



**The Sasanian Tradition in 'Abbāsīd Art: squinch fragmentation as The structural origin of the *muqarnas***

**La tradición sasánida en el arte 'abbāssí: la fragmentación de la trompa de esquina como origen estructural de la decoración de muqarnas**

**A tradição sassânida na arte abássida: a fragmentação do arco de canto como origem estrutural da decoração das *Muqarnas***

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**Abstract:** Islamic architecture presents a three-dimensional decoration system known as *muqarnas*. An original system created in the Near East between the second/eighth and the fourth/tenth centuries due to the fragmentation of the squinche, but it was in the fourth/eleventh century when it turned into a basic element, not only all along the Islamic territory but also in the Islamic vocabulary. However, the origin and shape of *muqarnas* has not been thoroughly considered by Historiography. This research tries to prove the importance of Sasanian Art in the aesthetics creation of *muqarnas*.

**Keywords:** Islamic architecture – Tripartite squinches – *Muqarnas* –Sasanian – Middle Ages – 'Abbāsīd Caliphate.

**Resumen:** La arquitectura islámica presenta un mecanismo de decoración tridimensional conocido como decoración de muqarnas. Un sistema novedoso creado en el Próximo Oriente entre los siglos II/VIII y IV/X a partir de la fragmentación de la trompa de esquina, y que en el siglo XI se extendió por toda la geografía del Islam para formar parte del vocabulario del arte islámico. A pesar de su importancia y amplio desarrollo, la historiografía no se ha detenido especialmente en el origen formal de la decoración de muqarnas y por ello, este estudio pone de manifiesto la influencia del arte sasánida en su concepción estética durante el Califato 'abbāssí.

**Palabras clave:** Arquitectura islámica – Trompa tripartita – Muqarnas – Sasánidas – Edad Media – Califato 'abbāssí.

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## I. Introduction

Among the various motifs that Islamic art used to decorate buildings, *muqarnas* decoration (a system of projecting niches used for zones of transition and for architectural decoration) is most notable. It came to play a major role in architectural decoration due to its strong aesthetic appeal and flexibility, readily adaptable to various surfaces. This intricate three-dimensional decorative scheme was a device forged and developed in Islamic contexts and thereafter employed in non-Muslim settings, as for example in the Cappella Palatina in Palermo (Sicily), built around 1132 by the Norman Emperor Roger II (r. 1130-1154) or in the Chapel of the Assumption in the Monastery of Las Huelgas in Burgos (Spain), dated to the thirteenth century.

The material employed in the construction of *muqarnas* varied according to the region. In what today is Iran and Uzbekistan, *muqarnas* were mainly built in brick up until at least the seventh/thirteenth century; under the Mongols – reflecting an evident development and improvement of this decorative technique – plaster was more commonly used. In Syria and Egypt, by contrast, the preference was for carved-stone *muqarnas*, while plaster and even wood were used in the North Africa and in al-Andalus. A common decorative technique was polychrome painting, mostly in strong, bright colours, involving a wide range of motifs.

However, to embark upon a historical study on the use of *muqarnas* in architectural decoration is a complex task, since it is not easy to pinpoint the place and time at which *muqarnas* were first used<sup>2</sup>. A number of authors, including de Beylié, Bloom, Creswell, Ettinghausen, Grabar and Tabbaa, pointed to four possible origins: namely, Bukhara in present-day Uzbekistan, Samarra in today's Iraq, Egypt and today's Algeria (see table 1). Those art historians who suggest that the *muqarnas* first arose in the Eastern Islamic lands cite early examples of north-eastern Iran, Iraq and Egypt<sup>3</sup>, like the

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<sup>2</sup> About the etymology of the term, several scholars agree that it comes from the Greek word *χορῳνίς* (Latin *cornis*), meaning “cornice”, according to BEHRENS-ABOUSEIF, Doris. “Muqarnas.” In *Encyclopaedia of Islam*. 2nd ed., Leiden: Brill (VII), 1993, p. 501; also, on this subject see: HEINRICHS, Wolfhart. “The Etymology of *Muqarnas*: Some Observations.” In *Humanism, Culture, and Language in the Near East: Studies in Honor of Georg Krotkoff*, edited by Asma Afsaruddin and A. H. Mathias Zahniser, 175-184. Winona Lake, Ind: Eisenbrauns, 1997, pp. 175-184.

<sup>3</sup> CRESWELL, Keppel Archibald Cameron. *The Muslim Architecture of Egypt*. Oxford: Clarendon Press, 1952, p. 159; HARB, Ulrich. “Ilkhanidische Stalaktitengewölbe. Beiträge

Sāmānid Ismāʿīl Mausoleum (301-331/914-943) at Bukhara, the southeast and northeast domes of the Saljūqīd Great Mosque of Isfahan (464-480/1072-1088), the Shrine of Imām al-Dāwar (477/1085) at Samarra and the *muqarnas* fragments found in the *Ḥammām* of Abūʿl-Suʿud in Fustāt (Cairo). While some suggest that this ornamental device may have arisen independently and virtually simultaneously in North Africa (Qalʿat Banī Ḥammād built between 405/1015 and 547/1152 in Algeria) and the Near East<sup>4</sup>. This diversity of views testifies to the complex nature of the question.

Therefore, the first step in addressing the issue of the geographical origin of *muqarnas* decoration must be to review current wisdom on the subject, focusing on the best-documented theories. It would seem clear that this new three-dimensional system of architectural decoration developed under the Abbasid Caliphate, an idea first canvassed in 1985 by Yasser Al-Tabba<sup>5</sup>. Taking that assumption as a starting point, the next step is to determine what prompted this change with respect to the Islamic aesthetic predominant until that time. In this paper, it postulates that the change reflected the influence of Sasanian art on the formal origin of the *muqarnas*, i.e. on the fragmentation of the squinch.

That influence was already apparent in other aesthetic and architectural trends, including the use of recesses and projections on façades, and of the keel arch, both being characteristic of Persian architecture immediately prior to the arrival of Islam. The influence of Sasanian architecture was to be heightened from the Abbasid Caliphate onwards by the transfer of the capital from Damascus to Baghdad.

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zu Entwurf und Bautechnik." *Archaeologische Mitteilungen aus Iran* (1978), p. 16; GRABAR, Oleg. *La formación del arte islámico*. Madrid: Cátedra, 1986, p. 230 [1st ed. 1973. *The Formation of Islamic Art*. New Haven: Yale University Press]; TABBAA, Yasser. "The Muqarnas Dome: its Origin and Meaning." *Muqarnas: An Annual on Islamic Art and Architecture* 3 (1985), p. 62; ETTINGHAUSEN, Richard, and GRABAR, Oleg. *Arte y Arquitectura del Islam. 650-1250*. Madrid: Cátedra, 2000, pp. 200-203 [1st ed. 1987. *The Art And Architecture of Islam 650-1250*. London: Penguin Books] and BLOOM, Jonathan. "The Introduction of The Muqarnas into Egypt." *Muqarnas: An Annual on Islamic Art and Architecture* 5 (1988): 21-28, among other publications.

<sup>4</sup> GRABAR, Oleg. *La Alhambra: iconografía, formas y valores*. Madrid: Alianza, 2000, p. 176 [1st ed. 1978. *The Alhambra*. Cambridge, Mass.: Harvard University Press].

<sup>5</sup> TABBAA, "The Muqarnas Dome", 61-74.

**Table 1**

<b>BUILDINGS with MUQARNAS</b>	<b>PERIOD/DINASTY</b>
Mausoleum of Ismāʿīl (301-331/914-943) at Bukhara	Sāmānids (204-395/819-1005)
Great Mosque of Isfahan South-east and North-east domes (464-480/1072-1088)	Saljūqids (431-590/1040-1194)
Shrine of Imām al-Dāwar (477/1085) at Samarra	Abuʿl-Makārim Sharaf al-Dawla Muslin ibn Quraysh (453-478/1061-1085), governor of the ʿUqayli (384-594/990-1169).
<i>Ḥammām</i> of Abūʿl-Suʿud, Fuṣṭāṭ (tentatively attributed to the third/ninth or fourth/tenth centuries.	ʿAbbāsids (132-656/750-1258)
Minaret’s Mosque Badr al-Jamālī (477/1085), Cairo + window northern section, Cairo wall commissioned by Badr al-Jamālī in 479/1087	Fāṭimids (297-567/909-1171)
Qalʿat Banī Ḥammād (405-547/1015-1152) Algeria	Ḥammādids (405-547/1015-1152) al-Nāṣir b. ʿAlannās (454-481/1062-1088)

## II. From the fragmentation of the squinch to the creation of a three-dimensional decorative system

As indicated earlier, the formal origin of the muqarnas must be sought in the fragmentation of the squinch through the introduction of small concave niches in the form of pointed or keel arches. These early manifestations of muqarnas as devices for fragmenting squinches were to give rise to a highly-aesthetic formal mechanism, and indeed to a whole system of three-dimensional

decoration; in Ecochard's terms, these fragmented squinches can be seen as *préfigurations de muqarnas*.<sup>6</sup>

The formal development of muqarnas from squinches can be traced from the earliest surviving example at the Sāmānid Ismā'īl Mausoleum in Bukhara, built in the first half of the fourth/tenth century, which contains a primitive example of a squinch fragmented by niches, to the Salūyūqid squinches of the Great Mosque of Isfahan, which display a much more elaborate geometric and formal treatment. In formal terms, indeed, the muqarnas may be viewed as a multiplication of the squinch proper<sup>7</sup>, fulfilling the same function as a zone of transition from room to dome, though in a much more decorative manner. After all, the squinch as a means of transition from square to dome had already been used in Sasanian, Roman and Byzantine architecture, and thence— like other elements — became part of the Islamic architectural vocabulary, appearing even in the earliest Islamic buildings like for example, in the Great Mosque of Damascus.<sup>8</sup>

What was novel, therefore, was not the use of squinches *per se*, but rather the elaborate and ornate decoration achieved by dividing or fragmenting them. By the early fifth/eleventh century, these small concave niches were no longer restricted to squinch fragmentation, but had become independent decorative units, much more elaborate in composition and geometric construction, thus heralding the birth of a new three-dimensional system of architectural decoration.

This new system of suspended prisms, which was eventually to conceal the whole structure of the squinch<sup>9</sup>, was created using a wide range of materials and various additional decorative techniques.<sup>10</sup> The system gradually spread to cover

<sup>6</sup> ECOCHARD, Michel. *Filiation de monuments grecs, byzantins et islamiques*. Paris: Geuthner, 1977, p. 65.

<sup>7</sup> ROSINTAL, Josef. *Pendentifs, Trompen und Stalaktiten. Beiträge zur Kenntnig der Islamischen Architektur*, (Leipzig, 1912), p. 51.

<sup>8</sup> CRESWELL, Keppel Archibald Cameron. *A Short Account of Early Muslim Architecture*, (Aldershot, 1989), p. 112.

<sup>9</sup> AHLENSTIEL-ENGEL, Elisabeth. *Arte Árabe (The Arabic Art)*, trans. José Camón Aznar (Barcelona, 1st edition 1927, reprinted 1932, p. 129.

<sup>10</sup> In Iran and what is now Uzbekistan, *muqarnas* were mainly built in brick until at least the eighth century; under the Mongols — reflecting an evident development and improvement of this decorative technique — plaster was more commonly used. In Syria and Egypt, by contrast, the preference was for carved-stone *muqarnas*, whilst plaster and even wood were used in the

the whole of the dome and even other surfaces, including cornices and capitals. By the sixth/twelfth century, the geometric construction of *muqarnas* became even more intricate; they were now no longer designed as concave niches, but rather as authentic, geometrically-created prisms.<sup>11</sup>

However, it is impossible to establish exactly where the squinch was first fragmented. Very little is known about this primitive fourth/tenth century manifestation of *muqarnas*, largely because so few examples from that time are now extant. Since most surviving examples are to be found in north-eastern Iran, it was long held that this area was in fact the birthplace of the *muqarnas*. Yet there are extant examples in Iraq datable to the first half of the fifth/eleventh century, displaying a much more elaborate use of *muqarnas*, in other architectural spaces apart from squinches. Clearly, then, the matter needs to be reviewed.

### II.1. Geographical origin of the *muqarnas*: current views

It seems evident, *a priori*, that *muqarnas* started out as a device for the fragmentation of squinches, and ultimately developed into decorative highly-geometric prisms; they ceased to be mere architectural supports, and became a recurring ornamental device in Islamic architecture. In order to determine where and why this attempt to decorate squinches arose for the first time, we must first review, albeit briefly, the research carried out to date.

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Maghrib and in al-Andalus. The most common decorative technique was undoubtedly polychrome painting, mostly in strong, bright colours, involving a wide range of motifs.

<sup>11</sup> Few studies have addressed the construction and geometrical composition of *muqarnas*, in ninth/fifteenth century Ghiyāth al-Dīn Jamshīd Mas'ūd al-Kāshī wrote *Miftāḥ al-ḥisāb* (“The Key of Arithmetic”) in Samarkand (Uzbekistan); in Spain, one of the most interesting is an essay by the seventeenth century Seville master builder Diego López de Arenas, published in a theoretical work entitled *Breve Compendio de la Carpintería de lo Blanco y Tratado de Alarifes*. The essay describes the technique used in constructing the “mocárabes” whose geometric composition was largely adopted by Naṣrid art (seventh/thirteenth to ninth/fifteenth century) but not before; the essay provides a valuable outline of the basic principles of *muqarnas* construction. A facsimile edition, annotated and with an introductory essay by Manuel Gómez Moreno, was published by the Instituto de Valencia de Don Juan, Madrid, 1966.

### II.1.1. North-eastern Iran: segmentation of the squinch as the constructive origin of the muqarnas



Figure 1: Inside the Sāmānid prince Ismā‘īl Mausoleum at Bukhara –Uzbekistan- (301/914-331/943): the zone of transition. (Photo Christine-Anne Gaillard, in Markus Hattstein et. al., *Islam-Kunst und Architektur* [Köln, 2000], 115).

To determine where formal squinch fragmentation first took place, we must focus on north-eastern Iran, where the earliest surviving examples are to be found. The Mausoleum of the Sāmānid prince Ismā‘īl (d. 293/907) in Bukhara (Uzbekistan) was built – according to some authors<sup>12</sup> – between 301/914 and 331/943; it is a square building with a central dome and four smaller domes at the corners. The dome is supported by squinches which convert the square space into an octagon; each squinch is composed of two concave niches separated by a kind of rib. This segmentation of the squinch is intended as an ornament helping to enrich the zone of transition (Figure 1).

Very near Bukhara lies the village of Tīm, the location of the *Maṣṣār* (holy place) Arab-ata, a mausoleum built between 366/977 and 367/978. The layout is very similar to that of the Mausoleum at Bukhara; it is a square construction topped by a dome supported by *muqarnas*. The transition from square to dome at Tīm

<sup>12</sup> ETTINGHAUSEN and GRABAR, *The Art and Architecture*, p. 157: perhaps erected under the rule of Prince Naṣr (r. 301/914-331/943). Other authors, however, suggest that it was built before Ismā‘īl’s death in 293/907, see POPE, Arthur Upham. *Persian Architecture*, (London, 1965), 81; also interesting REMPEL, L., “The mausoleum of Isma‘il the Samanid”, en *Bulletin of the American Institute for Persian Art*, vol. 4, Germantown, 1935, 199-209.

is more elaborate, more decorative, than that used at Bukhara. The squinch comprises three elements, framed in the upper section by a pointed niche hood which is in turn surrounded by a kind of panel, providing a highly-dynamic transition to the dome (Figure 2).

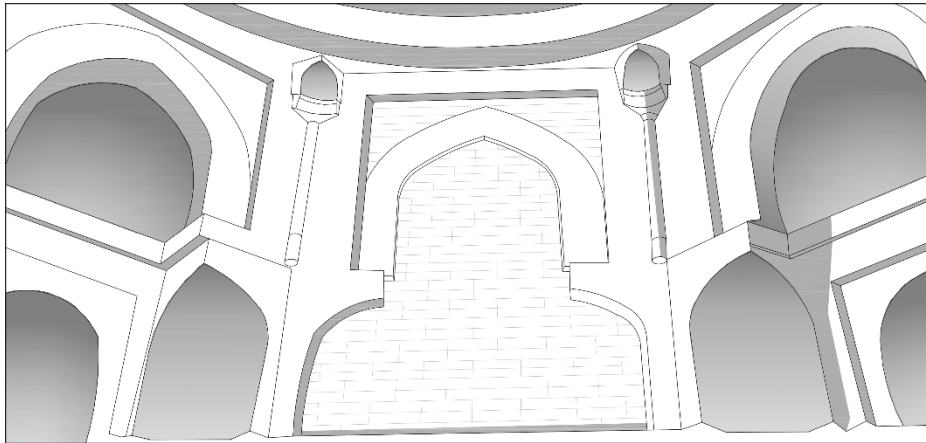


Figure 2: Inside the Arab-ata Shrine at Tim –Uzbekistan- (366/977-367/978): drawing in the zone of transition.

This system soon spread to other parts of Iran, and by the fifth/eleventh century was becoming increasingly common. Of particular interest is the shrine of Imām Duvazde at Yazd, in central Iran, built in around 427/1037, whose dome is supported by squinches consisting of *muqarnas* niches of a much more intricate design than those of the Mausoleum at Tim. A number of authors have suggested that this is the earliest surviving example of a *muqarnas* vault<sup>13</sup>. It would be tempting to assume that Tim had influenced Yazd, the latter displaying a more developed treatment; lighter, and with a greater play of volumes that would in turn directly influence the *Saljuqid* domes of the Mosque at Isfahan.

It was primarily under the Turkish *Saljuqid* dynasty (429/1038-551/1157) that the use of *muqarnas* became much more generalized, as a technique for decorating not only squinches but other architectural elements such as cornices. A fine example of squinch decoration is provided by the south-east and north-east *Saljuqid* domes, built in 464/1072 and 480/1088 respectively, of the Mosque at Isfahan<sup>14</sup> (Figure 3). These testify to the development of the squinch

<sup>13</sup> ETTINGHAUSEN and GRABAR, *The Art and Architecture*, p. 158.

<sup>14</sup> About the Great Mosque of Isfahan, see: GRABAR, Oleg. *The great mosque of Isfahan*. London, I. B. Tauris, 1990.



from 'Tim, through Yazd to Isfahan, where the composition tends towards three-dimensionality.<sup>15</sup>

The squinch comprises four niches, the central one acting as a segment of barrel vault and supported by a plain squinch, while the lateral niches retain the pointed concave design habitual in north-eastern Iran. Above the octagon proper is a sixteen-sided area before the base of the hemisphere dome itself; this latter structural solution like a “squinch net” has enriches the zone of transition.

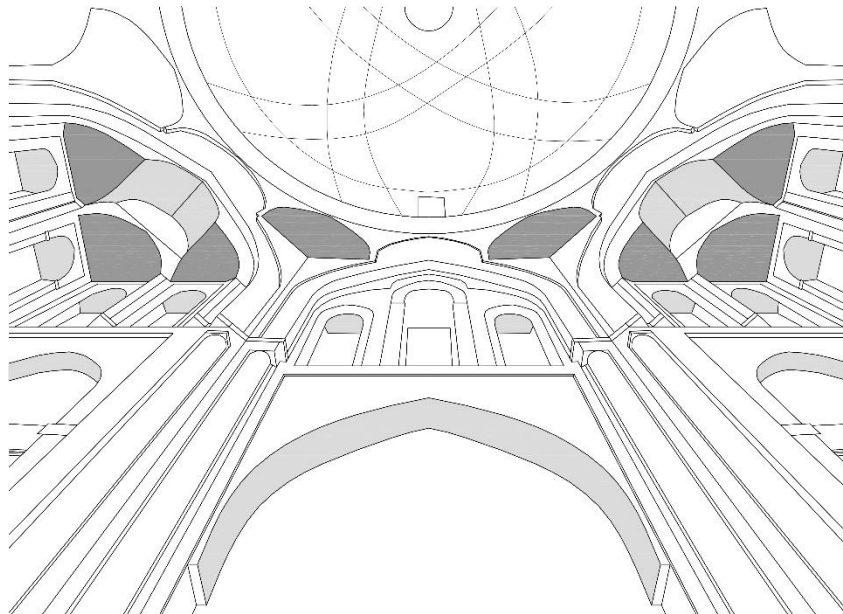


Figure 3: Mosque at Isfahan –Iran- (480/1088): north-east dome drawing.

In Iran, therefore, there is a readily-discernible trend in squinch fragmentation, contributing to the aesthetic and formal enrichment of the zone of transition, and starting out from the simple division of the squinch into small concave niches. The spread of this new technique from north-eastern to central Iran naturally prompted further development of the elements involved; the fragmented squinch gradually became more complex and intricate, ultimately giving rise to the elaborate devices used at Yazd, Isfahan and in other places like in the Mosque at Ardestan, built in the fifth/eleventh and sixth/twelfth centuries, where the influence of the Salÿuqid domes of Isfahan is unmistakable.

<sup>15</sup> FRISHMAN, Martin; H. KHAN (eds.), *The Mosque. History, Architectural Development and Regional Diversity*. London: Thames and Hudson, 1994, p. 65.

Detailed analysis of eastern buildings erected at the same time as the Mosque of Isfahan, both abroad and elsewhere in Iran clearly shows that this new squinch system failed to go beyond a few small buildings close to the Salýuqid capital, perhaps, in opinion of Ettinghausen and Grabar “because contemporary technology was not equal to their complexity”.<sup>16</sup>

From the fifth/eleventh century onwards, the *muqarnas* became an increasingly popular resource in Islamic architecture, not merely for squinch fragmentation but also beyond the zone of transition, for the decoration of whole domes as well as other surfaces such as cornices – as in *Gumbad-i ‘Alí* at Abarquh (Iran), built in 447/1056<sup>17</sup> – capitals and niches. It is not clear precisely when the composition of these elements developed to the point where they became suspended geometrical structures wholly independent of the architectural support, placed side-by-side until they covered the required space. Some interesting remains of *muqarnas* were found during excavations carried out by the Metropolitan Museum of New York in Nishapur (Iran) in the 1940s. Amongst the remains of a fourth/tenth century palace, archaeologists discovered some stucco remains in the form of small, painted concave niches, which must have been part of the decoration of a dome.<sup>18</sup>

The fragments unearthed at Nishapur represent something of a milestone, in that they raise two crucial issues. The first concerns the dating of these fragments; since they are individual pieces, made of plaster and presumably added once the dome itself was built, it seems reasonable to assume – given the style of later works – that these fragments date from much later than the fourth/tenth century. Secondly, even if the *muqarnas* remains at Nishapur were made in the fourth/tenth century, these plaster elements may have been used initially for other purposes, and only later superseded by brick devices intended for squinch segmentation.

This latter idea, however, seems improbable, given that the relative architectural crudeness of the *muqarnas* at Bukhara and Tim suggests that their earliest use was in squinch fragmentation. It therefore appears more likely that the *muqarnas* fragments discovered at Nishapur actually date from the fifth/eleventh century, and were thus produced at around the same time as the surviving examples

<sup>16</sup> ETTINGHAUSEN and GRABAR, *The Art and Architecture*, p. 159.

<sup>17</sup> HOAG, John D. *Islamic Architecture*, New York: H.N. Abrams, 1975, p. 101: “(...) The Gunbad-i-‘Alí de Abarquh in central Persia, dated 1056, provides the first example of an exterior muqarnas cornice”.

<sup>18</sup> GRABAR, *The Formation of Islamic Art*, p. 201.

found at *Qal'a Banū Hammād* in Algeria or the fragments of *muqarnas* from Hammām of Abū'l-Su'ud, on the site of the old city of Fustāṭ – discussed below – and the *muqarnas* discovered in the Santa Clara Convent in Murcia (Spain), belonging to an earlier palace - Dār al-Ṣughrā- built during the rule of Ibn Mardanīsh (d. 567/1172).<sup>19</sup>

Assuming a later date for the *muqarnas* fragments found at Nishapur, a clear development can be charted from the first use of *muqarnas* for squinch fragmentation and their subsequent use as a purely decorative architectural resource, based on the introduction of *muqarnas* cells, generally made of plaster, beyond the squinch structure.

### II.1.2. *Muqarnas* in Egypt: review of a hypothesis

Creswell and Bloom studied the use of *muqarnas* as a decorative device in Egypt<sup>20</sup>. Interestingly, a widely-held theory sustained that *muqarnas* could have appeared in two places at the same time<sup>21</sup>. This hypothesis was based on the fragmentation of the corner pendentive, as displayed in Bukhara, also found in some mausoleums at the Necropolis of Aswan, dated between the end of the fourth/tenth century and the beginning of the fifth/eleventh<sup>22</sup> (Figure 5). Some mausoleums, undeniably contain a device very similar to that found in the tenth-century *Maṣṣār Arab-ata* in Tim (Uzbekistan): a squinch divided into four pointed concave niches.

Creswell also based this theory on the existence of Egyptian examples that he dated to the fifth/eleventh or sixth/twelfth centuries. Those examples are the

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<sup>19</sup> Amongst other studies, see NAVARRO PALAZÓN, Julio and JIMÉNEZ CASTILLO, Pedro, “La arquitectura de Ibn Mardanīsh: Revisión y nuevas aportaciones.” In *La Aljafería y el Arte del Islam Occidental en el siglo XI, Actas del Seminario Internacional celebrado en Zaragoza los días 1, 2 y 3 de diciembre de 2004*, edited by BORRÁS GUALIS, G. M.; CABANERO SUBIZA, B., 291-350. Zaragoza: Institución Fernando el Católico, 2012.

<sup>20</sup> CRESWELL, *The Muslim Architecture of Egypt* and BLOOM, “The Introduction of the Muqarnas into Egypt”, previously mentioned; also, BLOOM, Jonathan. *Arts of The City Victorious: Islamic Art and Architecture in Fāṭimid North Africa And Egypt*. New Haven: Yale University Press, 2007.

<sup>21</sup> Creswell suggested that the presence of this three-part pendentive in Aswan reflects a North African influence, and more specifically the direct influence of contemporary Coptic architecture. His theory is based on the finding of early examples in the Coptic church of Abu'l-Sayfayn in Old Cairo, CRESWELL, *The Muslim Architecture of Egypt*, p. 232.

<sup>22</sup> MONNERET DE VILLARD, Ugo. *La necropoli musulmana di Aswan*. Le Caire: L'Institut Français d'Archéologie orientale, 1930, pp. 50-51.

*muqarnas* fragments found in the *Hammām* of Abū'l-Su'ud (Figure 5), in Fustāt; made in stucco, with painting decoration that has been thought to recall 'Abbāsīd style in Samarra. The fragments, preserved now in the Islamic Museum of Cairo, feature a dancer and a young man sitting with a glass in his hand. It is believed that they were part of a cupola, perhaps as transition elements. They have been tentatively dated to the third/ninth or fourth/tenth centuries by Behrens-Abouseif.<sup>23</sup>

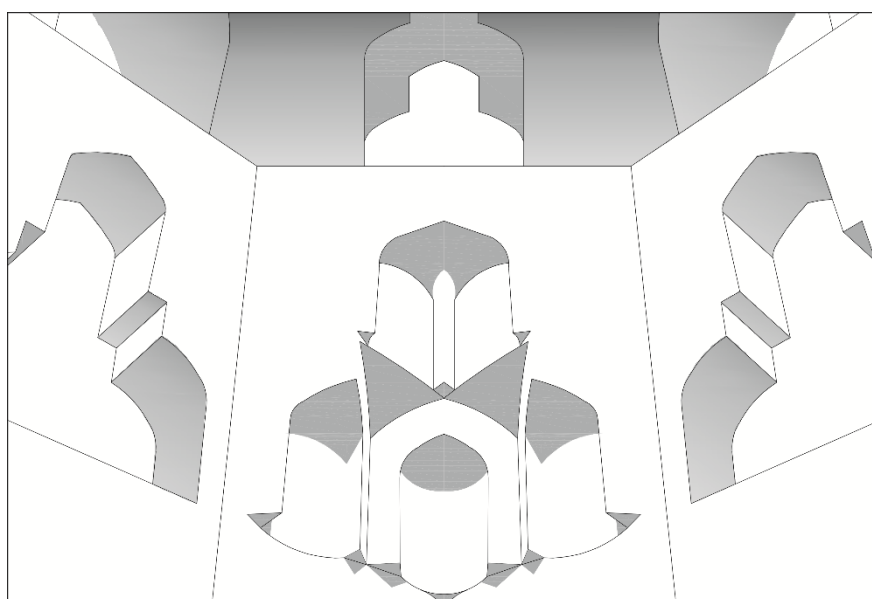


Figure 4: Inside the mausoleum in the necropolis at Aswan –Egypt- (fifth/eleventh and sixth/twelfth centuries): drawing in the zone of transition.

This chronology is not totally convincing. Instead, they could most probably be dated to the fifth/eleventh century onwards, which coincides with the extraordinary development undergone by *muqarnas* decoration in the Eastern Islamic lands, as seen for example in the dome covering the Tomb of the Imām al-Dāwar in Samarra (477/1085). This is the same hypothesis that for the fragments of Nishapur, previously mentioned.

In addition, there is a cornice decorated with *muqarnas* on the minaret of the Mosque of the vizier Badr al-Jamālī (477/1085) in Cairo and from the same period, it remains an outstanding window with a lintel, decorated in its upper part with two rows of *muqarnas*, located on the northern section of the Cairo wall, a vestige of the walled enclosure built on the orders of Badr al-Jamālī in

<sup>23</sup> BEHRENS-ABOUSEIF, “Muqarnas”, p. 501.

479/1087. On that subject Bloom has argued convincingly that the introduction of *muqarnas* into Egypt can be explained by several aspects.

One of the most convincing reasons is that Egypt received it from Iraq, Iran or Syria via the Egyptian trading and pilgrim routes leading to Mecca, as documented in descriptions of contemporary travellers. Indeed, from these descriptions, it can be deduced the economic development achieved by places such as Aswan, Aydhab or Qus, which were obligatory points of passage for merchants and pilgrims from Egypt and North Africa to Mecca, or vice-versa, who learned about and passed on what they had seen during their journey. In Bloom's opinion it is likely that contact was first established in Aswan, and from there the technique would have reached Cairo, during the Fāṭimid Caliphate (297-567/909-1171).



Figure 5: Fragments of muqarnas from the *Hammam* of Abū'l-Su'ud in Fustāṭ. Various authors, *Le Caire*. Paris: Citadelles & Mazenod, 2000, p. 132.

Nevertheless, there is also the possibility that the flourishing and powerful Fāṭimid Caliphate capital attracted artisans and craftsman directly to its court<sup>24</sup>. In this sense, Egypt can be considered as a crossroads between East and West receiving and transmitting ideas, people and goods from Iraq, Iran, Syria and North Africa (among others), not only in reference of *muqarnas* decoration but also regarding other artistic elements.<sup>25</sup>

From the fifth/eleventh century onwards, under the Fāṭimid dynasty, the *muqarnas* technique was further developed, and became part of the architectural vocabulary of the time; it was used not just in squinches, as in the necropolis at Aswan, but also as a decorative motif for niches, windows and minaret cornices, thus gradually losing its initial function.

### II.1.3. *Muqarnas* in North Africa

Where and when did then *muqarnas* decoration first appear in North Africa? The hypothesis put forward by Grabar<sup>26</sup> that *muqarnas* decoration may have been born spontaneously in North Africa in parallel and contemporary with that of the northeast Iran, in present-day Uzbekistan, was ruled out by Tabbaa.<sup>27</sup>

At the beginning of the twentieth century the French historian and archaeologist de Beylié led excavations at Qal'at of the Banī Ḥammād (397-534/1007-1152) in which he found *muqarnas* remnants (see Banī Ḥammād's Qal'at UNESCO Video<sup>28</sup>). In the *Qaṣr al-Manār* (the Palace of the Beacon or Tower) he unearthed vestiges of a small half-cupola that originally covered a

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<sup>24</sup> BLOOM, "The Introduction of the Muqarnas into Egypt", pp. 26-27; also, in the works sponsored by Badr al-Jamālī, there is a direct relation with Syria since he was previously governor of Damascus, AL-IMAD, Leila.S. *The Fāṭimid Vizierate: 969-1172*. Berlin: Klaus Schwarz, 1990, p. 98.

<sup>25</sup> An example is the 'Abbāsīd decoration in Samarra, used in one of the prayer niches (*mihṛāb*) of the Ṭūlūnid Mosque of the old city of Fustāṭ (262/876-265/879), BEHRENS-ABOUSEIF, Doris. *Islamic Architecture in Cairo*. Leiden: Brill, 1989, pp. 56-57 and BLOOM, Jonathan, "On The Transmission of Designs in Early Islamic Architecture." *Muqarnas: An Annual on Islamic Art and Architecture* 10 (1993): 21-28.

<sup>26</sup> GRABAR, *La Alhambra: iconografía, formas y valores*, p. 176.

<sup>27</sup> TABBAA, "The Muqarnas Dome: its Origin and Meaning", p. 62.

<sup>28</sup> Al-Qal'a of Beni Hammad. Video (Unesco /NHK) [online] Available from: <http://whc.unesco.org/en/list/102/video> [Accessed 01 March 2016]

niche and traces left on its structure decorated with *muqarnas*.<sup>29</sup> Concerning the chronology of this cupola, Lambert's opinion<sup>30</sup> is that it was a first approach to the use of *muqarnas* "(...) un décor de coquilles ou de coupolettes en creux comme vers la même époque en Espagne à Saragosse, l'emploi d'un 'nid d'abeilles' d'ou sortira la stalactite" (A decoration of shells or small concave domes, just as in the same period in Spain in Zaragoza, the use of a honeycomb structure, from where the stalactite will appear). Apparently, Lambert made this statement based on the absence of earlier evidence.

However, these were not the only remnants of *muqarnas* found at Qal'at. In the 1960s Golvin led further excavations, which completed de Beylié's. These included the study of the *Qaṣr al-Salām* (Palace of Peace), where he found among the remains some fragments of painted *muqarnas*.<sup>31</sup> The fragments reproduced vegetable motifs, and probably formed part of the decoration of a cupola or the squinches (Figure 6).

The exact chronology of these *muqarnas* fragments is still uncertain; they may have been produced either in the first period of Qal'at (405/1015) or rather during the second period of occupation, when the Ḥammādi ruler al-Manṣūr b. al-Nāṣir (481-498/1088-1105) carried out a series of restorations and additions, as mentioned in historical sources such as that of Ibn Khaldun<sup>32</sup>, and confirmed by the excavations carried out by de Beylié<sup>33</sup>.

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<sup>29</sup> DE BEYLIÉ, Léon. *La Kalaa des Beni-Hammad*. Paris: E. Levoux, 1909, p. 39. De Beylié explains the presence of this half-cupola by the junction of the external walls of the palace, which had buttresses separated by deep concave mouldings. These would terminate in semi-cupolas decorated with *muqarnas*. This fragmentation of the wall is reminiscent of the palaces built in ancient Mesopotamia, which although are two different points in time, allows to relate it to the Qal'at.

<sup>30</sup> LAMBERT, Élie., *L'Art musulman d'occident des origines à la fin du XV*. Paris: Sedes, 1966, p. 99.

<sup>31</sup> GOLVIN, Lucien. *Recherches Archéologiques à la Qal'a des Banu Hammad*. Paris: Maisonneuve et Larose, 1965, p. 72.

<sup>32</sup> IBN KHALDOUN. *Histoire des Berbères et des dynasties musulmanes de l'Afrique septentrionale*. 4 vols. Baron de Slane, trans. Algiers [2nd ed. 1925-1956. P. Casanova 4 vols. Paris: Paul Geuthner], pp. 51-52.

<sup>33</sup> DE BEYLIÉ, *La Kalaa des Beni-Hammad*, p. 21.



Figure 6: Remains of muqarnas found in the *Qaṣr al-Salām* of the Qal'at Banī Ḥammād (Golvin, Lucien. *Recherches Archéologiques à la Qal'a des Banu Hammad*. Paris: Maisonneuve et Larose, 1965, Planche XLVI, 1).

For Hoag and Golvin<sup>34</sup>, it is clear that these remains belong to the second period of Qal'at. The fact that the Qal'at *muqarnas* retain part of its original polychromy complicates the issue further because, based on their painted motifs; they have been related to those found in Nishapur. Considering that the pictorial decoration of the *Qaṣr al-Salām's muqarnas* is also reminiscent of Samarra 'Abbāsīd decoration that has been dated to the third/ninth or fourth/tenth centuries, Grabar suggested the possibility that these remains from North Africa were produced in the same period. Based on this very early dating of the *muqarnas* found in the *Qaṣr al-Salām*, Grabar put forward the possibility that they were first used at the same time as in the East.<sup>35</sup>

<sup>34</sup> HOAG, John D. *Islamic Architecture*, p. 77; GOLVIN, Lucien. *Recherches Archéologiques à la Qal'a des Banu Hammad*, pp. 125-126.

<sup>35</sup> GRABAR, *La Alhambra: iconografía, formas y valores*, p. 176.



However, this chronology is not totally convincing because is the same case of the Abū'l-Su'ud *muqarnas* of Fustāṭ, mentioned above. This resemblance lies in the paintings decorating the two examples, reminiscent of the 'Abbāsīd decoration of Samarra. Therefore, it is plausible to argue that they both correspond to a moment when this type of decoration was already fully established in architecture, and was therefore well known in the artistic vocabulary of the period. Hence, it is unlikely that they were produced before the middle of the fifth/eleventh century, bearing in mind the limited development of *muqarnas* in the Eastern Islamic lands at that time, judging from existing remains.

Instead, the *Qaṣr al-Salām's muqarnas* were probably executed at the time of the government of al-Nāṣir b. 'Alannās (454/1062-481/1088) and therefore prior to the year 482/1090 when the Ḥammādids withdrew to Béjaia (Algeria) before the invasions of the Banū Hilāl. A similitude between Egyptian *muqarnas* and the *Qaṣr al-Salām muqarnas* point to a possible impact of Fāṭimid Egypt on the Qal'at of the Banī Ḥammād at some point during the fifth/eleventh century.<sup>36</sup> However, the Qal'at master artisans do not seem to have completely copied but rather took an idea and adapted to their own context, which can be observed in the differences to the motifs represented. This illustrates their artistic know-how as well as certain individuality present in the Qal'at, distinctive from Egypt and the other Eastern lands. Nonetheless, the fragments found at the *Qal'a Banū Ḥammād* may be considered the earliest use of *muqarnas* in Western Islam.

Under the Almoravids (*al-Murābiṭūn* 454-541/1062-1147), the technique saw enormous growth, as can be seen for example in the *muqarnas* vaults of the Qarawiyyīn Mosque in Fez (528-536/1134-1142). With the Almohads (*al-Muwahḥidūn* 524/1130-668/1269), *muqarnas* vaults are still the ceiling of choice for covering the most important spaces in both civil and religious architecture, as we can deduce from the surviving examples. However, it was with the Marīnids (614-869/1271-1465) and the Ḥafṣids (627-982/1229-1574) that this type of decoration achieved a pinnacle of extraordinary Baroque mastery as can be seen, for example, in the patio of the al-'Attārīn Madrasa in Fez (723-

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<sup>36</sup> GOLVIN, *Recherches Archéologiques à la Qal'a des Banu Hammad*, pp. 125-127. Various written testimonies such as al-Bakrī's (d. 487/1094), gathered by Golvin confirm that in this period under the Banū Ḥammād, Qal'at was an important trading centre attracting numerous caravans coming from Iraq, the Hijaz, Egypt, Syria, as well as other parts of North Africa.

725/1323-1325) and in the Mosque of Abū Zakariyyā' in Tunis, from the Marīnid and Ḥafṣid periods respectively.

#### II.1.4. The Palace of the 'Abbāsīd Caliph Ḥārūn ar-Rashīd at Raqqā: the earliest surviving muqarnas gate?

Few historians like Marçais and Otto-Dorn believe that the squinch *muqarnas* in the southern iwan of the main gate of the *Qaṣr al-Banāt* at Raqqā belong to the period when the city was founded (155/772) by the 'Abbāsīd Caliph Ḥārūn ar-Rashīd (r. 169/786-192/809).<sup>37</sup> Inside the southern iwan, *muqarnas* appear on squinches which must have supported a dome; nothing is known of the decoration, since its has not survived. Until recently, the *muqarnas* were considered the work of Ḥārūn ar-Rashīd, giving rise to a very early date for the use of this device in Islamic architecture<sup>38</sup> with a marked decorative purpose.<sup>39</sup> However, this use of *muqarnas* is unrelated to the early tripartite squinch found in north-eastern Iran and in Egypt; rather, the shape of the cells strikingly resembles the decorative *muqarnas* used in Syria itself, but in the sixth/twelfth and seventh/thirteenth centuries. Although few references are available on this point, and research to date has been insufficient, it seems likely that the palace, though built in the time of Ḥārūn ar-Rashīd, was refurbished or rebuilt at a later stage.

The *muqarnas* cells at Raqqā are remarkably similar in size and shape to those used in buildings erected under Nūr al-Dīn (r. 540/1146-569/1174), such as the *Māristān* (hospital) *Nūri* at Damascus, the first building completed there by Nūr al-Dīn when he made the city his capital in 548/1154. The entrance iwan is crowned by a highly-elaborate dome whose cells closely resemble those of Raqqā. Also, the Damascus dome is that it rises from a base comprising an

<sup>37</sup> Ḥārūn ar-Rashīd (r. 169/786-192/809) decided to move the Imperial capital from Baghdad to the newly-founded city of Raqqā, in the ancient region of *Yazīra* –Jazirah, now Syria, MEINECKE, Michael. "From Mschatta to Samarra: the Architecture of Ar-Raqqā and its Decoration", in *Colloque international d'archéologie islamique. Le Caire, 3-7 février 1993*, Institut français d'archéologie orientale (IFAO), Textes arabes et études islamiques, 1998, p. 142.

<sup>38</sup> MARÇAIS, George. *L'Architecture Musulmane d'Occident. Tunisie, Algérie, Maroc, Espagne, Sicile*, (Paris, 1954), p. 102. Titus Burckhardt, *Art of Islam. Language and Meaning*, London, 1976, p. 75 [referring to the origin of *muqarnas*]: "(...) The oldest example found so far is at Raqqā (Syria) and dates from the end of the eighth century" and Henri Stierlin, *Islam from Baghdad to Córdoba. Early Architecture from the 7<sup>th</sup> to the 13<sup>th</sup> century*. Köln, 2002, p. 218: "(...) The so-called stalactite or mukarnas technique probably developed in Persia, although it has a precedent at the palace of Harun al-Rashid in Raqqā".

<sup>39</sup> OTTO-DORN, Katharina. *Kunst des Islam*, Baden-Baden, 1964, p. 81.

arcade of blind arches mounted on small columns. The arcade of lobate and mixtilinear arches is framed by a polylobate arch. In the southern iwan at Raqqa, the *muqarnas* squinches are also supported by a blind arcade comprising two pointed arches and a lower trilobate arch. Comparison of the two constructions suggest that date from the same period, i.e. the sixth/twelfth century (Figure 7). The Raqqa gate, therefore, cannot be considered the earliest surviving *muqarnas* gate. References on this topic are almost lacking<sup>40</sup> and investigation is not sufficient yet, however the existence of *muqarnas* demonstrates a later intervention

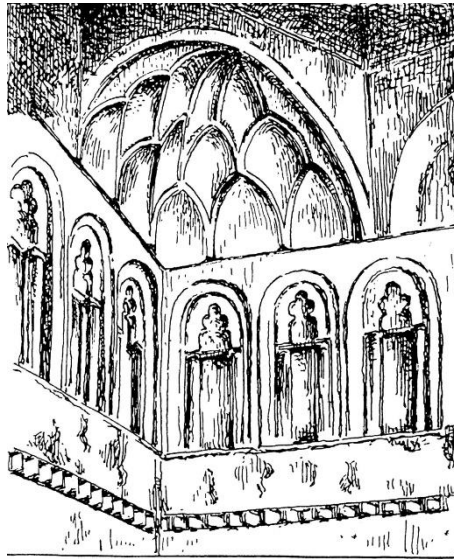


Figure 7: The Palace of the ‘Abbāsīd Caliph Hārūn ar-Rashīd at Raqqa –Syria- (eighth century?): southern iwan drawing according to Sarre y Herzfeld. (George Marçais, *L’Architecture Musulmane d’Occident. Tunisie, Algérie, Maroc, Espagne, Sicile* [Paris, 1954], 102)

### III. Baghdad, the capital of the Abbasid Caliphate, as the origin of *muqarnas* decoration and its influence on other Islamic lands

The north-east Iran theory is not convincing, since it fails to chart the development of the device from the squinches at Tīm or Isfahan and the Iraqi and Syrian domes composed entirely of *muqarnas* cells. At some stage, clearly, the direct link between pre-Sal̄yūqīd and Sal̄yūqīd domes in Iran and the great īlkhānīd and tīmūrīd constructions – with their astounding technical mastery of the device, and the introduction of new cells types to decorate not only domes

<sup>40</sup> HILLENBRAND, Robert. “Eastern Islamic influences in Syria: Raqqa and Qal’at Ja’bar in the later 12th century”, en RABY, J. (ed.), *The art of Syria and Jazīra: 1100-1250*. Oxford, University Press, 1985, pp. 21-45.

by also portal vaults – has been lost. The type of ceiling displayed in the Shrine of Imām al-Dāwar at Samarra, dated in 477/1085, in which the dome is covered by muqarnas whose cells are also repeated on the outside (Figure 8), only ever became common in Iraq and in Syrian architecture under Nūr al-Dīn; the Shrine is in fact one of the earliest examples.

Although it dates from around the same period as the Sal̄uqids squinches used at the Mosque of Isfahan, there is no formal similarity between them; the muqarnas in the Shrine at Samarra are perfectly developed and deployed with immense technical virtuosity.

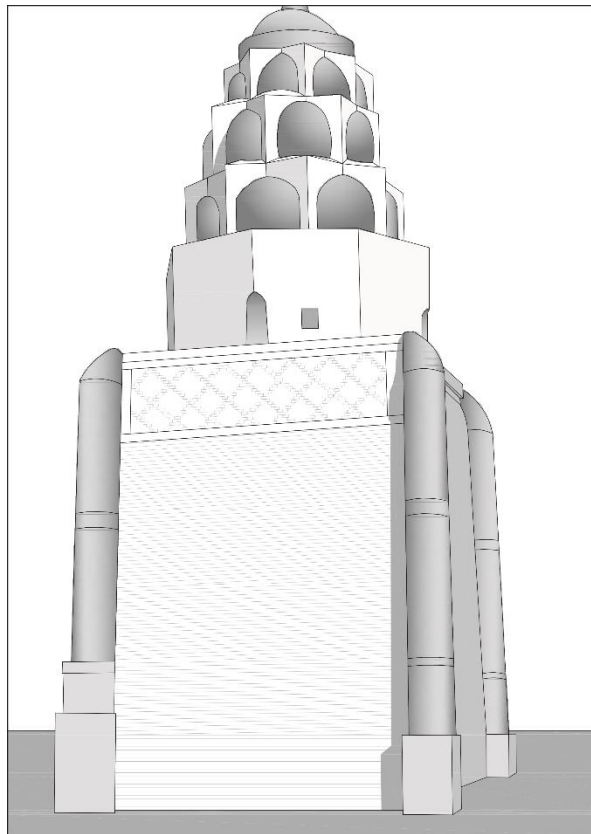


Figure 8: Outside the Imām al-Dāwar Mausoleum at Samarra –Iraq- (477/1085): outside drawing.

Sal̄uqid architecture used *muqarnas* in two different ways: in the zone of transition, through squinch fragmentation, in the north-eastern Iranian tradition; and in tiers decorating minarets and cornices, for example in *Gumbad i-‘Alī* in Abarquh (Iran), built in 447/1056 and Alminar Kalan in Bukhara, dating from 520/1127. In the *Sal̄uqid* architecture of Anatolia (now Turkey)

from 469/1077 onwards we can trace the development of the *muqarnas*, not just in cornices and squinches but also, and especially, in portal vaults (Figure 9).



Figure 9: Qaratay Madrasah at Konya –Turkey- (648/1251): drawing of the muqarnas portal vault (Author’s photography).

Since this use of *muqarnas* differs considerably from that of the *Saljuqid* architecture of Iran, it is necessary to locate a specific geographical area in which *muqarnas* were used for something more than squinches, and with a much more intricate form than simple pointed niche hoods; an area which might account for the spread of this purely ornamental use of the device in Turkey, Syria, North Africa and Egypt; the surviving Iranian squinches clearly contribute nothing to this development. The Shrine of Imām al-Dāwar in fact provides grounds for an alternative hypothesis, one which runs counter to the traditional theory: that *muqarnas* must have been conceived and used for the first time in Iraq.

Some historians like Herzfeld, in fact, have already suggested this possibility<sup>41</sup>, although in-depth research is hampered by the fact that, following the Mongol invasion – and especially after the capture of Baghdad in 655/1258, when the city was virtually razed to the ground – many buildings with *muqarnas* must have been lost, even though they would have been remembered by their destroyers.

<sup>41</sup> Herzfeld considers Iraq to be the creative origin of the *muqarnas* dome, in BEHRENS-ABOUSEIF, Doris *Encyclopedie de L’Islam*, s.v. “Muqarnas”, p. 505.

Yet it is hard to believe that this type of *muqarnas* vault could have originated with the Shrine of Imān al-Dāwar; the Shrine is located in a small village 20 kilometers from Samarra, rather than in a city, and it was in the cities that advances and innovations of all types took place. The origin is more likely to be the ‘Abbāsīd capital, Baghdad, especially given that the patron of the Shrine, Muslim ibn Quraysh (d. 477/1085), maintained friendly links with the ‘Abbāsīd Caliphate. Although no other fifth/eleventh century domes of this sort survive in Baghdad, a study by Yasser al-Tabba in 1985 of two miniatures dated in the ninth/fifteenth and tenth/sixteenth centuries confirms that the conical arrangement of *muqarnas* tiers was a common feature of the cityscape during the ‘Abbāsīd period.<sup>42</sup>

It is also found in other surviving buildings not only in Baghdad – such as the sixth/twelfth century Shrines of Sitt Zubaida and Zumurrud Khātūn and the eighth/fourteenth century Mausoleum of al-Shaykh ‘Umar al-Suharawardī – but also in other cities; examples include the Mausoleum of al-Ḥasan al-Baṣrī in the city of Basra, dating from the first half of the seventh/thirteenth century, and the eighth/fourteenth century Mausoleum of Dhū’l-Kifl in the town of al-Kifl (Iraq).<sup>43</sup>

Finally, archaeological excavations at the old Caliphal palace in Baghdad have unearthed fragments of domes including elements that appear to have been placed in the zone of transition. They feature the same kind of pointed concave niche as those found at Nishapur, and the ceramic surfaces are also decorated with sgraffito reliefs dating from the fourth/tenth century according to Herzfeld.<sup>44</sup>

There are, moreover, additional grounds for assuming that *muqarnas* first appeared in Baghdad. The pointed arches – derived from the Persian keel arch – and polygonal niches widely used in the ‘Abbāsīd capital<sup>45</sup> may be taken as

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<sup>42</sup> The miniatures on which the author bases his thesis, one dated 1468 and the other 1537, show birds-eye views of Baghdad, in which numerous *muqarnas* domes are visible, TABBAA, “The Muqarnas Dome”, p. 63.

<sup>43</sup> AL-JANAB, Tariq Jawad. *Studies in mediaeval iraqi architecture*, Baghdad: Republic of Iraq, Ministry of Culture and Information State Organization of Antiquities and Heritage, 1982, pp. 96-97.

<sup>44</sup> PIJOÁN, José. *Historia General del Arte*. SUMMA ARTIS. Tomo XII “Arte islámico”, Madrid, 1966, pp. 156-158.

<sup>45</sup> On the gates of ‘Abbāsīd Baghdad in the second/eighth century, in OTTO-DORN, *Kunst des Islam*, p. 91.

the formal and stylistic basis for the earliest muqarnas. These features are closely linked to the local pre-Islamic architectural style, i.e. Sasanian architecture, whose major surviving manifestation – the palace at Ctesiphon – is situated very close to the capital. If it is accepted that muqarnas cells may have had a meaning other than the purely aesthetic, that they were intended to convey either the symbolic significance of geometry itself, or certain aspects of philosophy or theology<sup>46</sup>, then it is reasonable to assume that the first manifestations should arise in the capital of the Caliphate, where the main philosophical and scientific circles met.

Thus it would seem that at a given moment in the second/eighth or third/ninth century, in Baghdad itself, and as a development of the Persian keel arch, the idea arose of segregating the squinches in the zone of transition in order to generate a more dynamic and decorative space. This idea was adopted by other regions, and spread to cities like Bukhara, through contacts maintained between semi-independent ruling dynasties such as the *Sāmānids* and the ‘Abbāsīd capital.<sup>47</sup> Even so, we cannot rule out the possibility that the fragmentation of squinches using niches, later termed *muqarnas*, arose in north-eastern Iran, and that it was in Iraq that this device was expanded for decorative purposes, in the form of what are now termed *muqarnas* cells.

Whatever the case, from the fifth/eleventh century onwards, Baghdad was certainly home to the idea of reducing these squinch niches to independent cells, *muqarnas*, as a device for decorating either the zone of transition, as evident in the stuccos at Nishapur, or the whole dome, as at the Shrine of Imām al-Dāwar.

This new, highly-decorative scheme undoubtedly proved appealing, and soon spread to other places, where it was used in squinches, vaults and cornices. It seems likely that by the time the Sal̄uqīds arrived in north-eastern Iran, in the fifth/eleventh century, the development of *muqarnas* had been arrested at an early stage (being used only for squinches); this would have influenced the domes of the Mosque at Isfahan. But the Sal̄uqīds must also have been familiar

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<sup>46</sup> CARRILLO, Alicia, “Muqarnas Domes: an Interpretation of ‘Heavenly Vault’ ”, in *Domes in the World. Cultural Identity and Symbolism, Geometric and Formal Genesis, Construction, Identification, Conservation*. Congress Proceedings, (G. Tampone, R. Corazzi, E. Mandelli, Scientific Editors), Nardini Editore, Firenze, 2012, pp. 3-4.

<sup>47</sup> BOSWORTH, Clifford Edmund. *The New Islamic Dynasties. A Chronological And Genealogical Manual*. Edinburgh: Edinburgh University Press, 2004, p. 171. In 263/875, Naṣr ibn Aḥmad was granted control of the whole of Transoxiana and Khurasan by Caliph al-Mu‘tamīd.



with other buildings in which *muqarnas* cells were used for structures other than domes, and this may have prompted them to use *muqarnas* for other surfaces, such as cornices. A similar process must have occurred with the so-called Salâuqid̄s of Anatolia in what is now Turkey, since they imported a *muqarnas* technique based on small juxtaposed cells for covering portal vaults.

It is reasonable to assume that the idea of the *muqarnas* was spread from Iraq to other regions by pilgrims, merchants, artists and scientists; this would account for the similarity of the dome of Imān al-Dāwar in Iraq to the domes erected by Nūr al-Dīn in Damascus from the sixth/twelfth century onwards. By similar routes, this ornamental device probably spread to Egypt – where it was used both in squinches and for the decoration of cornices, windows and domes – and even as far as North Africa, where the Qal'a Banū Ḥammād provides the earliest known manifestation of the technique in Western Islam.

The earlier theory, that the *muqarnas* developed independently in the *Qal'a* and in Egypt, would seem to be untenable, given the strong likelihood of contacts with Baghdad, even though there are no surviving examples of the technique dating from that time, except for the Shrine of Imām al-Dāwar at Samarra. The influence of Baghdad also made itself felt in the area of Ÿazīra, where from the seventh/thirteenth century onwards the conical dome of the Imān al-Dāwar was gradually superseded by the pyramidal roof covered on the outside by glazed tiles and on the inside by successive layers of *muqarnas* cells, a good example being the Shrine of Awn al-Dīn in Mosul (646/1249).

In short, it seems reasonable to assume that there was one single origin; in different countries, though the formula remained the same, the device developed in different ways from that shared origin: the eastern *muqarnas* developed by the Īlkhānids (654/1256-754/1353), Tīmūrīds (771/1370-913/1507) and Ottomans (680/1281-1342/1924) vary considerably from those used in Western Islam by the Almoravids (448/1056-541/1147), the Almohads (541/1146-667/1269) and the Naṣrids (635/1238-898/1492) of Granada.

On the other hand, this paper sought to answer two questions: where and how did the *muqarnas* first arise. Analysis of the research carried out to date suggests that this new aesthetic trend first arose in Baghdad, the capital of the 'Abbāsīd Caliphate, and that the original form of the *muqarnas* derived from the fragmentation of squinches. But it would also be instructive to determine what exactly prompted this desire to decorate and embellish squinches. It has



touched already on the importance both of the keel arch and of the recessing and projecting of façades to create an interesting play of light and shade.

These aesthetic factors were of fundamental importance during the ‘Abbāsīd Caliphate, when the capital was transferred from Damascus to Baghdad, bringing Islamic art into closer contact with the local pre-Islamic artistic substrate. This earlier artistic context blended the legacy of the Achaemenian, Parthian and Sasanian dynasties; a characteristic feature was vaulted architecture, segmented by spatial fragmentation of walls and by the use of stucco or carved-stone decorations, which displayed a taste for the repetition of decorative motifs. While Achaemenian architecture was characterized by a preference for trabeated structures, the strongly Iranian conscience of the Parthians<sup>48</sup> led them to develop an artistic style based on the Eastern tradition native to the region, wholly free of any artistic intrusion from Mediterranean culture. This trend continued under the Sasanians<sup>49</sup>, and is apparent in the surviving remains of buildings that must undoubtedly have dazzled the Islamic conquerors.

Perhaps the finest example is the Palace at Ctesiphon, built in the second half of the third century AD by Sapor I<sup>50</sup>; the remains of the Palace must have amazed the Islamic conquerors of this ancient Persian territory, and its architectural forms had a clear influence on ‘Abbāsīd art, enhanced by the geographical proximity of Ctesiphon to Baghdad.<sup>51</sup> The most prominent feature of the Palace façade is a large longitudinal iwan, richly decorated in four tiers fragmented by blind niches flanked by columns. The surviving hall at the palace of Ctesiphon has a cruciform layout, and consists of a square central space flanked on all four sides by iwans, and decorated with niches adorned with frieses and plant motifs.<sup>52</sup> The ground-plan used in Sasanian palaces – itself derived from the Parthian architectural style - divided the space into rooms crowned with squinch-supported vaults, and favored the constant use of iwans; this layout was adopted by Islamic architecture and duly adapted to its specific

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<sup>48</sup> GHIRSHMAN, Roman. *Iran: Parthians and Sassanians*, London: Thames and Hudson, 1962, pp. 15-17.

<sup>49</sup> GHIRSHMAN, Roman. “Persian Art in Parthian and Sasanian Times”, in *Art and Mankind I*, ed. René Huyghe (New York, 1962), p. 388.

<sup>50</sup> GHIRSHMAN, *Iran: Parthians and Sassanians*, 136.

<sup>51</sup> About this question see: BIER, Lionel. “The Sasanian palaces and their influence in early Islam”, en *ARS ORIENTALIS*, VOL. 23, University of Michigan, 1993.

<sup>52</sup> GHIRSHMAN, “Persian Art in Parthian and Sasanian Times”, pp. 394-395.

civil and liturgical requirements, appearing not only in palaces but also in mosques, as is evident in Sal̄yūqīd architecture.

It would appear that, just as the iwan came to form part of the vocabulary of ‘Abbāsīd architecture, the Sasanian taste for fragmenting walls by means of recesses and projections also had a marked influence on the Muslim designers of the ‘Abbāsīd Caliphate<sup>53</sup>, prompting a characteristic compartmentalisation of architectural surfaces evident even in early ‘Abbāsīd constructions such as the Palace of Ukhayḍīr, built in around 158/776, where the recess/projection approach leads to a very different external appearance from that found in Ummayyad buildings.

## Conclusion

The *muqarnas* take the form of a concave quarter-sphere resembling, in fact, a small-scale architectural iwan. Their early use in the zone of transition and their later development into independent cells must reflect the blending of ‘Abbāsīd art with the Sasanian aesthetic of light and shade, of recesses and projections; in short, forms designed to fragment architectural lines.

Though first used in Baghdad and the surrounding area, these soon spread to north-eastern Iran where the Persian spirit still prevailed, for example in Nishapur, Balj, Merv or Bukhara. In the fourth/tenth century, these north-eastern cities developed a complete and definitive Islamic culture, considered by some scholars as the “Iranian Renaissance.”<sup>54</sup>

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<sup>53</sup> GHIRSHMAN, *Iran: Parthians and Sassanians*. This Sasanian interest in the play of light and shade created by the presence of blind niches is apparent not only in their architecture but also in the sumptuary arts, and particularly the production of glass vessels decorated with honeycomb motifs.

<sup>54</sup> GRABAR, *The Formation of Islamic Art*, pp. 49-50.