational design forms an intermediate link between the typologies at the Kutubiyya and the Great Mosque of Rabat (Hassan Mosque). However, the original design of the mosque is very distorted and has undergone several transformations that have given it its present rather anomalous shape.

Shortly after inheriting the rule of the empire, the caliph Abū Yūsuf Yaʿqūb al-Manṣūr (1184-9) undertook the construction of the Qaṣba in 1185, occupying a plot to the south of the city of Marrakesh. The new congregational mosque was built between 1185-89 in the public sector of this new Qaṣba, thus representing a point of contact between the caliph and the people. Despite this, it is unclear whether its construction was completed during this period, although it did undergo a later modern alteration and successive interventions, the most recent of which was the restoration carried out between 2012 and 2013. It should also be noted that the city in which it is located experienced an intense period of decadence during the 15th century, from which the mosque was certainly not exempt. As such, the building that can be observed today has most likely undergone various transformations that have given it its current state, generating great interest in what its original design was and what the 16th-century Saʿdian restoration consisted of.

To this day, all architectural and archaeological approaches to the study of this mosque have recognised the exceptionality and rarity of its plan, even though its form maintains fundamental compositional elements of the prototypical Almohad mosque (Basset and Terrasse, 1932, 274-310; Marçais, 1954, 211; Deverdun, 1959-66, 232-236; Ew-

ert and Wisshak, 1987, 179-211; Villalba, 2015, 168-177). Among the existing studies, the most outstanding is the one by Ewert and Wisshak in *Madrider Mitteilungen*, although their contributions have not been widely considered in subsequent research because it is the only study they published on this mosque and it was written in German. In addition to the plans, elevations and sections they provide, their main contribution is the survey they carried out at the foot of the pillars in two of the minor courtyards, which was carefully recorded by writing and drawing of sketches. This documentation represents to this day a valuable source of archaeological information, if not the only one. For this reason, we have incorporated this data throughout our analysis. However, contrary to what our analysis has determined, these authors were inclined to consider the structure of the present mosque as the original Almohad structure, corresponding only to later transformations some minor changes such as roofs, redecorations and coatings.

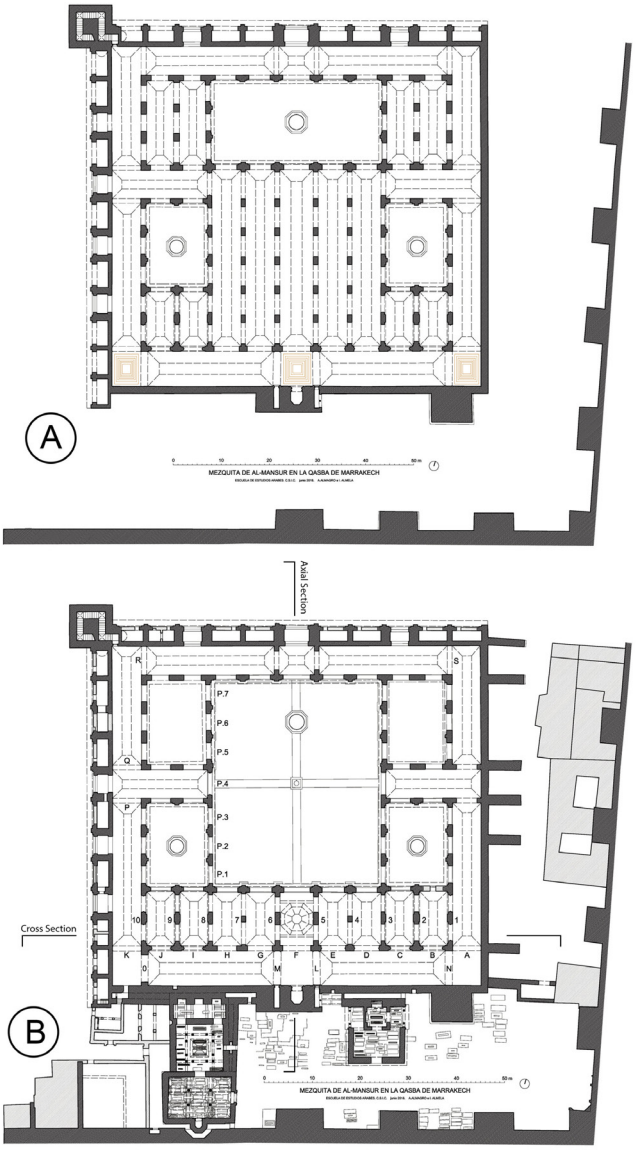

Figure 5. *Qaṣba Mosque (Marrakesh). A. Almohad-Foundational phase (12th century); B. Current state (Author).*

Despite this, most of the studies carried out to this day have not paid sufficient attention to the evolutionary and diachronic aspect of the building, disregarding the existence of a major architectural transformation, and neglecting to investigate the characteristics of the original building. Fortunately, during 2018 we were able to carry out a new architectural survey of the mosque that allowed us to undertake a detailed analysis of its structure and identify its radical historical transformation (Almela, 2020).

For the time being, the method of analysis described above has only been applied to this mosque, where it has been possible to recognise some characteristics of the Almohad foundational building and its subsequent evolution. To do this, we have delimited four major areas of the building in which the main traces of its transformation are concentrated: the central courtyard, the minor courtyards, the hydraulic structure, and the arcades of the prayer hall. But it is worth mentioning that most of the irregularities are repeated symmetrically to the longitudinal axis of the mosque, which shows that the mosque has always functioned as such, both in its initial configuration and in its subsequent alterations. In the case of the prayer hall arcades, however, not all anomalies follow this symmetrical layout.

The inaugural Almohad phase (Figure 5A) consists of an eleven-aisle building that was arranged with the usual integrated T and E plan and dominated by a developed longitudinal axis, while it was provided with a large courtyard in the northern sector and two minor courtyards inserted within the large prayer hall. In addition, the three *qubba*-s located next to the qibla wall may have been covered with muqarnas vaults, of which the one at the western end still survives. This was

a mosque with a much larger covered area if we compare it to the present-day building and it was originally organised in a quite different way. The interior would have had only three courtyards, two minor ones corresponding to the two courtyards in the southern half of the present building, while a major courtyard would have occupied the northern part of the present central courtyard. All these courtyards have been equipped with fountain until the present day. The largest courtyard also has two underground cisterns.

Regarding the major courtyard of the present mosque (Figure 5B), it is the most revealing space since it presents notable differences that are symptomatic of its main transformation. First, we find that on the east and west side fronts there is a very noticeable inequality between its northern and southern halves (Figures 6 and 7). The northern one shows a sequence of three arches very well defined as a courtyard façade with double-ring arches, *alfiz* (a rectangular moulding that encloses the outward side of an arch) and pi-

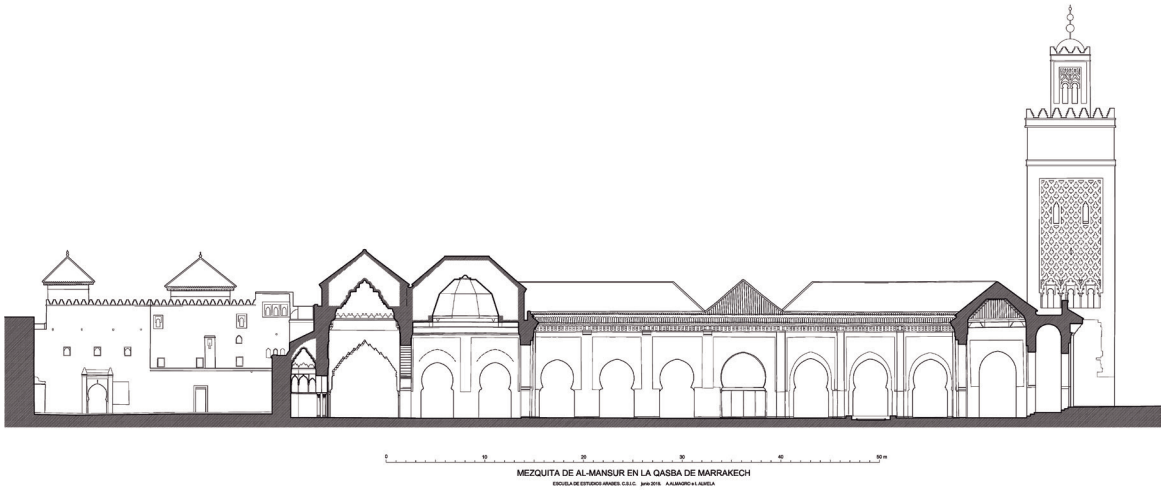

Figure 6. *Qaṣba Mosque (Marrakesh). Longitudinal section (Author).*

Figure 7. *Qaṣba Mosque (Marrakesh). View of the mosque from the minaret (Author).*

lasters attached to the pillars. By contrast, the southern one, including the central opening, consists of a plain face of simple arches, typical of an interior arcade. Furthermore, if we consider the pilasters, it can be observed that the one that separates P4 from P5 is slightly displaced towards the jamb of arch P5 (Figure 8). All of this evidences how the major courtyard was originally 3 x 5 arches with its dominant axis perpendicular to the longitudinal axis of the mosque, although it was later extended to the south by removing four bays of the prayer hall.

As for the four minor courtyards, the two located in the northern sector have a simple, undressed façade on all four sides with pointed horseshoe arches and a shallow *alfiz*. On the other hand, the two ones located in the southern sector have four elevations with double-spiral arches, *alfiz* and pilasters, namely the usual façade treatment in Marrakesh's medieval architecture. Furthermore, these four minor courtyards are arranged around the large central courtyard and are related to it by means of the arcades themselves, with no intermediate roofed space that isolates them or gives meaning to the presence of the arcades (Figure 5B). Regardless of the archetypes and building typologies, it is contrary to architectural logic to place two juxtaposed courtyards separated by an arcade. If we contrast the two faces of the arcades that stands between the major courtyard and the minor courtyards, it is possible to observe that the pillars are arranged in opposite ways on either side. In other words, in the northern sector, the major courtyard has a façade treatment, while in the two minor ones this is not the case. And in the southern sector, just the opposite occurs.

In this way, it is revealed how the southern sector of the mosque, which consists of a prayer hall and two minor courtyards, had a wide-span transverse aisle juxtaposed to the qibla wall and a sequence of perpendicular aisles between which the two courtyards are integrated. The only difference with respect to the present mosque is precisely the extension of the five central aisles with the addition of four bays to the north. As for the two minor courtyards in the northern sector they are not original. In fact, this point would also be accounted for in the surveys of Ewert and Wisshak, where it was found that the pillars located in the centre of the north and south sides of both

Figure 8. *Qaṣba Mosque (Marrakesh). Main courtyard. Sequence of arches (P3, P4, P5) in the west side front.*

courtyards had been flattened (Ewert and Wisshak, 1987, 184-185), in other words, the central arcade that compartmentalised the former aisles may have been removed.

Likewise, the water supply of a mosque is an element whose layout is guaranteed to be maintained over time, which is why it contributes to the understanding of the foundational building. On the one hand, the mosque has four fountains, two in the central courtyard and two in the minor southern courtyards. In the central courtyard, a small modern marble bowl is located in the centre, exactly in the crossing of the two axes, while another large circular marble bowl, slightly recessed, is centred in relation to the longitudinal axis of the building in the northern part of the courtyard (Figure 5). The significance of this is precisely its centred position with respect to the transversal axis marked by bay P6, which would correspond to the Almohad courtyard. On the other hand, the two minor courtyards located to the south, allegedly original, accommodate a type of central marble fountain similar to the previous one. In short, the location of these three low fountains centred on the three courtyards contributes to the consideration of these last as part of the foundational project.

Regarding the T-shaped layout, it emphasises the transverse and central aisles, both of which are wider than the rest, especially the transverse one, whose dimensions are unusual (7.28 m as opposed to 4.77 m in the Kutubiyya). As is customary in Almohad architecture, the transverse aisle would have had an odd number of *qubba*-s, corresponding to the three domes of today, although two of them were rebuilt at a later date. As for the central aisle, it would be most logical to think of a continuous wooden roof. Moreover, this longitudinal axis extends to the northern front where the main doorway and a carpentry *qubba* are located. The second E-shaped layout adds the two lateral aisles that extend along the east and west sides respectively. These aisles are slightly wider, but not as wide as the two aisles that form the T-shape.

Meanwhile, the prayer hall has a wide variety of arches, generally arranged symmetrically, although there are several peculiarities and anomalies. Regarding the composition of the arcades and their ornamentation, several Almohad capitals have been identified on the small columns attached to some of the pillars in the transverse aisle, which suggests that the whole archery belongs to that period. This detail is especially interesting since allows for the recognition of a particular feature of the Almohad building, namely the use of transposed arches in the interior of the building. In general, this architectural solution is only implemented in façades either external walls or courtyards, but at the Qaşba mosque it has been possible to recognise it implementation for two ornamentally more distinguished sectors located to the south of the minor courtyards (arcades 1-3 and 8-10). The lower arch ends with a slightly pointed horseshoe, while the arch behind it is poly-lobed (Figures 9 and 10). Likewise, the intermediate arcades 2 and 9, which divide the two distinguished sectors into pairs of aisles, have a thickness greater than normal, in such a way that they invade the space for the alfiz of arches B, C, I and J. This detail makes us think that they were widened.

On the other hand, the pairs of aisles headed by arches D-E and G-H distort the symmetry. The first pair, located to the east of the longitudinal axis, features large poly-lobed plasterwork arches, similar to the ones lining B, C, I

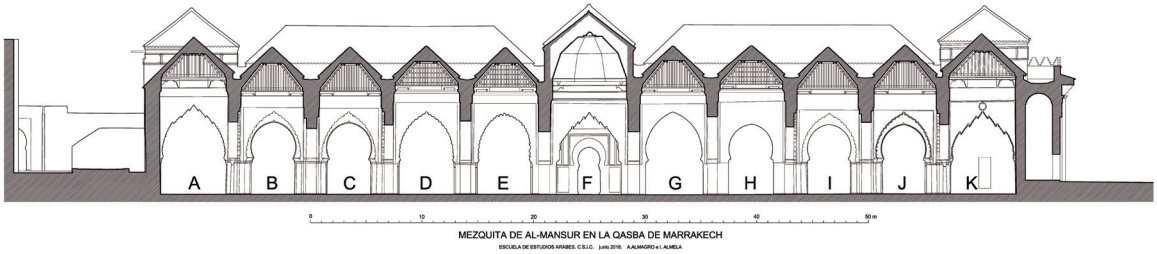

Figure 9. *Qaşba Mosque (Marrakesh). Cross section through the prayer hall (Author).*

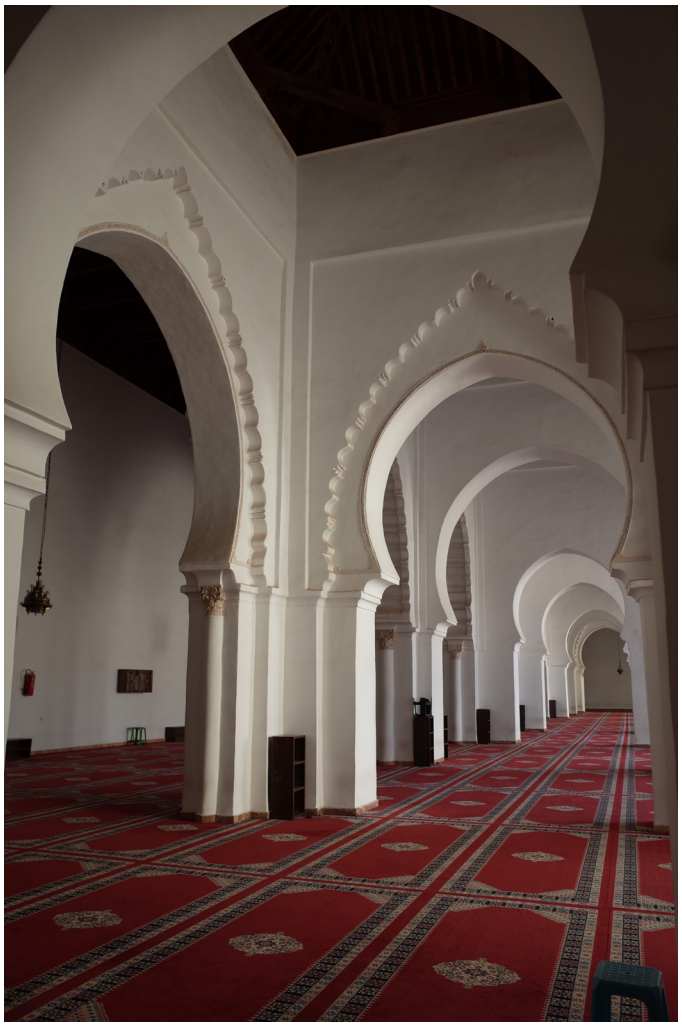

Figure 10. *Qaṣba Mosque (Marrakesh). Prayer hall. Different types of arches preserved in the aisles.*

and J. In turn, G is a slightly larger arch with a tumid design and H is a slightly pointed horseshoe arch. As for G, it coincides perfectly with the geometric profile of the poly-lobed arch D, which suggests that G is the structural arch that resolves this bay and lacks of the plaster finishing that defines the ornamental poly-lobed arch (Figure 9). As for H, it is the most discordant feature and, given the absence of data, it is only possible to think that it corresponds to a later alteration of the arch, perhaps to reinforce it, as it is much coarser than the rest.

Moreover, it is possible to recognise a possible reinforcement in an ensemble of arches such as those in the central aisle (5-6), the *maqṣūra* (F, L, M) and the western *qubba* (O). In the first case, this is evident, since the traces of older and larger arches have been embedded by new arches of smaller span. As in the case of the aforementioned arches of the *maqṣūra* and the western *qubba*, their massive condition and their deformations suggest that they were strengthen.

Following on with the configuration of the Almohad foundation mosque, it should be mentioned that at the intersection of the two main aisles, that is to say at the midpoint of the transverse aisle, we can find the most prominent space in the hall, the *qubba* adjoining the mihrab (Figure 5). This is formed by three large arches and the qibla wall in which the mihrab's opening and a prominent façade are located. The mihrab façade is complemented by two lateral openings for the *almimbar* and the imam's vestibule, which are also integrated underneath the side arches. On a lower level, a collection of 12 marble columns flanking the openings and the façade were arranged, most of which are spolia pieces, some of Umayyad Caliphate origin. Above this level, there is a very elaborate composition with various decorative elements and ornamental devices.

The last element to highlight in the prayer hall would be the western muqarnas dome, the only one among three that might have survived, and which has several characteristics that differentiate it from the other two, but at the same time resemble Almohad examples. The noteworthy features of this dome include the use of a rectangular base without transitional friezes, the composition around two distinct axes of symmetry, the crowning with a triple little dome, the significantly larger format of *adaraja* (muqarnas piece), as well as the use of an auxiliary mesh of thick *medina*-s (set of narrow pieces that make up a structural network inserted in the assembly of the dome).

With respect to its external composition, the mosque is enclosed to the south and east by two thick walls that are completely blind except for small openings, while the other two fronts, north and west, border the public space and were treated as a monumental façade. This design consisted of a double membrane with a narrow intermediate bay compartmentalised into modules that opened outwards through large tumid arches that are ploughed through by pointier arches.

Some of these modules accommodates the gates of the mosque which are integrated alternately, three on the northern side and four on the western side. The system used for the construction of the mosque is based on the use of rammed-earth walls for the internal membrane and the compartmentalisation of the modules. The exterior façade, on the other hand, is entirely built with brick masonry, which is used to unify the arch's two rings and the pilasters. As for the barrel vaults that cover each module, they were built by means of a first vault that worked as a lost formwork and on which a second structural vault was built.

Such a mosque could not be devoid of a large minaret, although its scale did not compete with that of the Kutubiyya. In the Qaṣba Mosque, the tower is located outside the northwest corner of the building and consists of two volumes. Its main characteristics are the use of brick for its construction and the design of the façades with *sebka* (decorative motif of interlacing vegetal and architectural elements in form of rhombus) squares whose pattern varies from one side to the other. In this case, the glazed tilework is quite more remarkable than in the Kutubiyya minaret.

After a long period of decline since the Almohad collapse, Marrakesh was settled by the Saʿdians in the 16th century, when Sultan ʿAbd Allāh al-Gālib (1557-74) undertook an urban reform of the city that also affected the Qaṣba. Regarding the Mosque of al-Manṣūr, its reform was of particular significance after an incident involving a gunpowder explosion during his reign, which apparently affected the transverse aisle next to the qibla, causing serious damage to the domes. Furthermore, this sector of the Qaṣba became particularly important for the Saʿdians, as the dynasty's funerary complex was erected behind the qibla wall.

Evidence of this intervention includes several elements located in the cross aisle next to the qibla wall, the redecoration of some spaces, and finally, the consolidation of its plan with a large, roughly square central courtyard around which four other minor courtyards are placed adjacent to it. Of these, the two most northerly ones may have been created at that time to enhance the symmetry of the plan. This operation involved the elimination of a large part of the aisles, which may have already been ruined, and reduced considerably the roofed area.

The 16th-century intervention is evident in the transverse aisle next to the qibla, where two of the muqarnas domes (the central and eastern ones) may have been remade according to Saʿdian typology. Nevertheless, the written sources only mention the renovation of a single dome, so it cannot be ruled out the possibility that one of them is later to ʿAbd Allāh al-Gālib or even corresponds to the Alawid period.

Regarding the ornamentation, the Saʿdian project envisaged a comprehensive redecoration of the entire mosque, which, however, does not seem to have been completed. Along the cross aisle and the two western aisles there is the usual repertoire of false arches, geometric friezes, ataurique borders, rosettes and epigraphic bands. However, among all the Saʿdian decorative work, the intervention on the mihrab façade and niche is noteworthy, where the craftsmen took advantage of the pre-existing Almohad composition but added a repertoire that followed the patterns of the Saʿdian mihrabs of Marrakesh.

The refurbishment was also quite certainly extended to the roofs and ceilings of the mosque. Among the diverse set of wooden ceilings; the design of those located in the northern aisle, the western lateral aisle and the transverse aisle between the minor courtyards is indeed similar to the wooden frameworks located in the Saʿdian mosques of al-Muwāssīn, Bāb Dukkāla and Sīdī Abū al-ʿAbbās mosques (Almela, 2021: 77, 114 and 200).

Later on, the mosque underwent further alterations during the Alaouite period and especially during the reign of Sultan Muhammad III (1757-1790). The wooden dome in the central aisle most certainly dates from this period.

5. Conclusions

As a final conclusion, we can point out that configurational analysis represents an alternative methodology

for the archaeological study of historic buildings, being part of the archaeology of architecture and constituting a non-destructive tool. As such, it is a solution for the study of buildings, in our case the Maghrebi mosques, allowing to further our knowledge of them when it is impossible to carry out archaeological interventions, and especially when there is a lack of coordination between documentary research and conservation, or restoration works. As a provisional resource, its results may in the future be cross-checked or confirmed by more definitive archaeological approaches.

Regarding the Qaṣba Mosque in Marrakesh, it has been possible to confirm that the Almohad building underwent several transformations throughout its history. The most relevant result of its configurational analysis is the identification of its foundational typology, which is radically different from the present-day building. Its design could be recognised as an intermediate link between the typologies of the Kutubiyya and the Great Mosque of Rabat. The inaugural phase responds to a building with eleven aisles; with the usual T and E-shapes integrated; presided over by a developed longitudinal axis; with an oblong-shaped major courtyard in the northern sector; and two minor courtyards inserted within the large prayer hall. In addition, the three *qubba*-s located next to the qibla wall may have been covered with muqarnas vaults, surviving today the one located at the western end.

The subsequent decay and successive interventions are difficult to distinguish without an exhaustive archaeological study, although it is worth noting the 16th-century alteration under the Saʿdian dynasty. Evidence of this can be detected in several points such as the cross aisle next to the qibla wall, the redecoration of some spaces, the consolidation of its ground plan provided with a roughly square central courtyard, and the four minor courtyards placed adjacent to the major one. This last operation involved the elimination of a large part of the aisles and a considerable reduction in the roofed surface area.

Acknowledgment
This work was supported by the Spanish National Research Program under Grant PID2019-111644GB-I00 (Name of the Project: Atlas de Arquitectura Almohade, ATARAL); and the Alexander von Humboldt foundation under the Postdoctoral programme.

References

Almagro, A. and Jiménez, A. (2022). The Kutubiyya Mosque of Marrakesh Revisited. *Muqarnas, 39,* 255-288.

Almagro Gorbea, A. (2020). Arquitectura religiosa almorávide. *Arqueología del al-Andalus almorávide* (ed. R. Azuar Ruiz, Alicante: Museo Arqueológico de Alicante): 163-190.

Almela, I. (2020). La mezquita de al-Manṣūr en la Qaṣba de Marrakech. Aproximación a su configuración almohade. *Arqueología de la Arquitectura, 17,* e096. https://doi.org/10.3989/arq.arqt.2020.005.

Almela, I. (2021). *Arquitectura religiosa saadí y desarrollo urbano (Marrakech, siglos XVI-XVII).* Editorial Universidad de Granada.

Basset, H. and Terrasse, H. (1932). *Sanctuaires et forteresses almohades.* Paris: Institut des hautes-études marocaines.

Caballero Zoreda, L. (2009). Edificio Histórico y Arqueología: un compromiso entre exigencias, responsabilidad y formación. *Arqueología de la Arquitectura, 6,* 11-19. doi 10.3989/arqarqt.2009.09005

Creswell, K.A. (1979). *Early Muslim Architecture, Volume II: Early ʿAbbāsids, Umayyads of Cordova, Aghlabids, Tūlūnids, and Samānids, A.D. 751-905.* New York: Hacker Art Books.

Deverdun, G. (1959-1966). *Marrakech des origines à 1912.* Rabat: Éditions techniques nord-africaines.

Ettahiri, A.S. (2007). Vestiges archéologiques sous la mosquée Al-Karawiyine. *Architecture du Maroc, 34,* 103-106.

Ettahiri, A.S. (2014). Fès à l'aube du Maghreb al-Aqsa. *Le Maroc Médiéval. Un empire de l'Afrique à l'Espagne* (ed. Y. Lintz and C. Déléry, Paris: Hazan): 118-120.

Ettahiri, A.S., Fili, A. and van Staëvel, J-P. (2012). Nouvelles recherches archéologiques sur la période

médiévale au Maroc: Fès, Aghmat et Îgîliz. *Histoire et archéologie de l'Occident musulman (VIIe-XVe siècles): Al-Andalus, Maghreb, Sicile, Actes de la réunion des 20-25 sept. 2010* (ed. P. Sénac, Toulouse: Université de Toulouse II-Le Mirail, CNRS): 157-181.

Ewert, C. and Wisshak, J-P. (1987). Forschungen zu almohadischen Moschee III: Die Qasba-Moschee in Marrakesch. *Madrider Mitteilungen, 28,* 179-211.

Fernández Puertas, A. (2015). *Mezquita de Córdoba. Su estudio arqueológico en el siglo XX*. Granada: Universidad de Granada.

Marcos Cobaleda, M. (2015). *Los Almorávides. Arquitectura de un imperio.* Granada: Universidad de Granada.

Marçais, G. (1954). L*'architecture musulmane d'occident: Tunisie, Algérie, Maroc, Espagne et Sicilie.* Paris: Arts et Métiers graphiques.

Maslow, B. (1937). *Les mosquées de Fès et du nord du Maroc.* Paris: Les Éditions d'art et d'histoire.

Mannoni, T. (1998). Analisi archeologiche degli edifici con strutture portanti non visibili. *Archeologia dell'Architettura, 3,* 81-85.

Parenti, R. (1988). Sulle possibilità di datazione e di classificazione delle murature. *Archeologia e restauro dei monumenti* (ed. R. Francovich and R. Parenti, Firenze: Edizioni All'Insegna del Giglio): 280-302.

Villalba Sola, D. (2015). *La senda de los almohades: arquitectura y patrimonio.* Granada: Universidad de Granada.

Terrasse, H. and Deverdun, G. (1968). *La Mosquee al-Qaraouiyin a Fes.* Paris: C. Klincksieck.

Terrasse, H. (1942). *La mosquée des Andalous à Fès.* Paris: Editions d'Art et d'Histoire.

Terrasse, H., Colin, G. S., and Luquet, A. (1943). *La Grande Mosquée De Taza.* Paris: Editions d'Art et d'Histoire.