EXPLORING LOCAL GLASSMAKING AND SOCIAL SIGNIFICANCE: GILDED GLASS BEADS IN COLONIAL MEXICO CITY

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This article centers on gilded glass beads discovered through excavations conducted by the Instituto Nacional de Antropología e Historia in Mexico City, with a particular focus on the collection from the Convent of the Incarnation. This study challenges two prevalent notions regarding these artifacts in New Spain. Firstly, the archaeological context defies the conventional belief that these beads were exclusively intended for Indigenous or African-origin populations. Evidence suggests that these items were also a component of the attire worn by Spanish women of Peninsular and Creole origin who constituted the local elite. Secondly, by combining archaeological findings with historical sources, it becomes evident that the viceroyalty fostered a specialized glassmaking industry for the production of small objects, including beads. The practice of beadmaking in New Spain commenced during the 16th century and experienced its zenith in the 18th century, characterized by the emergence of distinctive stylistic features that probably included gilded beads.

INTRODUCTION

Gilded glass beads have been found at various archaeological sites dating ca. 1600-1790 in the Americas, with a concentration in the regions of former New Spain. The decorated varieties are referred to as Seven Oaks Gilded Molded in the southeastern United States, a designation coined by Goggin (n.d.) around 1960 but no longer in favor (Francis 2009a:88-89). Their precise place of production remains uncertain, although many experts attribute them to Spanish craftsmen. Debates among specialists revolve around their manufacturing techniques, specifically whether they were molded or wound, as well as how they were decorated and gilded. Regarding their societal utilization, these beads have often been linked to Native American communities. This paper presents collections of gilded glass beads from two distinct excavation sites within Mexico City, with a special emphasis on the Convent of the Incarnation site, which boasts higher concentrations of these beads. Following an overview of gilded glass beads, this paper discusses their social context of use and explores potential manufacturing origins.

GILDED GLASS BEADS: AN OVERVIEW

The current understanding of wound, gilded glass beads remains limited. A type decorated with grooves and dots was initially named Seven Oaks Gilded Molded by John Goggin (n.d.) after the type site in Florida, but subsequent researchers have contested this label. This challenge arises from further archaeological investigations that have unveiled a broader distribution of these beads. It also challenges that the production technique was molding. Lorann Pendleton and Peter Francis (2009:5) therefore introduced the alternative term Incised Gilded, though Karlis Karklins (2023: pers. comm.) points out that the design elements are actually impressed and not cut into the glass. After an extensive examination of the decoration, Peter Francis (2009a) ruled out the use of molds and established that the designs were made by hand, using a paddle and a toothed device. Francis' analysis has also led to the proposition of the existence of small-scale communities specializing in this production (Blair 2016:106-109). However, not all gilded beads are decorated, as plain beads also exist.

The method by which they were gilded remains a subject of discussion. Initially, it was assumed that they were coated with a layer of gold leaf, but more recent analyses suggest that not all beads underwent the same gilding technique. As demonstrated by pXRF analysis conducted on beads of this type from Mound Key, St. Catherines mission, Sapelo Island, Old Mobile, and Fusihatchee, not all that glitters is gold, and some beads lack precious metals (Thompson et al. 2015).

In essence, the beads under discussion are wound, crafted from glass that displays a range of colors, from opaque yellow/white to translucent green, which is a common color in other fine ornamental Spanish glass, as noted by Goggin

(n.d.:32). They exhibit various shapes (oval, spherical, ring, rhomboid, etc.) and sizes. They can be either plain or adorned with alternating longitudinal rows of dots and parallel grooves, or only with grooves. The technique used to create the decoration remains uncertain, possibly achieved by pressing the bead with a paddle or imparted using an open-face mold or a trough mold where the bead is rolled along it while still on the mandrel. Different substances have been used to gild the beads, including bismuth, gold, iron-gold, copper-gold, and a mixture of gold, copper, and iron (Thompson et al. 2015).

As for their distribution, Incised Gilded beads have not been reported outside the Americas in archaeological contexts of the Modern Era, but are especially concentrated in the former territories of New Spain. Their presence is well-documented in the United States, particularly in La Florida (Florida and Georgia). John Goggin (n.d.:33) mentions their occurrence at the Punta Rassa site in Lee County, Florida, without specifying whether they were found in a mission context or a burial mound. He also alludes to their presence at the Bee Branch 1 (8HN17) burial mound in Glades County, the Seven Oaks site (8PI8) in Pinellas County, Lake Butler (8OR11) in Orange County, and the Cook's Ferry (8SE13) mound in Seminole County. Additionally, he mentions that the gilded beads from the Daugherty site (8HG3) could also belong to this type.

Subsequent excavations have shown that in La Florida, Incised Gilded beads are frequently found at religious missions and indigenous settlements. Notable mission examples include the O'Connell site, Leon County, Florida, which corresponds to the last of several locations of the San Pedro y San Pablo de Patale mission (1690-1704) (de Grummond 1997). On St. Catherines Island, Georgia, they have been found in the Wamassee area of the Guale village, dating back to pre-1689 (Blair 2009a:164; Smith 1983:153). Moreover, the largest concentration of gilded beads on the island was uncovered within the Franciscan mission of St. Catherine de Guale in 17th-century contexts. Within the church, the beads were discovered in funerary contexts, situated in the gospel, epistle, and mid-nave aisle areas (Blair 2009b:173). They were associated with 12 individuals, most of indeterminate sex. One exception is the burial of a woman in a coffin located on the gospel side of the church, near the altar and directly in front of the sacristy. Most individuals were young adults aged 20-30, while two were children and three were more than 30 years old. The beads also appeared in the mission courtyard, and one was recovered in the kitchen, near the convent (Blair 2009a).

Not far from this location, on Sapelo Island, the mission San José de Sapala yielded some Incised Gilded beads dating to the 18th century (Jeffries and Moore 2013:370-371; Thompson et al. 2015). Similar discoveries include those at the mission of San Luis Talimali (1633-1704) in the Apalachee Province where three beads were found near the council house (Mitchem 1993:402; Smith 1983:153), San Juan del Puerto (8DU53) (Goggin n.d.:33), and the Ortona Burial Mound mission site (8GL35) where one bead was collected by Goggin and likely dates to the early 16th-17th centuries (Jacob 1998:87-90).

Examples of indigenous sites with Incised Gilded beads include the Boynton Multiple Mounds site (8PB100) in Palm Beach County where three beads were discovered with a burial dating to 1565-1700 (Jacob 1998:105, Table 12, 117). The Philip Mound (8PO446) in Polk County, likely utilized during the late 16th and early 17th centuries, yielded five Incised Gilded specimens (Benson 1967:24), as well as four plain oblate gilded examples (Karklins 1974:5).

Incised Gilded beads have also been excavated in other states. In Rhode Island, at the Narragansett burial site in North Kingstown, a substantial quantity of such beads has been interpreted as a result of commercial connections with the Dutch during a period when the Netherlands were under Spanish jurisdiction (Turnbaugh 1984:42, cited by Francis 2009a:89). Maine also features this type of bead, at the Cushnoc trading post site (Cranmer 1990) and the Kirke family house, occupied during 1640-1696 (Gaulton 2006:221). In Alabama, at the Fusihatchee site, a Creek town, these beads are dated to the 17th century (Thompson et al. 2015).

Gilded glass beads are found in the southeastern regions of North America and in present-day Mexico, encompassing three states. In Chihuahua, examples were retrieved from the Convento site at the Casas Grandes mission (Goggin n.d.:33). Moving to the North Sierra of Oaxaca, in the indigenous village of Nejapa, the burial of a young native was accompanied by a significant quantity of gilded glass beads dating to the 17th century (King, Konwest, and Badillo 2012). In Mexico City this type of bead has been also identified in archaeological levels of the 17th-18th centuries (Martins Torres 2018, 2019:621-623).

Further south, they have been documented in Costa Rica, specifically in Puntarenas Province. At Zapotal, located on a military trade route, five gilded beads were found in association with five Nueva Cádiz beads in the funerary assemblage of an individual (Vargas Amador 2011).

Regarding their geographic distribution, gilded beads are primarily concentrated within the former territory of New Spain and are prevalent from the mid-16th century to the end of the 18th century. This pattern, however, may have been influenced by a historical bias in archaeological

endeavors in Latin America, which previously exhibited limited interest in the colonial era, especially concerning glass studies.

In terms of their origin, previous research has not definitively pinpointed the exact place of their manufacture. However, the prevailing consensus among most specialists leans toward attributing them to Spanish craftsmanship (Blair 2016:107; Francis 2009a). The exception is Rebecca Jacob (1998:172) who suggests that their origins could potentially have South American or Mexican roots.

ARCHAEOLOGICAL FINDS IN MEXICO CITY

In Mexico City, gilded beads have been identified at two distinct archaeological sites and are stored at the Archaeological Rescue Division of INAH. Specifically, in the Coyoacán neighborhood, these beads were unearthed at 62 Fernández Leal Street. They were found in the fill of an artesian well associated with the church of the Conception, along with other objects from the 16th-17th centuries. The two spherical-plain beads (CATSA 25850 1/1, CATSA 25850 2/2), corresponding to St. Catherines Type 98 (Blair 2009a:164), are made of translucent glass of undetermined color. They range from 5-6 mm in diameter and 4-5 mm in length (Figure 1, a). Additionally, a significant concentration of these beads was found at the former Convent of the Incarnation in archaeological levels that could be dated between 1639 and the late 18th century.

The Collection of the Convent of the Incarnation

Historical Context

The Convent of the Incarnation stands as a profound testament to the early establishment of the Conceptionist Order, situated in the heart of Mexico City (Figure 2). Originally, a modest monastery was erected in this vicinity by the late 16th century. The networks forged by the devoted women of the convent extended to the upper echelons of New Hispanic society, garnering support from influential public figures to provide financial backing for the convent's construction. The inaugural ceremonies took place in 1639, with the direct participation of the viceroy himself, the Marquis of Cadereyta, signifying an intimate connection to the seats of power. From then on, the institution assumed a pivotal role in the urban landscape, emerging as an emblem of prosperity, quantified by both the quantity and grandeur of its structures.

Up to the middle of the 18th century, the structure experienced substantial expansion, characterized by the successive acquisition of adjacent land parcels. Particularly intriguing are the properties formerly owned by Francisco de Oñate. In 1729, a transfer of these houses took place, with segments allocated to both the Convent and the Royal Customs House.[1] This reallocation was orchestrated with the explicit aim of facilitating the construction of distinct architectural entities for each establishment.

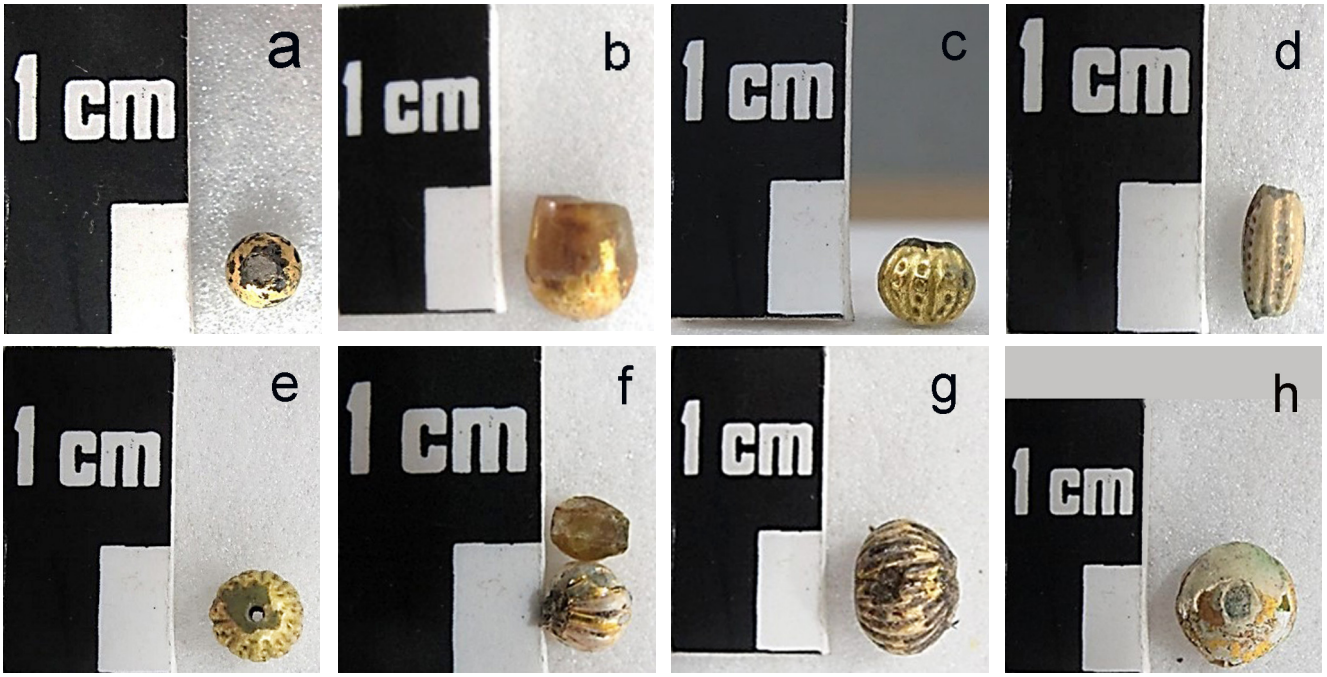

Figure 1. Gilded glass beads from Mexico City: a) spherical plain, b) oval plain, c) spherical, dot-and-groove, d-e) oval dot-and-groove, f-g) spherical grooved, h) rhomboid plain (all photos by the author unless otherwise specified).

Figure 2. Location of the Convent of the Incarnation. Detail from *Screen with Views of Mexico City*; unknown author, 2nd half of the 18th century (Franz Mayer Museum, Mexico City).

Nevertheless, between 1777 and 1779, a portion of the property had to be sold to accommodate the construction of the customs building in response to the escalating volume of trade in the city.[2] Despite spatial limitations, the convent retained a considerable size and continued to fulfill its original function until 1861, when the religious reformation plan mandated the evacuation of the premises. According to findings from on-site archaeological excavations, this transitional phase, extending until 1863, was characterized by the partitioning of specific sections, which were either sold to private individuals or repurposed for governmental use. Following the enactment of the law for the dissolution of religious orders, the building was definitively expropriated by the state, leveraging its potential as an exhibition hall, educational facilities, or lodging for financially disadvantaged students. Eventually, it was repurposed to house a library and the Ministry of Public Education (Salas Contreras 2005), signifying the culmination of its transformative journey.

The Gilded Bead Collection

Archaeological excavations led by Carlos Salas (1996, 1998) between 1989 and 1993 revealed 32 glass beads, 15 of which are gilded. These artifacts were found in two distinct contexts within the convent: a funerary setting in the church and debris from a nursery situated in the Jacaranda Courtyard, one of the former convent cloisters (Figure 3).

The initial section, known as the antechoir or *sala profundis*, is in the northern sector of the church. This room predates the choir and is accessed through an entrance adjacent to the southeast wall, with limited entry for convent residents. The underground chamber contained 86 primary burials and 31 secondary burials, one of them multiple. With the exception of four individuals (two children and two adult women), the rest were predominantly mature or elderly nuns, all of whom were laid to rest in the appropriate black habit attire (Salas Contreras 1996, 1998:147-152). This area was designated for the burial of convent residents who had succumbed to contagious diseases. Traditional burials did not take place within the private chapel of the garden, commonly used for such cases. The depth of this division and the careful isolation of burials with layers of lime minimized contagion risks, effectively isolating

Figure 3. Convent of the Incarnation indicating the *sala profundis* of the church (1) and the Jacaranda Courtyard, former cloister (2) (Google Earth).

the remains, and expediting decomposition. Despite this, significant details of their clothing were imprinted in the lime along with specific objects. Notably, individual 53 possessed two fragments of a single, oval, plain gilded glass bead without any other accompanying artifacts. This bead (CATSA 17350) has no correspondence with St. Catherines varieties. It is made of translucent glass of indeterminate color, and measures 4 mm in diameter and ca. 6 mm in length (Figure 1, b).

Unfortunately, there are limited details regarding the chronological position of this discovery. It is only noted that the burials date back to the colonial period. What we can affirm is that this burial was located in the northern section of the room, immediately adjacent to the choir. This area is where Carlos Salas (1998:144) reported the discovery of rosaries made of glass beads with gold-leaf decoration, although I was unable to locate them in the collections of the Archaeological Rescue Department. The *sala profundis* bead was uncovered within archaeological Layer 3, which corresponds to the initial grid of the *sala profundis* (C12). It is plausible that this layer corresponds to archaeological Layer 3 in the choir. In this area, Carlos Salas identified three burial layers. The first contains burials interred between 1812 and 1861, coinciding with the period between the conclusion of enhancements to the temple and the construction of the new cloister carried out by engineer Miguel Costanzó (1792-1812) and the Liberal Reform of the Church which marked the end of the use of the Convent by religious individuals. The second layer consists of material from the 18th century, while the third layer is composed of backfill containing fragments of materials associated with funeral rites, including tacks, rosaries, lace, and wood remnants. This layer is interpreted as resulting from the removal of lower deposits from the 17th century, intended to reorganize the subsurface of the choir and facilitate its continued use for more recent burials (Salas Contreras 1998:138-142). It is highly probable that this bead is from the same period, as there appears to be a seamless connection between the burials in the choir and those in the antechamber.

Most of the gilded specimens were found in the Jacaranda Courtyard, situated adjacent to the church and positioned between the residential area and the novices' courtyard. This location is next to the designated wash basin courtyard. An archaeological stratum containing various ceramic and glass artifacts was identified below the 18th-century floor in this area. Among the findings are several items associated with medical practices, including pots, plates, and bowls, some inscribed with the name "nursery." Carlos Salas (1998:82-84) interprets these objects as having stylistic elements that range from the 17th century to the latter half of the 18th century. He suggests they may have originated from a hospital or nursery dump dating to the 17th century. However, without additional information, the late 18th century should be considered as the upper limit for the 13 gilded glass beads uncovered there:

1) A spherical dot-and-groove bead (CATSA 23617 1/3), corresponding to Type 105 at St. Catherines, is made of translucent green glass and decorated with longitudinal grooves and alternating lines of dots. It is 5 mm in diameter and 6.5 mm in length (Figure 1, c).

2) An oval dot-and-groove bead (CATSA 23617 2/3), corresponding to Type 106 at St. Catherines, is made of translucent green glass and decorated like no. 1. It is 4 mm in diameter and 9 mm in length (Figure 1, d).

3) Oval dot-and-groove bead (CATSA 23617 3/3), corresponding to Type 104 at St. Catherines, is also made of translucent green glass and decorated as the previous specimens. It is 8 mm in diameter and 10 mm in length (Figure 1, e).

4) Seven spherical plain beads (CATSA 17369 1/5, CATSA 17369 2/5, CATSA 17369 3/5, CATSA 17369 4/5, CATSA 17369 5/5, CATSA 22874 1/2, CATSA 22874 2/2), corresponding to Type 98 at St. Catherines, are made of translucent green or yellow glass. They measure 5-6 mm in diameter and 4-7 mm in length (Figure 4).

5) A spherical grooved bead (CATSA 17376 1/2), Type 101 at St. Catherines, is made of translucent green glass and decorated with longitudinal grooves. It measures 6 mm in diameter and 5 mm in length. This specimen still retains part of the metal setting belonging to a strap (Figure1, f).

6) A spherical grooved bead (CATSA 17376 2/2) with no correlative at St. Catherines is made of translucent green glass and decorated with more than 15 longitudinal grooves. It is 11 mm in diameter and 8.5 mm in length (Figure 1, g).

7) A rhomboid plain bead (CATSA 23618) with no correlative at St. Catherines is a made of translucent glass of indeterminate color glass. It is 11 mm in diameter and 6 mm in length (Figure 1, h). This specimen still retains part of the metal setting belonging to a strap.

Unfortunately, compositional analysis of these beads has not been possible as yet, and accurately determining their chronology, which should range from 1639 to 1792, remains a challenge. According to assessments presented by Carlos Salas, the beads from the Jacaranda Courtyard are likely from the 17th century, aligning with the dating of the majority of previous documented gilded glass beads. Nevertheless, the specific reasoning behind this assertion remains to be clearly resolved.

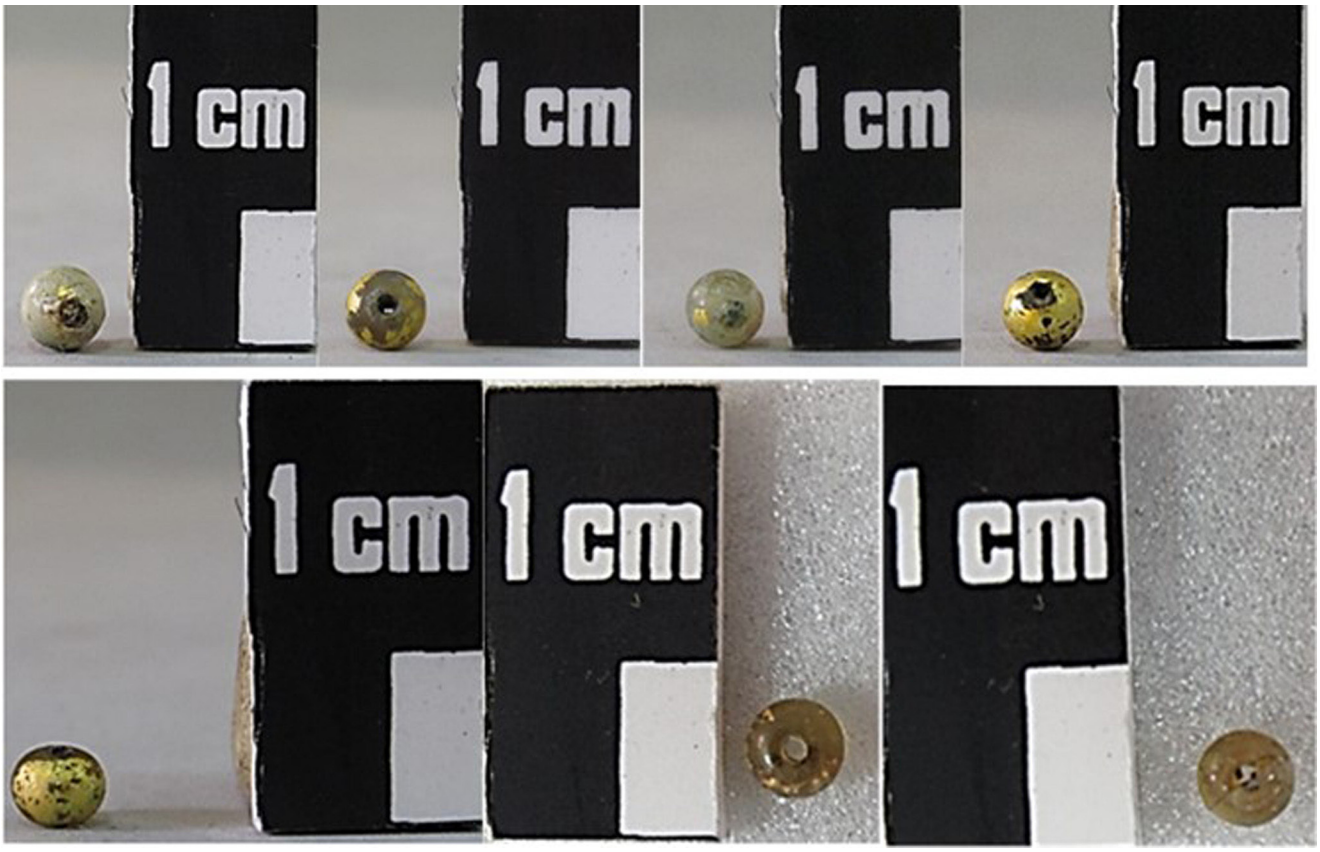

Figure 4. Spherical, plain, gilded glass beads from Mexico City.

EXPLORING POSSIBLE PLACES OF MANUFACTURE

As previously mentioned, the precise origin of gilded beads is still unknown, though most researchers suppose that they may have originated in Spain. This belief is supported by several factors. The primary argument rests on the fact that these beads are exclusively found in contexts associated with Spanish colonization and trade. This strongly suggests a connection between the production and circulation of these beads and artisans or traders within the Hispanic monarchy. However, it is important to delve deeper and clarify that this does not necessarily confirm their Peninsular or European origin.

Peter Francis (2009a:87) suggests a potential link to Andalusia, or possibly Catalonia and Castile (Blair 2016; Francis 2009b:181), where small-scale glass industries existed. Our current knowledge about glassmaking in Spain highlights the presence of significant glass factories in various cities across the provinces during the Early Modern Age, but the lampworking specialization remains relatively underexplored.

The place where unequivocal evidence for the presence of glassworking workshops has been found, and where they likely had a more significant presence, is precisely in Catalonia. The glass productions of Barcelona reached significant development and prestige in both local and international markets. However, outside of this city, the decline in importance of Catalan glass furnaces has been documented. According to Paloma Pastor (1998:12), by the 18th century, very few glassmakers still operated traditional furnaces, producing a variety of everyday glassware. Most of them worked "at the lamp," crafting beads and trinkets that were in high demand and provided greater profits. These artisans often purchased glass rods to shape with the heat of a lamp, but their suppliers remain unknown. It is uncertain whether larger workshops existed that could handle the different phases of production at scale. Josep Gudiol i Ricart (1935:90) suggests that the cylindrical beads found by Alfonso Macaya near the Church of San Pedro Pons in Corbera (Lleida) might represent traces of local manufacture. This idea is based on oral tradition which indicates the presence of an ancient glass furnace in the area, although this information has not been confirmed.

Additionally, I have recently identified the names of six lampworkers (*vidrieros del candil*) in Madrid who operated during the 17th century (Martins Torres 2021:71-75). One of them has familial connections with Barcelona and, having in mind the general guild's structure, with a tendency to keep the art within the family, passing down the knowledge from parents to children, this information hints at a potential influence of Catalan techniques on Madrid's lampworking practice.

Beyond Catalonia and Castile, the activity of lampworkers on the Iberian Peninsula remains largely unrecorded. In the absence of records identifying other specialists in regions with known significant glass production, who could have supplied them with glass rods in different colors, it is plausible to consider that this specialized craft was organized around small workshops. In the 18th century, there are well-documented attempts to establish a Royal Factory dedicated to glass bead production, which were considered a new industry at that time. However, despite the promoters being granted production privileges for six years, these efforts were not formalized.

The first initiative, led by Jacobo Schmitz, received authorization in 1770 to establish a "Factory of Beads, Trinkets, and Enamels of all kinds," in a location or locations of his convenience (Anonymous 1770:85-86).[3] The second initiative was carried out by Roque Ghiselli in 1774. He obtained permission to establish a "Factory of Beads, Glass Stones, and Crystals" in the city of San Lucas de Barrameda, a departure point for ships destined for the Americas (Anonymous 1774:81-82; Larruga 1788, I-3:191). While these endeavors could postdate the gilded beads under discussion, they underscore the fact that during the 17th century and until the end of the following century, there was no similar large-scale manufacturing in the European provinces of the Hispanic Kingdom. Instead, it is supposed that all local production occurred in workshops exclusively dedicated to lampworking tasks.

Rebecca Jacob (1998:172) proposes an alternative hypothesis, suggesting that gilded beads may not have been manufactured in Spain, but could potentially have been made in Mexico or South America. This proposition aligns with our current understanding of glass production in these regions.

In New Spain, there exists a well-established acknowledgment of a glass industry in Puebla. The earliest publications on this matter emerged precisely during the commemoration of Mexico's inaugural centennial of independence (Murillo 1922). These and investigations in subsequent years highlight the early origins of glass production in the region and underscored the exceptional nature of the Puebla case within the colonial American industrialization process (Murillo 1922). Recent works by Miguel Ángel Fernández (1990) and José Peralta Rodríguez (2013, 2018) provide valuable insights into glass production in Mexico City as well, suggesting it is likely that some of the earliest glass productions in the viceroyalty took place in Mexico (Martins Torres 2019: 232-236).

Beyond these main centers, other local initiatives have been identified (Martins Torres 2019:240-246). For instance, there are indications of production in Potosí, possibly linked to the manufacture of *cornamusas*, glass retorts used to sublimate certain metals. Curiously, these activities extended to indigenous settlements where the presence of Spaniards was prohibited. This is exemplified by the case of Benito de Espinosa, who is regarded as the first glassmaker active in the Americas, accused in 1576 of operating a glass furnace in Ameca (Jalisco).

Apart from glassworkers, extensive research in various Mexican and Spanish archives has also documented the presence of *candileros* (lampworkers) in New Spain from the 16th century onwards, with a concentration in Mexico City during the 18th century (Martins Torres 2019). Before 1618, only the names of three of these specialists are known (Table 1). The first identified lampworker in New Spain is Diego Balderas in 1561, mentioned in a document that linked him with a *dorador* (gilder) with whom he may have collaborated on enameled or gilded glass beads. A few years later, in 1595, Blas Hernández arrived in New Spain holding the title of master of lampworking. In that position he entered into an agreement to take on Ángelo Carlo as an apprentice. Carlo, a native of Genoa residing in Mexico, underwent a four-year training period, receiving 40 pesos of common gold annually, along with food and housing. The contract also stipulated that he might undertake journeys to Castile, if necessary.

This information sheds light on the processes of implementing and developing glassmaking in New Spain, involving the organization of artisans into specific branches, including lampworking. The career paths of Diego Balderas and Blas Hernández imply the informal transfer of production techniques and organizational models from various branches of glassmaking to the American colonies. This occurred independently of the legal framework that later regulated the industry through the establishment of guilds and the issuance of ordinances. By 1617, Blas Hernández's influential position allowed him to collaborate with glassmakers Francisco Prieto and Joan de Mora, to propose a regulation for the collection of *barrilla*, a key component in glassmaking.

During the 17th century, 12 lampworkers are known to have operated in Mexico City (Table 2). At least three of

Table 1. Glassworkers Identified in New Spain Until 1618 (Martins Torres 2019).

GLASSWORKERS	CASTE	ORIGIN (QUANTITY)	DESTINATION
Glassmakers	"Españoles" (Iberian Peninsula) - 20	Andalucía (2)	Puebla & Mexico
		Cataluña (1)	Mexico
		Galicia (1)	Mexico
		Extremadura (1)	?
		? (1)	Ameca (Guadalajara)
		? (1)	?
		? (1)	Ixmiquilpan (Hidalgo)
		? (12)	Mexico
	"Españoles" (from Italy)	? (2)	Mexico
	"Criollo" (Afro-American)	Veracruz (1)	Mexico
Lampworker	"Indio" (1545)	Puebla (1)	Puebla
	"Italiano" (1595)	Genova (1)	Mexico
	"Español" (1565, 1595)	? (2)	Mexico
Slave	"Negro"	? (2)	Mexico

them were involved in glass bead production: Francisco de Lara (1634), Diego García de la Gandara (1640), and Alonso Francisco Hidalgo (1640) (Martins Torres 2019). The exact appearance and techniques used in finishing and decorating their beads remain unknown. It is currently impossible to ascertain whether any of the mentioned artisans were involved in crafting gilded beads, and if so, whether they had access to gold or used alternative materials. Research conducted by Thompson et al. (2016) demonstrates that the 16th-century beads from the Mound Key site are gilded with bismuth and not gold. In contrast, the gilding materials of the 17th-century beads from St. Catherines include gold, iron-gold, copper-gold, and gold-copper-iron, while beads from Sapelo island are exclusively gilded with gold. The beads from the Old Mobile and Fusihatchee sites, dating to the late 17th and early 18th centuries, also incorporate bismuth, gold, and copper-gold, revealing the diversified nature of the gilding materials.

It is important to note that a common technique used to create a gilded appearance on glass beads in the 18th century without actual gold was described by the Creole scientist José Antonio Alzate (1785:7). He alludes to a practice of producing copper-colored glass beads for crafting rosaries intended for the natives:

> One cannot overlook a practice carried out by the "Candileros," that is to say, by the artisans who craft small glass pieces using a lamp. Those who work with glass in larger quantities in Mexico, through a well-considered practice, introduce blue color to the glass by mixing it with copper. The "Candileros" source this glass, and for crafting Rosary beads that possess the desired copper color, much sought after by the indigenous population, they subject the beads to the smoke or soot of the lamp. As a result, the copper mixed with the glass is revitalized. Indeed, any person not acquainted with true Chemistry would judge these beads to be made of copper. What does this prove? The revitalization of copper, through the influence of phlogiston in the fat. To this, add what was previously discussed about the revitalization of silver. The certainty remains that even the most skilled Mercury-User [referring to an alchemist] given copper metal will undoubtedly not be able to obtain even the smallest portion of copper metal. Let us apply this same principle to minerals or silver metals (translated and adapted by the author).[4]

This information is particularly interesting in light of the new data provided by pXRF analysis, which indicates the presence of copper-gold and gold-copper-iron gilded beads (Thompson et al. 2015).

Table 2. Lampworkers in Mexico City from 1618 to 1680, Highlighting the Three Bead Producers (Martins Torres 2019).

NAME	CASTE	DATES OF OPERATION
Pedro de Cárdenas	"Español"	1629-1640
Francisco de Lara	"Español"	1629
Riviera	?	1633-1640
Francisco Bezerra	?	1634
José de León	"Español"	1636
Diego García de la Gándara	?	1640
Alonso Franco Hidalgo	"Español"	1640
Juan de Espinosa	?	1640
Diego de Ruceta	?	1640
Diego Becerra	?	1642
Francisco de la Vega	?	1672
Tomas de León	?	1672
Francisco de Ugarte	?	1672
Agustín Baptista	?	1672
Antonio de Espinosa	?	1674
Francisco Duran	?	1680

Outside of New Spain, several papers highlight glassmaking at Ica, Peru (Ramos 1984, 1989; Soldi 2005), and Cochabamba, Bolivia (Morales 1978), but its significance within the Hispanic monarchy's glass industry had not gained much attention. Additionally, recent archival investigations have also identified glassmaking in Lima (Peru), Guambacho (Peru), Arica (Chile), Córdoba (Argentina), and intents to produce glass in the Jesuitic missions of Paraguay (Martins Torres 2019). However, there is no evidence of lampworking in these places.

THE SOCIAL CONTEXT OF BEAD FASHION

The first point of consideration revolves around the perception of glass beads as "Indian artifacts" in America since the colonial era. The chronicles of the Indies contain various accounts that illustrate how, in the early stages of Spanish presence, the extensive use of glass beads was closely linked to the practice of gift giving. For instance, in Bernal Díaz del Castillo's *True History of the Conquest of New Spain*, published in 1576, he recounts various episodes in which they were utilized. On one specific occasion, they were employed to prevent conflicts:

> ... when the indigenous people arrived with the ten canoes near our ships, responding to the peace signals we made and beckoning them with our hands, waving for them to come and speak to us, ...without any fear they came and boarded the flagship, over thirty of them, and we gave each of them a string of green beads... (translated and adapted by the author).[5]

The same author points out other instances where this was not feasible, and the act of gift giving was subsequently employed to satisfy the defeated and maintain peace over time:

> And to those two indigenous messengers, green beads and blue diamonds were given, and Aguilar spoke many sweet and flattering words to them, stating that we wanted to consider them as brothers, that they should not fear, and that the past war was their fault. He instructed them to call all the chieftains from different villages, as we wanted to converse with them. Many other things were gently advised to attract them to peace... (translated and adapted by the author).[6]

Beads also served as a form of currency for the ransom of captives. Bernal Díaz del Castillo dedicates a few lines to describe the history of Jerónimo de Aguilar and Gonzalo Guerrero, the only survivors of a shipwreck who lived for some time at Maya communities in the Yucatán. The author recounts how Hernán Cortés, upon receiving news of Spaniards near Cozumel, sent traders to deliver gifts and a letter requesting they join his group. Apparently, among the gifts were glass beads which Jerónimo de Aguilar used to pay for the use of a canoe and the services of rowers to meet the Spaniards:

> When the Spanish man who was in the custody of the Indigenous people received certain news that we had returned to Cozumel with the ships, he rejoiced greatly and thanked God. He hurried to come, along with the two Indigenous individuals who had carried the letters and the ransom, to embark in a canoe. And since he paid well with green bead ransoms that we sent, he found it rented out immediately, with six Indigenous rowers aboard (translated and adapted by the author).[7]

Simultaneously, beads were used to acquire various products, embodying the principle of barter prevalent between the natives. One of the most significant effects of these transactions was obtaining sustenance, as well as valuable objects such as gold. This is connected to the perception that the Spaniards deceived the local populations, convincing them to trade their gold for worthless trinkets.

> ... while we were preparing our ship, many indigenous people from the town of Tonalá, located a league away, came to us. As a gesture of peace, they brought maize bread, fish, and fruit, which they willingly offered to us. The captain bestowed them with many compliments and presented them with green beads and diamonds. He communicated through gestures that they should bring gold for trade, promising to provide them with items in exchange for our ransoms. They had hidden gold jewelry beneath, and they received beads in return for it. People from Coatzacoalcos and other nearby villages also came, bringing their own jewelry (translated by the author).[8]

Although the cited texts transport us to the initial years of European presence in America, this idea persisted throughout the entire viceregal period. It is evident in the expectations expressed through the distribution of glass beads to presidios and missions in New Spain during the 17th and 18th centuries, specifically intended for the local inhabitants. For instance, in 1692, Governor Don Domingo de Theran de los Ríos dispatched a shipment of beads to the San Francisco de Texas and Real de Santa Margarita de Buenavista missions, enabling Captain Gregorio de Salinas Varona to offer them as gifts to the native communities he faced.[9] Furthermore, as early as the 19th century, between 1806 and 1809, the Franciscan fathers overseeing the missions in Alta California requested various colors of glass beads as part of their supplies.[10]

This concept is also conveyed through iconography originating in New Spain and circulated throughout Europe, contributing to the dissemination of that image on both sides of the Atlantic. For instance, an engraving featured in the French edition of Antonio de Solis' *History of the Conquest of Mexico*, published in 1691 (Figure 5), and a painting depicting "natives of distant communities" from a series of *casta* paintings by Miguel Cabrera, created in 1763 (Figure 6), provide concrete examples. These visual representations not only display their bodies adorned with feathers and beadwork but also serve as a manifestation of the establishment of indigenous uniqueness from the European perspective. The incorporation of such material elements in the cultural depictions of the most isolated individuals within the viceroyalty reinforced the perception of native populations as exotic and distinct, further perpetuating the concept of their "otherness" in the domination context. This artistic portrayal becomes a tangible reflection of the cultural and social dynamics during that time, emphasizing the European concept of the native populations of the Americas.

Figure 5. Indigenous people illustrated in the *History of the Conquest of Mexico* (Antonio de Solís 1691; Bibliothèque pnationale de France, ark:/12148/btv1b23000099).

Figure 6. *Indios Gentiles*, Miguel Cabrera, 1763 (Museum of the Americas, Madrid).

Curiously, these objects are present in the collections of national museums in Spain, encompassing historical-ethnographic items spanning the Modern Era to the present (Martins Torres 2021), with only a few objects dating back to 1700. Primarily comprising rosaries and necklaces from the period between 1650 and 1750, various anthropologists (Cavero and Alonso 2002) and art historians (Herradón 2005; Piñel Sánchez 1998) have interpreted these pieces as examples of popular jewelry used in rural environments. This stands in contrast to the notion of refined and courtly jewels more commonly associated with higher social groups living in the urban areas. In some cases, they have been linked to non-canonical forms of Catholic religion and the warding off of specific types of illness. In a way, they were ideologically associated with the construction of an "otherness" in European geography that drew parallels between the lower strata of the population on both sides of the Atlantic. However, the use of glass in adornment accessories was not limited to the lower strata of the population of the Iberian Peninsula. From the late 17th century onwards, there was a growing fondness for cut-glass jewelry among the ladies of the court. This went against successive decrees aimed at prohibiting the use of imitation gemstones. This practice was still uncommon in Europe and drew admiration from outsiders, such as the Frenchwoman Marie Catherine D'Aulnoy, who visited Spain in 1679 and was surprised by the fact that:

> ... they are charmed by fake stones; despite having so many fine and beautiful ones, they don't refrain from wearing the bad ones, which are nothing more than roughly carved glass pieces, completely similar to the ones peddlers sell to our countrywomen... (translated by the author).[11]

Her words carry a dismissive judgment that is detached from the socio-cultural context she observed and clearly indicate that this trend did not emerge in Spain as a more economical option at the end of the 17th century. Those who wore glass adornments weren't lacking the means to acquire other jewelry made from precious materials; instead, they used them as an alternative. This also suggests that artistic quality was not solely tied to material value, but rather the highly regarded technical skill of lapidaries (who worked with gemstones and glass) or jewelers (who, unlike goldsmiths, were restricted from selling precious materials and engaged in trade with glass beads, among other items), as well as its aesthetic impact.

This information challenges the prevailing belief that glass adornments were solely associated with individuals from lower socioeconomic backgrounds in Europe, but also in the Americas. In New Spain, both Peninsular and Creole elites strove to imitate European fashion trends, albeit with adaptations tailored to local sensibilities. As a result, a plethora of courtly attire, liturgical textiles, and household linens decorated with beadwork provide insights into the manifold social strata that glass beads traversed. Their circulation extended beyond the boundaries of subordinated people and encompassed individuals from native groups and people of African descent.

The ideas expressed so far demonstrate that the use of glass beads throughout the colonial period was quite widespread among the entire population, regardless of their economic capacity or social status. This prompts us to weigh the likelihood that certain glass beads unearthed in diverse archaeological settings in New Spain may not necessarily have belonged to individuals of modest financial means or from social backgrounds of Native American or African-American origin. Building upon this foundation, significant avenues of research are designed to be explored concerning the gilded glass beads from the Convent of the Incarnation. Notably, whether disparities existed in the types of beads favored by distinct social collectives, potentially linked to their preferences, purchasing power, access to production centers, distribution and sales networks, or even other forms of symbolic considerations.

Regarding the socio-economic context, it is important to emphasize that although the convent aimed to gather nuns from the elite of New Spain, not all were considered equal. Their status was determined by their ability to pay the dowry, which was among the highest in New Spain at that time.[12] The convent also accommodated secular women, both free and enslaved, who provided their services to that institution or even to a particular resident.[13] Their lives were shaped by the architecture of the building and the rules set by the Conceptionist Order. These factors, coupled with each individual's status within the institution, determined the spaces they could circulate in and even influenced the appearance of their bodies.

In the church, a single example of an oval, plain gilded glass bead was found in a funerary context in the antechoir. This area was reserved for the elite members of the convent population, particularly those who suffered from contagious illnesses. The customary funerary practice for these nuns in black habits, which culminate their religious profession, involved dressing them in garments worn during the ceremony of their vows. Archaeological records indicate that this attire included a habit, apron, cap, and veil. Notably, the veil of the burial features intricate lace remnants made from copper and maguey fibers, reflecting the solemnity of the occasion (Salas Contreras 2005). Fragments of a crown and a branch near the arm were also unearthed. Crafted from metal wire, some coated with silver, these complements were adorned with flowers, whether natural or made of paper. Additionally, a medallion or shield often graced the chest, with one instance revealing beadwork impressions in a plaster fragment, suggesting that the shield had been bead-embroidered. Furthermore, a bead rosary was frequently draped over the left shoulder.

While the only depictions of the nuns from the Convent of the Incarnation in their final moments (Figure 7) suggest that some rosaries used towards the end of the 18th century featured gilded beads, older portraits from other convents depict nuns wearing beads similar to the oval plain gilded glass bead found in the church (Figure 8). This resemblance, along with the deposition context, strongly indicates that the bead with the burial may have been part of a rosary belonging to a nun in a black habit, signifying her high status within New Hispanic society.

The significant concentration of these materials in a debris area abundant with nursery-related items leads to the hypothesis that the beads likely played a role in contexts connected to illness and healing rituals. They could have been incorporated into rosaries or amulets used by nuns, their attendants, or individuals who frequented the convent, to beseech divine intervention for healing or to commend the soul as death approached.

Concerning amulets, it is worth noting that their use was not entirely condemned by the Church, and in some instances, they are associated with divine imagery or medicine. On the other hand, while apparent orthodoxy prevailed within the convent, the influence of Indigenous women from various American ethnicities and African and Asian backgrounds might have led to behaviors considered divergent and cultural exchanges between these groups, similar to occurrences outside the convent. Hence, it is not difficult to imagine that women continued to utilize their protective objects or traditional remedies, and that some nuns sought out formulas from other women to heal the body or satisfy their ambitions. All these circumstances make it difficult to define the social profile of the user of these beads. There is compelling evidence suggesting that religious women from the upper echelons of Creole society occasionally used these beads. However, it is also important to consider the possibility that they were employed by other individuals. This becomes particularly pertinent if future research reveals that the gilded beads had a higher price compared to other glass beads. This argument has been used to suggest that the glass beads gilded with gold, of higher value, were initially intended for the use of the ecclesiastics and that, when they broke, they may have been repurposed by Indigenous people at North American missions (Francis

Figure 7. Portrait of Prudencia, a professed nun of the Convent of the Incarnation in Mexico, deceased in 1781. Copy made by Andrés Lopez in 1872 (New York State Office of Parks, Recreation and Historic Preservation).

Figure 8. "Sister Elvira of Saint Joseph, Religious of Santa Ines, twice Prioress. Died on 6 May 1711, aged 74 years, 4 months, and 4 days, and a nun for 5 months and 18 days" (Museo Nacional del Virreinato, http://mediateca.inah.gob.mx/repositorio/islandora/object/pintura%3A2586).

2009a: 88). However, as previously demonstrated (Martins Torres 2016:115), even those from the lower ranks of New Hispanic society substantially invested in acquiring jewelry with significant symbolic value and a high cost. Thus, this argument inherently lacks sufficiency as a criterion.

In the mentioned circumstances, the relationship between this small consumer community and its preference for gilded beads, along with the community of artisans producing them, should be investigated. This exploration could shed light on potential social connections as well as shared economic and political interests associated with beadmaking and trade. The consumption of glass beads made in New Spain by members of the Spanish elite with strong roots in the land could have served as a distinctive marker through which they could differentiate themselves from recently arrived Peninsular Spaniards. In doing so, they would also be demonstrating their support for the development of local industries and the colonial economy. This trend would become more pronounced from the mid-18th century onward with the emergence of a discourse on Creole identity, which laid the foundation for 19th-century independence movements.

CONCLUSION

The presented data allow us to assert that the gilded glass beads were used by Creole women in New Spain, as well as by individuals from original ethnic groups, mainly during the 17th century and probably also during the following century. Their production most likely took place within the New Hispanic context, where several lampworkers operated, particularly in Mexico City. These workshops would have been small establishments where the craft was passed down from parents to children or where apprenticeship contracts were established to facilitate the learning of the specialty.

Generally, glassworker guilds excluded the participation of women, although widows were permitted to assume their late husbands' positions without examination, indicating their possession of the necessary knowledge to carry out the tasks. Similarly, regulations excluded castes (including natives, Africans, and Afro-Americans) from the higher echelons of the guild hierarchy to favor Spanish control of the sector. However, it has been proven that this was not always the case. It is conceivable that certain workshops combined lampworking tasks with the production of glass rods, as some artisans held the title of glassworker as well. It is also possible that a division of labor existed within these smaller workshops with the gilding being performed by a person other than the one who created and decorated the bead. The insights provided by Alzate's data indicate the existence of various lampworking workshops producing gilded beads in the 18th century. All these workshops formed a small community from which a new type of bead emerged at that time and place. Their use by the highest social strata of the Convent of the Incarnation indicates that the nuns supported this local manufacture through their consumption practices and taste preferences

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ENDNOTES

1. Archivo General de la Nación [AGN], México, Bienes Naciones, vol. 18, exp. 8, 1729.

2. AGN, Tierras, container 946, vol. 2238, exp. 7, 1777-1778; AGN, Obras Públicas, container 17, vol. 41, exp. 1, 1778; AGN, Reales Decretos Originales, vol. 116, exp. 228, 1779.

3. Archivo Histórico Nacional, Spain, Consejos, Book 1521, Nº 25, 1770.

4. "No se puede dejar pasar en silencio una práctica acostumbrada por los Candileros, quiero decir, por los Artesanos que fabrican por medio del candil pequeñas piezas de vidrio: Los que trabajan vidrios por mayor en México por una práctica muy bien pensada, dán color azul al vidrio por mezcla de cobre; los Candileros se surten de él; y para construir cuentas de Rosarios, que tengan el color de cobre, color muy apetecido por los Indios, después de fabricadas las cuentas, las exponen al humo ú ollín del candil; entonces el cobre mezclado al vidrio se revivifica; y es cierto que qualesquiera persona que ignore la verdadera Química, juzgará aquellas cuentas por de cobre: ¿qué prueba esto? La revivificación del cobre, en virtud del flogistico de la grasa: añadase esto á lo expuesto sobre la revivificación de la plata; lo seguro es, que si al mas hábil Azoguero se le entrega el metal de cobre, seguro es no conseguirá la mas pequeña porción de metal de cobre: apliquemos esto mismo respecto á los minerales ó metales de plata" (Alzate 1785:7).

5. "... llegados los yndios con las diez canoas çerca de n[uest]ros nauios, con señas de pas que les hizimos y llamandoles con las manos y capeando para q[ue] nos viniesen a hablar, ... sin temor ninguno vinieron y entraron en la nao capitana sobre treynta dellos y les dimos a casa vno vn sartalejo de quentas verdes ..." (Díaz del Castillo 1904 I-2:11).

6. "E aquellos dos yndios mensageros se les dio cuentas verdes E diamantes azules, y les dixo Aguilar muchas palabras bien sabrosas y de alagos, y que les q[ue] remos tener por hermanos, y que no oviesen miedo, y que lo pasado de aquella guerra q[ue] Ellos tenian la culpa, y que llamasen a todos los Caçiques de todos los pueblos q[ue] les queremos hablar y se les amonesto otras muchas Cosas bien mansamente para atraellos de paz" (Díaz del Castillo 1904 I-35:95).

7. "Quando tuvo notiçia çierta El español questava En poder de yndios que aviamos buelto A coçumel Con los navios, se alegro En grande manera y dio graçias a dios y mucha priesa En se venir El y los dos yndios que llevaron las cartas y rrescate A se embarcar En vna canoa, y como la pago bien En quentas verdes del rrescate que le enbiamos, luego la hallo alquilada con seys yndios rremeros con ella" (Díaz del Castillo 1904 I-28:78).

8. "... y estando adereçando n[uest]ro nauio vinieron muchos yndios del pueblo de tonala, questa vna legua de alli y muy de paz truxeron pan de maiz, y pescado, y fruta, y con buena voluntad nos lo dieron, y el capitan les hizo muchos alagos y les mando dar quentas verdes y diamantes y les dixo por señas que truxesen oro a rrescatar y que les daria de n[uest]ro rrescate, y trayan joyas de oro baxo, y les dauan quentas por Ello y tanbien vinieron los de guaçacalco y de otros pueblos comarcanos y truxeron sus joyezuelos" (Díaz del Castillo 1904 I-16:46).

9. Biblioteca Nacional de México, Manuscritos, Nº Sistema 000604373, "Recibo por armas, pólvora, ropa, avalorios y otros géneros entregados a las misiones" (Receipt for weapons, gunpowder, clothing, glass beads, and other goods delivered to the missions), f. 187v-188r.

10. AGN, Archivo Histórico de Hacienda, vol. 283, exp. 23. AGN, Archivo Histórico de Hacienda, vol. 283, exp. 45.

11. "... las piedras falsas les encantan; ellas, que poseen tantas finas y que son tan bellas, no dejan de llevar otras malas, que no son más que pedazos de vidrio labrados toscamente, enteramente semejantes a los que los vendedores ambulantes venden a nuestras provincianas ..." (D'Aulnoy 1986:346).

12. According to historical records, since the late 17th and early 18th centuries, it cost 3,000 pesos (AGN, Bienes Nacionales, vol. 128, exp. 37, 1691).

13. In 1663, the nun Ana de San José Neli requested a servant due to being ill (AGN, Indiferente Virreinal, vol. 2885, exp. 7, 1663), and in 1600, the abbess

Luisa de Encarnación requested six free indigenous or mulatta women on behalf of the congregation (AGN, Bienes Nacionales, vol. 78, exp. 39, 1600).

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