

Advances in Science, Technology & Innovation
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Stella Kostopoulou · Gricelda Herrera-Franco ·
Jacob Wood · Kheir Al-Kodmany *Editors*

Cities' Vocabularies and the Sustainable Development of the Silkroads

Advances in Science, Technology & Innovation

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The title of the photo: Rotunda (or Rotonda) monument in Thessaloniki, Region of Central Macedonia, Greece by Miltiadis Maleas. Brief info: An early 4th-century AD Roman monument, next to the Arch of Galerius in the city center, inscribed on the UNESCO World Heritage List in 1988 as part of the Paleochristian and Byzantine monuments of Thessaloniki.

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Introduction

The Silk Road, a historic network of trade routes that connected the East and the West, played an important role in the exchange of goods, ideas, and cultural practices across civilizations. Along this extensive network of routes, cities emerged into significant trade and culture centers, evolving distinctive identities that were reflected in their architecture and arts as a result of their diverse populations and cultural influences.

This conference proceedings book is a selection of research papers from the first edition of the International Conference on “Silk Road Sustainable Tourism Development and Cultural Heritage (SRSTDCH)” held in 2021 in collaboration with Aristotle University of Thessaloniki, the European Interdisciplinary Silk Road Tourism Centre, Greece, and the fifth edition of the International Conference on “Cities’ Identity through Architecture and Arts (CITAA)” held in 2021 in collaboration with University of Pisa, Italy. The book brings together scholars from various disciplines, economists, architects, planners, tourism experts, and decision-makers to explore how the Silk Road sparked not only trade to thrive, but was also a catalyst for cultural exchange, tourism, and entrepreneurship. Through a range of case studies and interdisciplinary approaches, this book aims to provide a nuanced and comprehensive understanding of the cultural interaction and sustainable development along the Silk Roads, as well as the formation of cities’ identities through architecture and arts.

The chapters in the book examine how the Silk Road influenced trade, architecture and the arts of cities along its routes. From the caravanserais and temples of Central Asia and China, to the bustling marketplaces of the Middle East and the Mediterranean, the Silk Roads connected a vast and diverse region that was rich in cultural exchange and innovation.

In addition to its emphasis on the Silk Road legacy, this book also highlights how local cultures and traditions shaped the architecture and arts of cities along the routes. From the indigenous styles and motifs found in the art and architecture of Central Asia and China, to the blending of local and foreign influences in the arts of the Middle East and the Mediterranean, this volume showcases the diversity and complexity of civilizations along the Silk Roads.

Overall, this conference proceedings book offers a thorough and nuanced examination of how the Silk Road impacted travel, trade, entrepreneurship, tourism, cultural exchange and artisanal crafts, and the development of cities’ identities through their built environments. Through its interdisciplinary approach and diverse range of case studies, the book provides a valuable resource for scholars and researchers interested in the cultural exchange and sustainable tourism development along this ancient network of trade routes, as well as the formation of distinctive identifiers of the cities’ architecture and the arts throughout the centuries and over modern times.

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The Lustre Pottery Techniques Continuum Through the Silk Roads

Stratos Karakitsos

Abstract

In this paper we will attempt a macrohistorical examination of the Silk Roads and the resulting dissemination of ceramic techniques. Our research will concentrate on lustre technique in the production of ceramics. *Lustre Pottery* comes into existence at the beginning of the 9th c. in Abbasid Iraq and remained in use during the Fatimid, Seljuk, Ilkhanid and Safavid eras. Thence, it spread westwards to central and western Mediterranean, to Italy and Andalusia. *Lustre Pottery* technique was later adopted in Western Europe, finding its way in the workshop of internationally acclaimed British potter and ceramic scholar Alan Caiger-Smith (1930–2020). Our paper will concentrate on the enduring interest in the art of *Lustre Pottery* and the enchanting qualities of the surfaces it creates, irrespective of the cultural background of their provenance as well as on the strong continuity in the exchange of ideas and commercial goods between Europe and Asia which builds on the Silk Roads.

Keywords

Macrohistory • Silk roads • Ceramics • Lustre • Techniques

1 Introduction

The term *Silk Roads* was coined by the geographer von Richthofen at the end of the nineteenth century referring to trade routes linking east and west or China, India and the Mediterranean world, through Central Asia (Karakitsos 2021). Nowadays, the term *Silk Roads* or the *Great Silk*

Roads, refers to the geophysical and historical socially determined transcontinental commercial and cultural routes—primarily in Afro-Eurasia-. The *Silk Roads* are continental and maritime providing commercial, cultural and technological exchange between the countries. In regards with the merchandise trade, high value goods like silk, paper, metals, horses, lower-cost bulkier goods like olive oil, grain and manufactured goods such as ceramics, furniture etc. are being exchanged. Cultural exchanges include religious and philosophical systems, arts, literature and also scientific and technical knowledge e.g. paper, printing technology and gunpowder (Barisitz 2017).

The continental Roads interconnect the geographically demarcated areas with surplus resources, high population density and ongoing long-running wars, which are based on water complexes: the central ones, Indus Valley, Tiger and Euphrates (Mesopotamia), Nile and Danube with a second pole, Yangtze and Yellow rivers—through Amu Darya and Syr Darya basin-. At the same time, all of them, besides the latter, are coastal, so they act as potent maritime *Silk Road* hubs. All that results in the connection of the Pacific Ocean, first of all, with the Mediterranean Sea through the Indian Ocean and secondly with the Atlantic Ocean, through Mediterranean Sea or South West Indian Ocean (Peponis 2021).

Silk Roads exist for millennia. Their traces can be found to the trading activities of the Andronovo cultures in the Central Asia around 1500 BC (Perdue 2003). We see the Sogdian merchant networks and later the Achaemenid Empire road network which connected the Black and the Aegean Sea with the Central Asia and beyond (Vaissière 2005). Trade and cultural exchanges continue flourishing in the Diadochi period and Romans after their domination in Mediterranean Sea will fight with the Persians for the heart of the world, Mesopotamia (Frankopan 2015). In this first half of the first millennium AD, the maritime relations between the eastern countries and the Mediterranean and the Gulf started. Following the monsoonal climate Roman Egypt

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connected with southern India in the first century AD and in the fifth century AD the maritime trade between Arabs, Persians and Chinese begins (Shen 2017).

In the seventh century the core of Islamic rule lies in Mesopotamia, which is located in the crossroads of Afro-Eurasia and has direct contact with the Mediterranean Sea and the Indian Ocean through its ports. Islam soon secured the second important river complex, Egypt, uniting the economic heartlands of the former Sassanian and Roman Empire, which were stretching from west Mediterranean to Central Asia. The early Muslim scholars consolidated this spatial supremacy in maps and treatises, while the merchants travelled to every direction, importing and exporting goods (Frankopan 2015). Some early geographic treatises are: al-Khwārizmī (d. 850), *Shape of the Earth* (Sūrat al-arḍ) and Ibn Khurradādhbih (d. 912), *The Book of Routes and Realms* (Kitāb al-Masālik wa-l-Mamālik) (Park 2012). It is attested that even earlier, around 750 AD, Ībādī seafarers, as Abū ‘Ubayd al-Qāsim and al-Najjār b. Majmūn, have travelled to al-Šīn (China) (Lewicki 1935). The main termini of the eastern trade were the ports Siraf, Suhar, Bašra and the new cities Samarra and Baghdad. All of them flourished economically and demographically as centers of the market extending from west Mediterranean to Far East (George 2015). It’s not strange that Chinese ceramics are bestowed as gifts to caliph Harūn al-Rashīd (r. 786–809) through the continental roads (George 2015). Chinese ceramics are excavated in Samarra, as well in the ports of Siraf and Suhar, coming from the Eastern Seas. Thousands of Chinese ceramics were found in the ninth century *Belitung wreck* south-east from Sumatra. The ship was directing from China to Siraf (Wood and Priestman 2016). Via continental and

maritime *Silk Roads*, goods and specifically ceramics crafted in Islamic lands are circulated in Eastern and Western Mediterranean reaching the northern lands. Furthermore, after the conquest of Iberia and Sicily in eighth and ninth century respectively, the craftsmen of these areas started using the Muslim production techniques. (Messina et al. 2018; Amorós and Gutiérrez 2020).

2 Lustre Pottery

In the first part, we will follow the spread of lusterware in the eastern and western Muslim lands and in the second part we will see its adoption and use beyond the Muslim territory (Fig. 1). It is important to note that the Islamic or early Abbasid glazed pottery appeared and rised quite suddenly. By the tenth century glazed and lustre ceramics could be found from Spain to Central Asia. Especially in this early period we meet three interrelated ways of circulation of glazed pottery, as O. Watson observes:

- (1) Trading ceramics as physical goods within and out of the Islamic world
- (2) Ceramics travel as ideas and habits following the arrival of the objects and the immigrants
- (3) Potters travel for sundry reasons and set up their workshops in new places which leads to the dispersal of the techniques, technology and styles (Watson 2017).

It is said that the main impetus for this sudden glazed pottery emergence in the Islamic world is the arrival of Chinese stonewares in the Abbasid court in the ninth



Fig. 1 Main *Lustre-Pottery* production centers

century. However, as O. Watson mentions, that may not be the case. There is clearly a Chinese influence on the potters and customers but that does not explain

the revolution in the making and consumption of glazed fine wares, a practice which had no precedent in Iraq. It fails to address the widespread use of glazed pottery in Egypt and Syria before the ninth century and does not explain the complete independence of many early Islamic wares from Chinese types. (Watson 2017)

On top of that, there is already a glazing tradition in Mesopotamia since Parthian times. Most of the production consisted of large jars and vessels with limited decoration. The technology is simple: The clay is earthenware and the glaze is alkaline with copper giving a turquoise color. With the advent of Islam new social needs have to be satisfied. A new type of kiln is designed and better glazes, impermeable, easy to clean and brilliant are being produced. The first fine Islamic glazed ware, the *Coptic* or *Yellow glazed*, is found in Alexandria, Egypt, before the fall of the Umayyads in 750 AD. This type is mainly circulating eastwards toward Levant and Iraq. In the next century more types of clays and glazes will emerge in Mesopotamia. The opaque white glazed ware will replace the Yellow glazed, which is clearly a Chinese impact (Watson 2017). At that time we see the emergence of lusterware pottery, a unique technique which is totally different than any other category of pottery, glazed, unglazed or decorated with slips. But obviously, the potters, the market and the technology had reach such a point of sophistication that made this innovation possible.

The first applications of the lustre technique are first observed in glass, possibly in Egypt, in the Ptolemaic period if not in the Eighteenth period (Martin 1929; Whitehouse 2001). Al-Kindī (d. 873) writes treatises on industrial chemistry and refers to luster-painted glass in the *Kitāb Kimiyā' al-'itr wa al-taṣ'idāt* (Book of the Chemistry of Perfume and Distillations). Jābir ibn Ḥayyān (d. 815) mentions among others, recipes on the staining of glass in *Kitāb al-durra al-maknūna* (The Book of the Hidden Pearl) and *Kitāb al-Khawāṣṣ al-Kabir* (the Great Book of Properties). The alchemical performance and transubstantiation of the Aristotelian philosophy, from the Hellenistic era onwards, led to experiments that contributed to the transmutation of one element into another and their application in crafts. *The Art of Alchemy* ('Ilm al-San'a) refers to a theoretical and a practical science, although here, it seems that we are dealing with practical industrial chemistry (al-Hassan 2009).

On the surface of the wares, luster pigment grants a fine decoration thin film of metal oxides obtained by a complex technical process. Al-Neyschāpuri, in his treatise on precious stones, minerals and metals, *Jawāher-name-ye Nezami*, in 1196 AD and Abu'l-Qāsem, a potter of Kashan, in 1301 AD, mention lustreware recipes according to which the suspension, more or less, includes powdered copper compounds,

iron pyrites, silver sulphide and other ingredients dissolved in grape juice or vinegar (Roqué et al. 2008). That pigment was painted or brushed on top of pre-glazed pottery, composed of lead and/or tin oxides. The painted pottery was then given a second firing in a low-temperature smoky kiln, which produced an iridescent luster surface due to the metal reduction, which once polished, “reflects like red gold and shines like the light of the sun”, as Abu'l-Qāsem wrote in the aforementioned treatise (Caiger-Smith 1985; Allan 1973).

In 836 AD, the new capital of the 'Abbāsīd caliphate will become Samarra under Caliph al-Mu'taṣim. The first lusterwares excavated at Samarra dated at the beginning of the ninth century, represent the earliest examples of lusterware pottery (Sarre et al. 1925; Kervran 1977). At the same time, from ninth to late tenth centuries we see that Baṣra is the earliest center of production of the lusterware period (Mason and Keall 1991). The early Abbasid ceramics are polychrome and monochrome with a variety of decorations. We can see Roman designs, such as the Peacock-Eye, Sassanian symmetrical wings and palmettes and generally vegetal and figural, abstract and naturalistic decorations. The most important is that all of them share the common surface lustrous effect which is increased by the natural light. As M. Saba writes, the categorisation of these early lustre ceramics may supersede the abstract or naturalistic and vegetal or figural dichotomy (Saba 2012). Lusterware pottery transferred to Nishapur where beyond bright monochrome and polychrome lusterware we see items bearing inscriptions and at the same time, during the ninth century we observe that the Great mosque of Qayrawan, the capital of the Aghlabid Empire, is decorated with Baṣra lusterware tiles and a lusterware industry set up in Qayrawan. In the late tenth century artisans move to Fatimid al-Qāhira, where the lustre decorations and colors are enriched and reflect the cultural traditions of the new dynasty (Caiger-Smith 1985). Also, we observe the transition from earthenware to proto-fritware. Fritware is hardwearing white clay and is the precursor of the famous and so-called *Faience*. It seems that fritware or stonepaste technology is introduced to Syria and Iran after 1075 AD and will become the primary body for all fine ceramics including lustre wares (Mason and Tite 2007). Ayyubid Raqqa industry will flourish at this point (Mason 1997). We see similar type of pottery in Qal'at, Ja'bar and Balis Meskene (Blackman and Redford 1997). The Seljuks use the luster-fritware technology and produce exuberant arabesques and foliated kufic designs. They enrich the visual culture of Iran with a new figurative imagery inspired by Central Asia and the Buddhist arts. At the same time, during the twelfth–thirteenth century, Seljuks establish a stunning lusterware industry in Kashan, where high quality of luster wares with golden colors can be seen (Caiger-Smith 1985). From Kashan the technique spread to the eastern cities Nishapur and Samarqand (Watson 2017). The ceramics

technology and innovation developed rapidly and new styles around the thirteenth century emerged as the famous *Mina'i* overglazed wares with enamel painting (Watson 1975a, b, 2004). Kashan potters continued in the service of the Mongol Īl-Khanid dynasty till the fourteenth century. The cobalt borders and the luster animal illustrations on tiles produced for Īl-Khanid patrons display high aesthetic value. During the next two centuries the lusterware falls out of fashion in the region of Iran and the depressed industry is revived around 1650 by the Safavids (Watson 1975a, b). The Safavid style of luster glazed pottery becomes distinct as new colors are being produced such as the coppery luster of pinkish hue (Golombek et al. 2014). Beyond the Islamic world towards east, *Lustre Pottery* travelled via the sea routes to western India and Southeast Asia but as far as we know not in China (Watson 2017).

On the other hand, from east to west, the *Serçe Limanı shipwreck* near Rhodes island in 1025 show us the level of interaction between the Muslim and the Christian spheres in Mediterranean (Jenkins 1992). Among the objects found were byzantine coins, metalwork, jewelry, different types of ceramics etc. In regards with the ceramics we see Byzantine type amphorae and Fatimid glazed ceramics coming from Egypt and Syria, attesting the circulation of the crafts in the Mediterranean (Hoffman and Redford 2017). The *Serçe Limanı shipwreck*

provides evidence both dramatic and mundane of the extent to which Islamic art and material culture were enmeshed within the medieval Mediterranean sphere. The process of transculturation¹ in the particular context of art and culture of the Mediterranean during the eleventh to thirteenth centuries offers important insights into the nature of localization and identity between centers in the Maghrib, Africa, Egypt, Sicily, Venice, and al-Andalus, and between Islamic, Norman, and Byzantine realms. (Hoffman and Redford 2017)

Fatimid and Ayyubid iconographic and stylistic influences appear already in the pre Norman Sicily and it is said that at some point a *Siculo-Arabic* artistic court style emerged (Kapitaikin 2017). Also, it is not well known that the commercial and holy spaces of the north and south sides of the Mediterranean intersected thanks to the network of Crusader circulation and exchange. Fatimid crafts were a “recognizable signifier for the memory and presence of the Holy Land” (Hoffman and Redford 2017). So, these exchanges and affinities are based on substantial diplomatic, mercantile and cultural links (Kapitaikin 2017).

We should not forget the intellectual sphere exchanges: Already from the eighth century we witness the study,

translation and commentary of the Greek and Hellenistic scientific and learned works into Arabic (Gutas 1998). In fact, the denizens of the Islamic world continued the inherited traditions of their homelands by transforming this corpus fit to their own needs. Representatives of the Islamic Aristotelianism, such as Ibn Sina, Ibn Rushd, Maimonides converse with the Latin and ecclesiastical wise men, such as Albert the Great and Thomas Aquinas, acting as a catalyst in the formation of Scholasticism and later Nominalism (Ziakas 2007). In regards with the Arabic chemistry, the first alchemical treatise that is translated in Latin occurs in 1144 by Robert of Chester. More Arabic alchemical treatises are translated in the twelfth and thirteenth centuries, such as the *Summa Perfectionis* of the aforementioned Jābir ibn Ḥayyān under the Latin name Geber (al-Hassan 2009). That is the way the foundations of Latin alchemy were found not by the Eurocentric framed allegations that Julius Ruska and Berthelot used in order to disconnect the Latin alchemy from its Arab roots in the nineteenth and twentieth centuries, as Ahmad Y. al-Hassan proves (al-Hassan 2009).

The application of the early Islamic chemistry, the glazes, passed through Baṣra and Mesopotamia in North Africa and then moved to the northern side of the Mediterranean. Craftsmen that dispersed from Fustat and maybe Kashan, reached Malaga at the end of the twelfth century, establishing the first lusterware production center (Caiger-Smith 1985). In the well-known Alhambra palace located in Granada, the largest lustre pots made in Malaga were found, intended to occupy the wall-niches. The luster production thrived under the protection of Nasrid dynasty and lasted for two centuries till 1450. At that time, the production moved to Manises. The luster changes and is based only in tin, in order to highlight the glaze more brightly. The designs take on their own local character here as well. Thus, we observe Christian motifs like that of St. George and the dragon. These items were made for export to Europe (Frothingham 1951; Caiger-Smith 1985). Italy imported ceramics from Spain. The term *Maiolica*, which describes the later polychrome Italian ceramics, seems to be connected with Spain. Italians imported wares from the Islamic world, primarily from North Africa for centuries prior to the Spanish imports. By the fourteenth century, this trade had dried up as Italians learned to make things by themselves. The main *Lustre Pottery* centers have been established in Deruta and Gubbio and flourished till the mid-sixteenth century. The painter Bernardino Pintoricchio (1454–1513) and the potter Cipriano Piccolpasso (1524–1579) are the prominent figures (Lightbown and Caiger-Smith 1980; Caiger-Smith 1985). The reduced-lustre production with iridescent effects didn't really continue in the late sixteenth and seventeenth centuries and never transferred into northern Europe. The art survived in Spain till the eighteenth century. At that time, Italians started experimenting with the effects of real gold

¹ We use this term within the specific context of the Mediterranean sphere and its Islamic material culture and not in a colonial or post-colonial frame eg Latin American Studies or Neoliberalism (Hoffman and Redford 2017; Flood 2009).

applications on their pieces prior to firing. It was at this very point that European fashion began to develop an interest for the next two centuries in tableware with gilded surfaces, in a style very different from the old, traditional lustre techniques (Hunt 1979; Caiger-Smith 1985).

A revival of interest took place in late nineteenth century Europe, particularly as part of the Aesthetic and Arts and Crafts movements in France and Britain. Luminaries such as Joseph Theodore Deck or William de Morgan researched Islamic pottery and experimented with techniques to produce ranges of sophisticated designs that were fashionable until the outbreak of the First World War. The artisans recreated Nasrid Alhabra ceramic vases and were inspired by *Hispano-Moresque Pottery*. They were also inspired by Persian, Syrian and Iznik ceramic styles. At the same time, they produced their own types of clays and colors of luster glazes. In areas beyond the northwestern countries of the European continent, the monuments and ceramics made by innovative techniques and style that been found in them were preserved. These objects were considered archaeological, studied by scholars, categorized and to this day are exhibited in museums. Also, treatises on historical, philosophical and aesthetics were written concerning their forms and motifs-ornaments. This age is referred by Necipoğlu as dillentantism,

which encompasses the enthusiasm for Islamic art that was heightened with the taste for romanticism, exoticism, and eclecticism among ‘amateurs,’ including artists, architects, collectors, art dealers and travellers. (Necipoğlu 2012)

The pottery workshops that produced luster pottery continued in the second part of the twentieth century (Caiger-Smith 1985). The greatest example of fine craftsmanship is without saying Alan Caiger-Smith (1930–2020) a British studio potter and writer. He established the Aldermaston Potter in 1955 and by trial and error reconstructed the Islamic lusterware technique as well as wrote treatises in Islamic ceramic arts and lusterware. His book *Lustre Pottery: Technique, Tradition and Innovation in Islam and the Western World* is undoubtedly the bible of lustres, which undoubtedly inspired in multiple ways the modern ceramics. Nowadays we can find more artisans worldwide using the various techniques of luster e.g.: Joan R. Carillo from Spain, Greg Daly and Johan Demaine from Australia, Danny Moohead from New Zealand, Sutton Taylor and Pauline Monkcom from UK, Ken Turner and Cathy Keen from US. In the Islamic lands we find Sevim Çizer (see Çizer 2010), Mehmet Tuzum Kizilcan, Emre Feyzoğlu from Turkey, Abbas Akbari from Iran, Kashan (see Akbari 2013), Ossama Eman from Egypt, all of them applying the traditional techniques of luster.

Generally, the modern ceramic artisans recreate the lustre pigments with modern materials, build kilns specific for lustre firing and expand the possibilities of lustre applications by experimenting and mastering new recipes in glazes, pigments and clays. In some occasions there is a new meaning of their symbolism in the aesthetic and philosophical frame, following the cultural environment in which they are born. Finally, it is interesting to mention that while at the beginnings of the luster pottery, the secrets of the techniques were kept well hidden by a small number of potters, nowadays we can attend classes in art universities, train ourselves in a potter’s atelier, read articles and books and even watch videos in the internet. But it is also true that the lustres still hold a very small niche of the wide range of the clay applications, as they require quite a sophisticated level of experience.

3 Further Studies and Development

Lustre Pottery field has the potential to grow further and people can be acquaintant with it. Among others, tourism could be a way of such an acquaintance. For example, nowadays we observe that travel experiences include visits to places where specific types of traditional pottery are carried out as well as seminars by contemporary ceramists regarding their techniques. This venture may be further developed in the above mentioned *Lustre Pottery* production centers of *Silk Roads*.

Besides this type of cultural and art education, it is worth noting that we are currently working on developing an innovative product named Innovative Cultural Experience (ICE), T2EAK-02564, which combines the following cutting-edge technologies: 1. Transparent Window—touch screen, interactive technology, 2. Augmented Reality, monuments-exhibits, 3D immersive video, intangible heritage narration. The product will provide a unique atomic or mass-touring experience, utilizing information based on material and intangible cultural heritage, through narrative scenarios. ICE will be a Transparent Window’s advanced state of the art, in which any exhibit that will enter (e.g. ceramic object) it will be able to display visually enhanced and augmented Reality information to the user/visitor (admin enabled). In addition, visitors can, using the built-in 3D Camera, upload their own Video with their views or impressions from the exhibit. The advantage of ICE is based on the collection of alternative multimedia sources of information (material–immaterial), and it can adopt alternative forms of presentation of the aggregated information. For more information see <https://ice.web.auth.gr/>.

4 Conclusion

In this paper we attempted a macrohistorical examination of the *Silk Roads* and the resulting dissemination of ceramic techniques. We found out that already from the ancient times, East Asia and Europe were in fact connected thanks to the continental and maritime *Silk Roads*. By virtue of this geographic and social reality it is that civilizational process came to life. At the times of the Islamic command, we saw the birth of lusterware in Mesopotamia a basic artery of the *Silk Roads*, an innovative technique of ceramic wares application of a decorative film made of metal oxides. This technique turned out that was the result of a multilevel and age-old continuum of scientific and artistic achievements in which many peoples contributed. The *Lustre Pottery* circulated towards east and west in Muslim lands and beyond. Iraq, Egypt, Syria, Iran, Andalusia and Italy were the most important centers of lustre manufacture and distribution. Later a revival of interest took place in Western Europe which continued to this day influencing modern ceramic art and artisans worldwide.

In conclusion, we can say that the lusterware was born in the middle of the *Silk Roads* and has survived to this day, receiving special hues, techniques, individual elements and meanings depending on the region, the craftsmen, the market demand and the time. We observe that there is a dynamic in the circulation of this technique, which transcends established religious, cultural and linguistic identities and endures over time. Today, *Lustre Pottery* is being studied thoroughly by scholars, lustre objects are exhibited in museums and the technology and materials industry is developing rapidly. In general, the multiple sides of the lustres have a lot of room for cultural, trading and touristic development.

References

- Akbari, A.: *The Vessel*. Peykareh Publications (2013)
- al-Hassan, A.Y.: *Studies in al-Kimyā': Critical Issues in Latin and Arabic Alchemy and Chemistry*. Olms (2009)
- Allan, J.W.: Abū'l-Qāsim's treatise on ceramics. *Iran* **11**, 111–120 (1973)
- Amorós, R.V., Gutiérrez, L.S.: Ceramics in transition: ceramics from the first Islamic period in the western Mediterranean—the example of al-Andalus. *Libyan Stud.* **51**, 99–125 (2020)
- Barisitz, S.: *Central Asia and the Silk Road: Economic Rise and Decline over Several Millennia*. Springer (2017)
- Blackman, M.J., Redford, S.: Lustre and fritware production and distribution in medieval Syria. *J. Field Archaeol.* **24**, 233–247 (1997)
- Caiger-Smith, A.: *Lustre pottery: Technique, Tradition, and Innovation in Islam and the Western world*. Faber and Faber (1985)
- Çizer, S.: *Lüster. Tarihi, Tekniği, Sanatı*. İzmir (2010)
- de la Vaissière, É.: *Sogdian Traders: A History*. Leiden (2005)
- Flood, F.B.: Objects of Translation: Material Culture and Medieval “Hindu-Muslim” Encounter. Princeton University Press (2009)
- Frankopan, P.: *The Silk Roads. A New History of the World*. Bloomsbury (2015)
- Frothingham, A.W.: *Lustreware of Spain: Printed by Order of the Trustees*. Hispanic Society of America (1951)
- George, A.: Direct Sea Trade Between Early Islamic Iraq and Tang China: From the Exchange of Goods to the Transmission of Ideas. *J. R. Asiat. Soc.* **25**(4), 579–624 (2015)
- Golombek, L., Mason, R.B., Proctor, S.P., Reilly, E.: *Persian Pottery in the First Global Age: The Sixteenth and Seventeenth Centuries*. Brill (2014)
- Gutas, D.: Greek Thought, Arabic Culture: the Graeco-Arabic Translation Movement in Baghdad and Early ‘Abbāsīd Society (2nd–4th/8th–10th centuries). Routledge (1998)
- Hoffman, E.R., Redford, S.: Transculturation in the Eastern Mediterranean. In: Necipoğlu, G., Flood, F.B. (eds.) *Blackwell Companion to Islamic Art and Architecture*, vol. 1, pp. 405–430. Wiley-Blackwell (2017)
- Hunt, L.B.: Gold in the pottery industry. The history and technology of gilding processes. *Gold Bull.* **12**, 116–127 (1979)
- Jenkins, M.: Early medieval Islamic pottery: the eleventh century reconsidered. *Muqarnas* **9**, 56–66 (1992)
- Kapitaikin, L.A.: Sicily and the staging of multiculturalism. In: Necipoğlu, G., Flood, F.B. (eds.) *Blackwell Companion to Islamic Art and Architecture*, vol. 1, pp. 378–404. Wiley-Blackwell (2017)
- Karakitsos, S.: Chinese porcelains embedded in Omani Mihrābs. International trade and cultural relations. In: Fu, Z., Ziaka, A. (eds.) *The Silk Roads Between China and Oman. Networks of Communication and Transmission of Ibadī Knowledge*, pp. 121–144. Olms (2021)
- Kervran, M.: Les niveaux islamiques du secteur oriental du Tépé de l'Apadana. *Cahiers De La Délégation Archéologique Française En Iran* **7**, 75–161 (1977)
- Lewicki, T.: Les premiers commerçants Arabes en Chine. *Rocznik Orientalistyczny* **11**, 173–186 (1935)
- Lightbown, W.R., Caiger-Smith, A.: *Cipriano Piccolpasso. The Three Books of the Potter's Art = I Tre Libri Dell'arte Del Vasaio: A Facsimile of the Manuscript in the Victoria and Albert Museum*. Scholar Press (1980)
- Martin, F.R.: Lustre on glass and pottery in Egypt from the period of Hadrian to Saladin. *Collana di Studi D'arte Ceramic*, 3rd edn. Lega (1929)
- Mason, R.B., Keall, E.J.: The ‘Abbāsīd glazed wares of Sirāf and the Baṣra connection: petrographic analysis. *Iran* **29**, 51–66 (1991)
- Mason, R.B., Tite, M.S.: The beginnings of Islamic stonepaste technology. *Archaeometry* **36**, 77–91 (2007)
- Mason, R.B.: Medieval Syrian lustre-painted and associated wares: typology in a multidisciplinary study. *Levant* **29**, 169–200 (1997)
- Messina, M., Arcifa, L., Barone, G., Finocchiaro, C., Mazzoleni, P.: Islamic pottery production in eastern Sicily (10th–11th centuries): preliminary archaeometric data on local and imported products from Paternò (Sicily). *Mediterr. Archaeol. Archaeom.* **18**(5), 207–223 (2018)
- Necipoğlu, G.: The concept of Islamic art: inherited discourses and new approaches. In: Benoit, J., Georges, K., Stefan, W., Gerhard, W. (eds.) *Art and the Museum*. Saqi Books (2012)
- Park, H.: *Mapping the Chinese and Islamic Worlds. Cross-Cultural Exchange in Pre-modern Asia*. Cambridge (2012)
- Peponis, D.V.: Peri tis Dimiourgias tou Kratous (on the creation of the state). *Cosmoidioghlossia*. https://cosmoidioghlossia.blogspot.com/2021/02/blog-post_7.html (2021). Accessed Nov 2021
- Perdue, P.: Silk Road. In: Mokyr J. (ed.) *The Oxford Encyclopedia of Economic History*. Oxford (2003)
- Roqué, J., Molera, J., Cepriá, G., Vendrell, M., Pérez-Arantegui, J.: Analytical study of the behaviour of some ingredients used in lustre ceramic decorations following different recipes. *Phase Transitions* **18**, 267–282 (2008)

- Saba, M.D.: Abbasid Lusterware and the Aesthetics of 'Ajab. *Muqarnas* **29**, 187–212 (2012)
- Sarre, F., Herzfeld, E., Arnold, H.: *Die Keramik von Samarra*. Reimer (1925)
- Shen, H.M.: The China–Abbasid Ceramics Trade during the Ninth and Tenth Centuries. In: Necipoğlu, G., Flood, F.B. (eds.) *Blackwell Companion to Islamic Art and Architecture*, vol. 1, pp. 197–217. Wiley-Blackwell (2017)
- Watson, O.: Ceramics and circulation. In: Necipoğlu, G., Flood, F.B. (eds.) *Blackwell Companion to Islamic Art and Architecture*, pp. 479–500. Wiley-Blackwell (2017)
- Watson, O.: Persian lustre-painted pottery, the Rayy and Kashan styles. *Trans. Orient. Ceram. Soc.* **40**, 1–19 (1975a)
- Watson, O.: Persian lustre ware, from the 14th to the 19th centuries. In: *Le Monde Iranien et l'Islam*, 3rd edn, pp. 63–80 (1975b)
- Watson, O.: *Ceramics from Islamic Lands: The Al-Sabah Collection*. Thames & Hudson (2004)
- Whitehouse, D.: The growth of interest in Islamic glass. In: Carboni, S., Whitehouse, D. (eds.) *Glass of the Sultans*, pp. 8–13. MET (2001)
- Wood, N., Priestman, S.: New light on Chinese tang dynasty and Iraqi blue and white. *Bull. Chin. Ceram. Art Archaeol.* **7**, 47–60 (2016)
- Ziakas, G.: *Ta Ellinika Grammata kai o Aristotelis stin Araviki Paradosi* [The Greek Letters and Aristotle in the Arabic Tradition]. Agra (2007)