Glass from Islamic Lands: An Overview

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Abstract: The purpose of this essay is to offer a broad overview of the production of glass in historical Islamic lands, highlighting the past and current focus of research and offering brief answers to the basic questions of where, when, who, how and why glass production was a leading industry especially in the first centuries after the advent of Islam. The overall picture is far from being clear and much work needs to be done through interdisciplinary collaboration between art historians, scientists, archaeologists, historians, language specialists, glassmakers, and glass conservators. The essay provides therefore a general introduction to the more focused, specialised papers that follow.

The overview of the broad subject of 'glass from Islamic lands' represents a challenge when it must fit within the space of a lecture or an established number of words: it may result either into a simple survey that barely scratches the surface of the matter (being therefore of little use to a knowledgeable audience), or into a series of individual points that defeat the main purpose of a wide-ranging exercise.

With this in mind, and using the paragraph above also as a disclaimer, I will approach the subject firstly by offering a basic history of the interest, research, and publication on the subject. Then, I will try to answer succinctly the most obvious art historical questions the study of this subject – like all art historical subjects – requires: Where was it made? When was it made? Who made it? How was it made? Why was it made?

One additional disclaimer is that the subject covers largely what is considered artistic glass, that is, glass presenting decoration on its surface, or which has a particular shape that elevates it to the status of a collectible item rather than a plain functional vessel, container, or tool. Admittedly, this represents a minimal percentage (perhaps 3–5%) of the overall glass production in the Islamic lands over many centuries, as it can be inferred by any archaeological site yielding this type of material.

Interest in the Field of Islamic Glass Studies

Scholarly interest in the study and understanding of artistic glass produced in the Islamic lands started around the mid-nineteenth century following what can be described as acts of grand theft taking place in Cairo: unscrupulous dealers had many Mamluk-period mosque lamps decorated with enamels and gold taken down from their original buildings and distributed them for profit among the wealthy European elite, nobility, and royalty. These collectible lamps and other enamelled and gilded objects became highly appreciated for their appearance and technical challenges and soon were exhibited at large-scale *expositions* in the 1860s, creating a sensation among lovers of the decorative arts.[1] This is when a few connoisseurs, scholars and museum curators made the first attempts to describe and offer an initial framework for the production of glass in the Islamic lands, with special reference to the amazing skills demonstrated by the Mamluk-period glassmakers in the thirteenth

1 See for example Beaumond 1867; Jacquemart 1869; Union Centrale 1869.

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and fourteenth centuries. In the late nineteenth and early twentieth century we can mention, among others, Henri Lavoix (1820–1892), Alexander Nesbitt (1817–1886), Édouard Gerspach (1833–1906), Alfred Jacquemart (1824–1896), Alexandre Sauzay (1804–1870), Stanley Lane-Poole (1854–1931), Gustav Schmoranz (1858–1930) and Gaston Migeon (1861–1930).[2] After the Egyptian government took the formal initiative to stop the ongoing looting and had the remaining original mosque lamps collected and stored in what would become the Museum of Islamic Art in Cairo in 1881, Egypt-based scholars Yacoub Artin Pacha (1842–1919), Max Herz Bey (1856–1919) and Gaston Wiet (1887–1971) took the first steps in producing proper descriptions and catalogues of this material.[3] The most important contribution from this pioneering period remains however the Swedish scholar Carl Johan Lamm's (1902–1981) publication of his original PhD dissertation on "Medieval glass and rock crystal from the Near East" (with a particular emphasis on enamelled and gilded glass) which represents the first true attempt to compile a history of Islamic glass including an in-depth reading of original Arabic sources.[4]

Lamm's work was so influential that it prevented subsequent generations of scholars from approaching the subject from a holistic point of view and enabled them to focus on more specialised areas often linked to archaeological sites, such as Fustat in Egypt and Nishapur in Iran, for example with works by George Scanlon, Ralph Pinder-Wilson and Jens Kröger who published their reports at the end of the twentieth century.[5] At the same time, museums started to commission catalogues from their collections, a trend that was inaugurated by the Benaki Museum in Athens and continued with the Museum of Islamic Art in Berlin and, at the beginning of the twenty-first century, with the National Museum of Kuwait, the Khalili Collection in London and the Corning Museum of Glass, NY.[6] The opportunity given to the present writer to catalogue the glass collection in Kuwait, which is one of the most comprehensive in the world, allowed me to approach the task both as a catalogue raisonné and as an attempt to write a short manual of Islamic glass organised chronologically within different decorative techniques. Other significant contributions to the field in the past 30 years are the proceedings of a symposium held at the British Museum on enamelled and gilded glass, which updated the study of this specific subject from the early works by Schmoranz, Wiet and Lamm,[7] and a major exhibition organised by the Corning Museum of Glass and The Metropolitan Museum of Art entitled "Glass of the Sultans".[8]

The last 20 years have witnessed a flourish of studies that are focused not so much on the art historical aspect of Islamic glass but on its technological, technical, chemical, scientific, archaeological and, to some degree, socio-economic aspects, in an effort to offer better answers to the basic questions that follow and open the field to a welcomed multi-pronged approach.[9] A future combination and synthesis of these individual approaches, including of

2 See respectively, Lavoix 1878; Nesbitt 1878; Gerspach 1885; Jacquemart 1864; Sauzay 1884; Lane-Poole 1888; Schmoranz 1899; Migeon 1907.
3 Artin Pacha 1886; Artin Pacha 1907; Herz Bey 1895; Wiet 1929.
4 Lamm 1929–1930.
5 Scanlon/Pinder-Wilson 2001; Kröger 1995.
6 Clairmont 1977; Kröger 1984; Carboni 2001; Goldstein 2005; Whitehouse 2010.
7 Ward 1998.
8 Carboni/Whitehouse 2001.
9 Just to mention a recent few, Schibille et al. 2019; Henderson 2021; Adlington/Ritter/Schibille 2020; Schibille 2022; Qin-Qin Lu/Basafa/Henderson 2023.

course also the art historical, promises to be extremely helpful and exciting for the understanding of historical glass from Islamic lands.

Where Was It Made?

The title of this paper refers to the production of glass 'from Islamic lands' and is preferred to the historically more common 'Islamic glass'. This is of course in relation to the ongoing debate on the meaning and use of 'Islamic' in 'Islamic art', which transcends its implicit religious significance and embraces a broader cultural milieu. Without delving into this debate, suffice it to say here that the broadly geographic connotation of 'Islamic lands' – that is, those parts of Asia, Africa and Europe which were historically under the control of Muslim rulers and became majority Muslim – seems to be more appropriate in reference to glass production than the cultural 'Islamic' definition.

By default, the geographical places of production of glass from the Islamic lands, proceeding west to east, range from Andalusia to the north African coast, southern Italy, and the Balkans; Western Asia north-south from the Caucasus to Yemen and Oman; Iran, the Indian subcontinent, and Central Asia; and it can be stretched all the way to Malaysia, Indonesia, and the Philippines. This is not to say that glass production took place in every area mentioned above when a specific region was under Muslim rule, however the study of this material can be extended also to the rest of Europe and Asia and a good portion of Africa because it was traded either as a primary or secondary commodity virtually everywhere in these three continents. This is appropriately reflected in the variety of papers presented at this symposium, which range from Spain to China and Indonesia passing through the Balkans, Egypt, Lebanon, the Palestinian Territories, Syria, Iraq, Saudi Arabia, Yemen, Iran, and Uzbekistan.

One of the major challenges for the study of glass from Islamic lands is to determine the location of glass factories across this vast geographic area. This is due to a combination of factors, ranging from the lack of available historical sources to the minimal visual information offered by the material itself, to the long-distance commercial routes glass travelled on. The pattern that seems to emerge is that there were several well-established places in the late Roman era that continued their production in the Islamic period: they were concentrated along the southeastern Mediterranean coast and immediate inland of present-day Syria, Lebanon, Israel, Palestine, and Egypt (for example, Tyre and Fustat)[10] as well as in Iran under the Sasanians. With the advent of Islam and the establishment of the first powerful Muslim dynasties that stretched the Islamic world as far as the Iberian Peninsula and Central Asia, a number of new factories must have been established – perhaps government-run or controlled – in or near the new major cities and seats of power, such as Qadisiya near Samarra and Baghdad in Iraq, Damascus and Raqqa in Syria, but most likely also in faraway but important urban centres in southern Spain, North Africa and Central Asia.

Economic, technologic, and practical factors should not be underestimated in appraising the number and location of glass factories across this vast geographical span. The proximity to suitable quartzous sand or good quality river pebbles was imperative for the establishment of a primary producer. A well-travelled and reliable land or maritime route was necessary to have continuous delivery of natron, which was available only in specific regions such as Egypt; over time, plant ash replaced the dwindling supply of natron, making the availability

10 See for example Carboni/Lacerenza/Whitehouse 2003 and Scanlon/Pinder-Wilson 2001.

of flux material more readily available locally, therefore more economic. Large amounts of wood from nearby mountains or suitable sources were necessary to ensure a continuity of production that would turn the glass factory into a viable business.

The geography of the Islamic lands is such that the ideal combination of these three factors is limited to specific areas, and the establishment of new glass centres must have been decided after careful consideration of the supply network needed to keep them running. This is true of course for those factories that produced glass directly from raw materials, with the fire power to reach high temperatures for sustained amounts of time. It is likely that these core production factories were relatively few and far between; in their turn, they supplied peripheral factories with pre-prepared, ready-to-melt glass as well as cullet to avoid the transportation of raw material and reduce the required temperature of the kiln (therefore the necessary amount of wood), thus simplifying the overall technology of production of molten glass. These peripheral factories were perhaps smaller in size and overall output but by no means less significant. If one could imagine a constellation of glass factories across the three continents, the few bright stars of core production would be central to the more frequent, dimmer stars of peripheral production, the lines connecting them creating a network spreading across the entire Islamic world.

The effort to suggest specific locations for glass factories in the Islamic lands was for over a century in the hands of art historians, historians, and archaeologists. In the last decades, however, the work of scientists has been instrumental in progressing this study through the collection and analysis of useful data in reference to the composition of glass. In relation to places of production, the organization of the data into compositional groups of glass known to have a specific provenance and, especially, isotopic analysis that helps identifying specific markers in glass composition and pointing to locally sourced material and minerals, have allowed the classification of more restricted areas of glass production.[11]

The significance of this relatively new frontier in the study of the places of production of glass from Islamic lands cannot be underestimated. It still represents, however, one piece of a complex puzzle in which variable disrupting factors also play an important part. The most obvious of these variables is that glass travelled long distances at least as a by-product along the commercial routes (as a container for transportation of liquids, oils, perfumes), and it travelled shorter distances in the form of ready-to-melt glass or cullet for recycling. The picture of long-distance travel is still rather incomplete, but its range and complexity are constantly updated by the discovery of relevant glass in new archaeological sites and shipwrecks across continents and oceans. The chemical fabric of this material, displaced hundreds, or thousands, kilometres from its original place of production, is useful if it can be linked to specific compositional groups but also if it can be attached to a known commercial route. The picture of short-distance travel is murkier because, if the original glass was created in one place but was re-melted in a secondary factory without the addition of locally sourced minerals, the markers would point to the original place of production rather than the actual place in which the finished object was made; and in the case of cullet, the broken glass itself may have been collected from different production sites and thus the markers would be, literally, all over the place! Unfortunately, we do not know the extent of the trade in ready-to-melt or recycled glass, but since it makes economic sense, it must be assumed that it represented a

11 See above, note 9.

significant portion of the overall production as, for example, it can be inferred by the amount of cullet and overflow glass found in the shipwreck of Serçe Limani (Fig. 1).[12]

Another variable, admittedly of lesser scope and importance in the big picture, is that artistic glass from the Islamic lands was prized not only in the Islamic world but in both Europe and Eastern Asia, to the point that today we can admire some of its best achievements in treasures and tombs in China, Korea, Japan, and many medieval churches across Europe. These high-end diplomatic gifts and exchanged, traded, purchased, or sometimes looted objects represent the point of destination of a long journey from their original place. While they are a negligible portion of the overall production, their importance from the art-historical point of view makes them some of the most recognizable, reproduced and studied works in glass from Islamic lands.

When Was It Made?

Like its geographic boundaries, both the broad chronological framework and the more detailed periods of production of glass from Islamic lands are somewhat blurred. There is no question that there was continuity between the late antique period and the advent of Islam, especially considering that glass factories were not particularly affected by the epochal political and cultural changes. There is also no question that glass production was supported, and expanded greatly, in the first centuries of Islam, with peaks in some geographical areas during more limited periods of time (for example, in Iran in the eleventh–thirteenth centuries and in Egypt and Syria in the thirteenth–fourteenth centuries).

We can also state with confidence that towards the beginning of the fifteenth century the centuries-old experience, sophisticated artistic skills and state-of-the-art technological know-how of glassmakers operating in the Islamic lands had virtually disappeared: the reasons for this have not been definitively investigated, one of them being the oft-repeated story that Timur (Tamerlane, r. 1370–1405 CE) put an end to all the glass factories in Damascus after having sacked the city in 1401 CE, and had the glassmakers relocated to Samarkand.[13] This episode alone, of course, would not be sufficient to explain the virtual disappearance of the craft and industry earlier in Iran and concurrently in Egypt and along the Eastern Mediterranean shores, which were not subjected to major disruptions even when the Ottomans took over from the Mamluks in 1517 CE. In addition, it would not explain why there are no surviving objects proving a flourish of glassmaking in Central Asia in the Timurid period, even though there is evidence of factory waste elsewhere in Uzbekistan (Fig. 2).[14]

The following two-three centuries are a puzzling, almost void, period, which is being slowly filled thanks to glass excavated in the urban area of Istanbul datable to the sixteenth–seventhhenth centuries and corroborated by the documented presence of stained-glass window-makers during the construction of the Suleymaniyye Mosque (1550–1557 CE) and of

12 Bass et al. 2009.

13 This was reported in nearly real time by the Spanish ambassador of Henry III of Castile, Ruy González de Clavijo (d. 1412), writing that Timur "[…] carried away the weavers of that city […] bowmakers […] armourers […] also craftsmen in glass and porcelain, who are known to be the best in the world", Clavijo/Le Strange 1928, 287–288.

14 While there is no evidence for glassmaking in Samarkand, green and blue glass factory waste from the Timurid period was recovered in Uzbekistan in Shahrukhiya, a location about 90 kilometres south of Tashkent renamed after Timur's grandson in 1392.

guilds of glassmakers under Sultan Murad III (r. 1574–1595 CE) by the end of the sixteenth century.[15] This may be partially explained with a relocation of artisans from Cairo to Istanbul after the Ottomans defeated the Mamluks, which would also help explain the disappearance of the craft in Egypt. The later establishment of the state-run factories of Beykoz at the end of the eighteenth century is proof that the Ottoman industry was well-established and government-supported by that time.[16]

In Iran, the story goes that a rebirth of the industry took place in Shiraz under the influence and training of European, more specific Venetian, glassmakers,[17] and then it became more widespread in the late Safavid and the Qajar periods into the nineteenth century, including artistic glass.[18]

Unsurprisingly, also the Indian subcontinent played its role as part of the great artistic developments that took place under the Mughals: far from matching the technological achievements of the Mamluk-period glassmakers, Muslim Indian craftsmen rediscovered a taste for gilded and enamelled surface decoration that was much appreciated at the higher levels of society; glass production itself was heavily influenced by British and Dutch products, which also had a strong presence in the Indian market, thus making the study of the local output more complex.[19]

An obvious common trait of later glass from the Islamic lands, which marks a deep line of separation between the early and middle periods and the so-called age of the empires (Ottoman, Safavid and Mughal) – notwithstanding the picture of some continuity that is emerging in Istanbul – is that it may never have developed without the presence and influence of European glass: Venetian and Bohemian in Turkey, Venetian and façon-de-Venice in Iran, and British and Dutch in India. In the remainder of the Arabic-speaking Islamic world, that is, the largely neglected Ottoman provinces later falling under the control of colonial European powers, the industry was revived with small-scale, unambitious enterprises in places like Cairo, Hebron and Damascus, which still survive today or have recently ceased to exist due to adverse political situations.[20]

As for chronological subdivisions within specific periods in limited geographical areas, there is a broad understanding and agreement that some glass shapes, typologies, and techniques of decoration were made in restricted periods of time, although these often span a couple of centuries. For example, wheel-cut objects in high relief are datable to the ninth–eleventh centuries, moulded vessels with geometric patterns to the tenth–eleventh centuries, and dark-coloured glass with incised or scratched decoration to the ninth century. These attributions are somewhat corroborated by archaeological evidence, but they are mostly based

15 See for example Bayramoglu 1976, 43–46; Rogers 1983, 241–242, 251; Jenkins(-Madina) 1986, inside covers; Hayes 1992, 410, pl. 52d.

16 Eyice 1967, 178–179; Bayramoglu 1976, 57–81; Küçükerman 1985.

17 Among others reporting about glass produced in Shiraz in the first half of the seventeenth century, the traveller John Chardin wrote in the 1670s that "the art of glassmaking was introduced in Persia less than eighty years ago." Quoted in Lamm 1929–1930, 500, no. 104, from Chardin/Langlès 1811, IV, 147–148.

18 The most useful article remains Charleston 1974; see also Carboni 2001, 374–375, no. 102 with notes.

19 The main characteristics of Mughal glass are briefly discussed in Carboni 2001, 380–396, nos. 104–108 with relevant notes and bibliography. The most important study on Indian glass remains Dikshit 1969, however Desjardin 2025, based on her 2018 PhD dissertation, is now the most comprehensive work on Mughal glass.

20 See for example Millwright 2014.

on art historical, visual, and comparative analysis of these individual typologies. These broad chronological attributions are unlikely to change to more detailed periods any time soon.

On the other hand, there are a few cases in which glass objects do offer direct information, which is useful not only for their dating but also, once their chemical composition is entered into a workable database, for an attribution of other objects with similar composition. One example is provided by the large number of official state-run glass weights in the shape of coins that were produced from the Umayyad to the Mamluk periods, and which were stamped with historical inscriptions naming the current caliph or governor (Fig. 3).[21] In some cases, also archaeological excavations can provide a much more restricted timeframe, such as the shipwreck of Serçe Limani, which transported a cargo with tons of glass datable to around 1025 CE.[22]

One major step in advancing the understanding of the broad internal chronology of glass from Islamic lands has come from scientists in the past few decades. Based on the chemical analysis of innumerable samples and building a workable database of information, it has been established that the source of flux in glassmaking – that is, the substance that lowers the melting temperature in the furnace – was the natural sodium-based mineral natron in the first few centuries of Islam. The main source was the Wadi El Natrun (Natron Valley) in Egypt, which was especially rich in natron and provided the lion's share of this material before and after the advent of Islam (Fig. 4). Natron was progressively replaced by plant ashes, mostly from burning *Salsola kali* (prickly saltwort or prickly glasswort), which was found in abundance across the Islamic world and provided sodium carbonate like natron, having the same effectiveness as a flux (Fig. 5). The progressive replacement of natron with plant ash took place over a relatively long period of time starting from the eighth–ninth century and ending by the eleventh.[23] Since the main source of natron was in Egypt, it is likely that the first geographical areas that implemented the use of plant ash were the farthest from the source where it became progressively less available, whereas in Egypt itself the use of natron survived until the eleventh century.

Who Made It?

The answer to this question is relatively simple because glassmaking in the Islamic lands was almost universally a craft produced by anonymous artisans who were not in the habit, nor had they a particular desire or mindset, to sign their works. The written sources are also very scarce in details related to glassmaking in general and to the crafts-persons involved in the industry.

We also do not know much about the organization of glass factories, but it seems clear that the identification of particularly skilled glassmakers, whether they were factory supervisors, master glassblowers, or decorators (wheel-cutters and painters) was not of great importance. There are, however, a few exceptions to the rule, which need more investigation because they might provide a useful window into the social status of glassmakers in the Islamic world.

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21 Glass weights were issued in particular during the first few centuries of Islam including the Fatimid period. Useful general works are Balog 1980 and Morton 1985; several scientists have published on the subject recently, see for example Vaggelli et al. 2013.

22 Bass et al. 2009.

23 Among many studies, see Schibille et al. 2019 and the relevant sections in Schibille 2022.

The only study on the identification of glassmakers is from 1954, when Leo Aryeh Mayer in a brief article listed a few names taken from available written sources:[24] Qāsim, a southern Anatolian glassblower, eighth–ninth century; Al-Basrī, a nisba of several glassmakers or stain-painters originally from Basra, late ninth–early tenth century; ᶜUmar ibn Ibrāhīm, Iraqi glassblower, tenth century; ᶜAbbās ibn Nusayr, Egyptian glassmaker, eleventh century; Saᶜd, glass and pottery painter, Fatimid period in Egypt; the Mamluk sultan al-Malik al-Sālih Ismāᶜīl (r. 1342–1345 CE); and Serkhosh Ibrāhīm, maker of the glass windows for the Suleymaniyye Mosque in Istanbul, 1557 CE. Remarkably, this minimal information offers a few points of departure for further study, as it also informs us that Basra must have been a centre of production; that the painted decoration on glass and pottery was sometimes made by the same artist; and that the craft was learnt even by rulers.

Few other names have surfaced since Mayer's article directly from the reading of inscription on extant painted or moulded objects, among which are: Sunbāt, glassmaker or stained-glass painter in Damascus, late eighth century, perhaps of Caucasian origin; Tayyib ibn Ahmad Barmasī, the maker or the owner of a bronze mould for glassmaking from Baghdad, ninth century; ᶜAlī ibn Ahmad Sabrā, ninth century; ᶜUthmān ibn Abū Nasr al-Zajjāj, a glassmaker and owner of a bronze dip-mould; ᶜAlī ibn Muhammad al-Barmakī, maker or painter of two enamelled mosque lamps ca. 1330–1335 CE.[25]

How Was It Made?

As mentioned above, molten glass in the Islamic lands was obtained both from raw materials and through the recycling of cullet or melting pre-prepared slabs of glass. Progressively, plant ashes replaced the more expensive and less available natron as a flux. To various degrees, glassmakers were able to create a whole range of colours by adding specific minerals to the batch, including the ability to decolourize and obtain translucent, almost transparent glass. This was most likely in view of imitating the colour and texture of precious and semi-precious stones such as rubies, emeralds, turquoise and rock-crystal, to the point that some of the glass vessels that entered European ecclesiastic collections in the medieval period were believed to be made of the precious material (Fig. 6).[26] Glass factories in specific areas may have specialised in certain colours. Glassmakers from the Islamic lands were also able, when they needed to obtain a higher-grade product, to clear the batch from impurities and excessive bubbles, especially in the case of transparent glass. Another technical detail that is worth mentioning is the universal use of the pontil, adopted from the late antique glassmakers in the Eastern Mediterranean regions, which greatly improved the glassblower's ability to control the shaping and manipulation of the object.

This section deals mostly with the finished object and the mention of several surface decorative techniques used to create works that were more than just functional vessels. There is no question that all previously known decorative techniques were adopted and improved upon and that, by the end of the first millennium CE, the overall artistic glass production in the Islamic lands had no rivals anywhere in the world.

24 Mayer 1954.

25 See Carboni/Whitehouse 2001, 208, no. 102; 87–88, nos. 13–14; 232–234, no. 116 for the first two and the last glassmakers; Carboni 2001, 201, no. 48c for the third; von Folsach/Whitehouse 1993, 152, fig. 6 for the fourth.

26 Carboni 2010.