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Glass Beads and Global Itineraries

Elliot H. Blair

In this chapter, I explore what Joyce (2012a, 2012b, chapter 2, this volume; Joyce and Gillespie, chapter 1, this volume) terms the "object itinerary." As opposed to the "object biography" (Gosden and Marshall 1999; Kopytoff 1986), which metaphorically affirms an object's birth and death in a strictly linear progression of a life history, the object itinerary emphasizes the motion and interaction, the fragmentation and accumulation, of objects moving through space and time. The object itinerary, by focusing attention on "things as historicized traces of practices" (Joyce 2012b), highlights the social relationships and spatiality that link people, objects, and places through history.

Glass beads have long been acknowledged as important objects involved in the mediation of colonial relationships in the Americas. Beginning with Columbus's first landing, beads were widely distributed both as gifts and as trade items (Kelly 1992). They are commonly recovered on colonial archaeological sites and are widely regarded as sensitive temporal markers (Marcoux 2012; Rumrill 1991; M. Smith 1987). Yet, despite the understanding that colonial glass beads moved in "endless cycles" and "ceaseless itineraries" (Trivellato 1998:65), many analyses to date have illuminated only two points in the beads' life histories: their place of manufacture and their "final," that is, archaeological, site of deposition.

Lori Pendleton of the American Museum of Natural History, the late

Peter Francis from the Center for Bead Research, and I examined and reported on the bead assemblage excavated from Mission Santa Catalina de Guale, a Spanish mission located on St. Catherines Island, a barrier island just off the coast of Georgia (Blair, Pendleton, and Francis 2009). In that work, we attempted to examine the Mission Santa Catalina beads from "an overarching, global perspective," exploring the diverse origins of these objects, speculating on mechanisms of distribution and consumption, and presenting detailed analyses of their archaeological proveniences. Pendleton and Francis (2009:3–4) wrote, "Beads do not exist outside human experience and cannot be understood appropriately without an understanding of the history and behavior of the people involved in making, trading, using, and ultimately disposing of them."

The itinerary of an object can be productively contrasted with its route and its more biographical life history. The latter derive from a network approach, the linkage of points or nodes, rather than the linked and intersecting messy loci of things and people and places in motion. The distinction between route and itinerary is drawn from Tim Ingold's (2007b, 2009) differentiation between transport and wayfaring, or networks and meshworks. He argued that a "network," characterized by a linked set of nodes or points, is a sterile metaphor that emphasizes static connections. Alternatively, he proposed the "meshwork": rather than connected edges and nodes, there are tangled knots and paths. "It is in the binding together of lines, not in the connecting of points, that the mesh is constituted" (Ingold 2009:38). Particularly important for connecting the meshwork with the concept of object itinerary is the idea that places are best conceptualized as knots rather than points. Places are then understood as interwoven intersections of lines and action, not places of rest. This highlights that even when objects are in place, they are never static (even when they literally are) because they are continually entwined with people and places.

Carl Knappett (2011a, 2011b) also contrasted the network with the meshwork. Rather than promote either one as a superior metaphor and topology, he instead suggested that each operates at different scales. He argued that the meshwork is a particularly conducive topology for examining the micro-scalar movement of things. As he noted, zooming out and employing a network topology, although certainly useful, turns places into points in a way that "does not capture things in flux" (Knappett 2011b:47). For the object itinerary, the flux and flow of materials is entirely the point, however, and the micro-scalar focus of the meshwork is precisely the topology that enables us to examine the "detailed unfolding of activities, that is ultimately deeply empirical and against generalities" (Knappett 2011b:46).

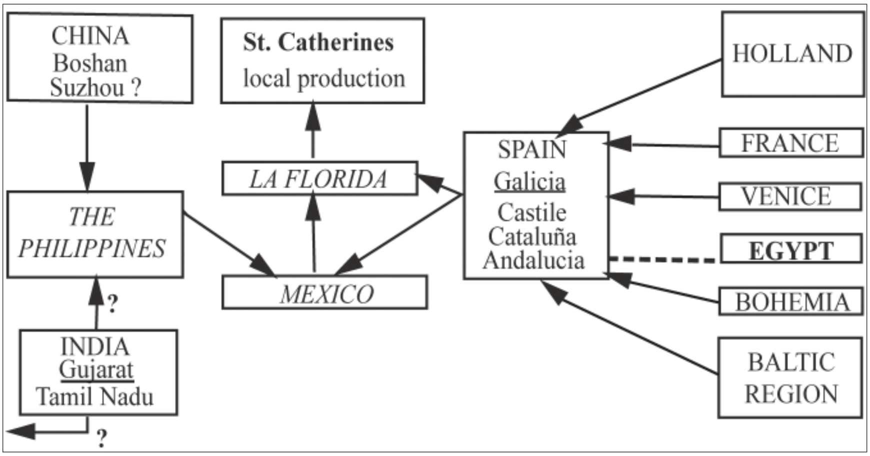

Figure 5.1
Schematic diagram depicting the bead trade to Mission Santa Catalina de Guale. Places that are underlined furnished beads made from materials other than glass. Places in italics are transshipment locales; they did not furnish beads. Egypt (boldface) *and the dotted line to Andalucia indicate a transfer of beadmaking technique rather than a shipment of beads. Drawing based on Blair, Pendleton, and Francis 2009:fig. 5.1, reproduced by permission of the American Museum of Natural History, Division of Anthropology.*

Figure 5.1 is a schematic diagram depicting the bead trade to Mission Santa Catalina (Blair, Pendleton, and Francis 2009:54). Heuristically useful for exploring the routes of beads to Mission Santa Catalina, such a diagram is also an excellent example of the network approach that Ingold rejected. In this diagram, beads appear to be transported across pathways from a nodal “place-in-a-box” to another nodal “place-in-a-box.” What if we reconsider these boxes as knots in a meshwork, as places where people do things with and to beads, and examine how the beads recovered at Mission Santa Catalina circulated through and within places that are tangled knots of interaction? Knappett (2011b) argued that few methodologies have been proposed to actually *do* a micro-scalar meshwork analysis in which artifacts are followed and their flux and flow, both within and between places, is examined. I suggest that explorations of “communities of practice” (following Lave and Wenger 1991) provide a method to break open a node, or unravel a place-in-a-box, and follow objects along their itinerary through the meshwork.

Like Roddick (2009, chapter 7, this volume) I see the concept of a community of practice as a fruitful way to explore the entanglement of people, places, and social actions. I suggest that it is multiple, overlapping communities of practice that we are tracing as we attempt to untangle the knots of the meshwork; the community of practice is what constitutes the relationships and motion between people and things emplaced in the knots of the meshwork. In other words, rather than connecting points, the meshwork can be envisioned as interweaving multiple communities of practice.

The community of practice is one of three interrelated concepts (with "legitimate peripheral participation" and "situated learning") developed as part of Lave and Wenger's (1991) theory of social learning. Together, the three concepts emphasize a process of learning in which "newcomers," through active social participation with "old-timers" and one another, "move towards full participation in the sociocultural practices of a community" (Lave and Wenger 1991:29). Wenger (1998:4–5, 72–73) emphasized that this process of learning links practice, meaning, identity, and community through mutual engagement, joint enterprise, and a shared repertoire. This is a direct connection between social action and the material world, one that is particularly important archaeologically as we trace things through their itineraries of both production and consumption.

Mission Santa Catalina de Guale, a seventeenth-century Spanish mission located on St. Catherines Island, Georgia, has provided a unique opportunity to study the circulation of colonial beads along their entire itineraries. For most of the seventeenth century, Mission Santa Catalina was the main *doctrina* and the provincial capital of Guale, one of several mission provinces located in La Florida (D. Thomas 1987, 1988, 1990). The bead assemblage recovered from this site was truly extraordinary, numbering almost 70,000 specimens and including many unique and unusual varieties manufactured at locations across the globe. In our study of this collection, we chose to highlight the diverse origins of the beads, identifying specimens manufactured in Venice, France, Spain, Bohemia, the Baltic region, India, and China and by the Native residents of Mission Santa Catalina. We also focused on the final site of deposition, their archaeological provenience, which was primarily the mission cemetery located beneath the floor of the church, considering the assemblages found with individual burials. Here, I focus on the itineraries of beads manufactured in Murano and Venice by highlighting the multiple communities of practice formed along all the stages of manufacturing, distribution, and consumption.

THE MANUFACTURE OF GLASS: THE WORK OF THE ARTE DE VERIERE

The glass for manufacturing Venetian beads was formed by the glassmaker's guild in Murano, the Arte de Veriere. The first step was to obtain and process the "raw" materials of glassmaking; Murano had to import all of these. Leaving aside the necessity of obtaining wood for the fires, clay for the crucibles, and materials for furnace construction (Jacoby 1993; McCray 1997), the manufacture of glass requires several critical ingredients: silica, a fluxing agent, colorants, decolorants, and opacifiers (McCray 1999b). In Murano, the primary source of silica for glassmaking during the sixteenth and seventeenth centuries was not sand, but quartz cobbles (*cogoli*) usually obtained from the Ticino River near Milan. The cobbles were crushed, ground, and sieved until they became a fine powder (Neri 2003[1612]). Chemical analyses by McCray (1999b:197n13) have shown that these cobbles were very nearly pure silica, lacking almost any impurities. Local Mediterranean beach sands may have also been used in limited quantities (Jacoby 1993).

The second essential material needed for glassmaking is a fluxing agent, used to reduce the melting temperature of the silica. In Murano during the sixteenth and seventeenth centuries, this was a soda flux imported from the Levant and composed of plant ashes made from the burning of *Salsola kali* and *Salsola soda* (glasswort, saltwort, or barilla plant). After the ash arrived in Murano (usually as ballast on ships transporting other, lighter goods), it was purified (see Neri 2003[1612]), resulting in a fluxing agent higher in soda and lower in calcium, magnesium, and aluminum than the raw ashes (McCray 1996:358, table 8.2; 1999b:116–117, table 5.1). Both of these processes—the powdering and sieving of cobbles and the production and purification of soda—can be detected through compositional analysis due to the lack of trace elements in the final glass product. After the silica and flux were prepared, these materials were mixed into a batch and heated in a low-temperature fritting furnace. The solid frit could then be broken apart and stored for use at a later time.

To then turn the frit into glass, an individual known as the *conciatore* would mix it with cullet (broken scrap glass that aids in melting the batch) and place the crucible into the primary furnace, stirring and adding colorants, decolorants, and opacifiers as he saw fit. Although specific, detailed glass recipe books exist from the sixteenth and seventeenth centuries (e.g., Neri 2003[1612]; Toninato and Moretti 1992; Zecchin 1986), the actual making of the glass was a process primarily guided by experience and expertise. McCray (1999b:156) argued, "There were many aspects of the craft which [were] not recorded succinctly in words and which were instead passed on through the apprentice system, trial and error, and shop practice. Glass making was primarily an empirically centered skill gained… from experience" (see also McCray 1999a).

This description of glassmaking indicates what McCray (1999a) called a "network of skill," a community of practice, "an integral part of generative social practice in the lived-in world" that bridges cognitive and embodied actions (Lave and Wenger 1991:35, 52). Because there is patterning to the physical traces left in the glass by these intersecting communities of practice, including those producing the raw materials and those forming the glass itself, chemical analysis can reveal both broad regional differences in glassmaking traditions and variations within regions determined by the specific choices made by individual glassmakers and glass houses.

THE MANUFACTURE OF BEADS

After the glass was made, the next step in the process was the glassmaker transforming the raw glass into a form that could be turned into beads. In Venice, the two primary bead-manufacturing techniques, wound and drawn, required solid and hollow glass canes, respectively. For a hollow cane, a gather of glass was heated, an opening was formed, and then two workers walking in opposite directions stretched the glass into a long, hollow tube. This was allowed to cool, and then the cane was broken into meter lengths (Anonymous 1835; Carroll 2004; Francis 1988; Karklins and Adams 1990; Karklins and Jordan 1990). These lengths were then transferred to bead makers for finishing, often outside the glass factories and in Venice rather than Murano (Trivellato 1998).

After the glass tubes were transferred to bead-making factories or the homes of individual bead makers, the manufacturing process consisted of cutting the glass cane into short segments, which were then (usually) rounded, possibly decorated, and finally polished, sorted, and strung (Karklins and Adams 1990). Variations in each of these stages can be observed through careful analysis of individual beads and bead assemblages. Indeed, there are different ways of doing each of these steps, and patterns in how each technological process was completed reveal much about the network or place where the task was completed.

The step of cutting the glass canes into small segments is depicted in a seventeenth-century painting of a Dutch bead factory by Jacob van Loo (Karklins 1993:fig. 1). One individual in this painting is shown cutting glass canes into short bead lengths. This process can leave characteristic imperfections on the beads, specifically, angles on one or both ends of the cut tube (Francis 2002:25–26). Though Francis (Blair, Pendleton, and Francis 2009:62) argued that such variation is "completely random," I suggest that the variation is likely directly related to how the individual cutting the canes habitually held and manipulated the glass cane and the cutting implement and that these habits were patterned and shared by a particular bead-making community of practice, where apprentice bead makers learned from a master the proper way to hold and cut glass tubes (see Minar 2001, which discusses linking a community of practice with habitual bodily motion). Indeed, with the right sample size and context, detailed morphometric analysis of this type of variation combined with chemical analysis might even be able to distinguish virtually identical beads composed of glass made in one glass factory but formed into beads in different workshops, which would be evidence of overlapping communities of practices operating at different points in the object's itinerary.

After the glass tubes were cut into lengths, the short segments were most often rounded into finished beads. How this was done was determined by the bead-making guild to which the master bead maker belonged. The first glass bead-making guild in Venice was the Arte dei Margareteri, which was organized in 1308 and primarily manufactured furnace wound beads. In 1486 a second branch of the guild was established, and together they were officially known as the Arte dei Paternostri e Margareteri, though by 1604 the two branches were more or less separate, governed by separate laws and councils and possessing separate banks (Francis 1988; Karklins 1993). Francis (1979b, 1988:13) convincingly argued that the initial organization of the Paternostri guild was due to the invention of drawn bead making, with the Margareteri branch of the guild producing smaller, plainer drawn beads after this time and the Paternostri branch manufacturing larger, fancier drawn beads to be used as paternosters for rosaries. This explanation seems likely because shortly after this change a new lamp-working, bead-making guild was created, the Arte dei Perlei e Suppialume, which replaced the Margareteri as the makers of wound beads. This guild was first recognized in 1528 but not organized as a distinct guild until 1647 (Francis 1988; Gasparetto 1958; Trivellato 1998, 2006).

The split between the two drawn bead-making guilds in 1604 was likely due to the invention of a new bead-finishing technique employed by the Paternostri. At this time the bead makers of the Margareteri guild finished beads by the *a ferrazza* method, heat rounding small beads in a copper pan. In contrast, from at least the early seventeenth century, the Paternostri guild finished beads *a speo* (by the spit) (Gasparetto 1958; Karklins 1993; Neri 2004[1612]). In this method, the cut glass segments are threaded on a multipronged spit and then rotated in a furnace until rounded. This process is also depicted in the van Loo painting (Karklins 1993:fig. 1), where examples of such spits can be seen threaded with finished beads and unfinished glass segments. What is interesting and significant about this method is that the *a speo* process often leaves characteristic imperfections on the beads, usually in the form of small tails and other irregularities (Karklins 1993). These imperfections enable beads made by the Paternostri guild to be readily identified, whereas beads manufactured *a ferrazza* by the Margareteri guild are generally smaller and lack the diagnostic deformities characteristic of the *a speo* method. Additionally, Neri (2004[1612]:27) noted that glassmakers altered their recipes depending on whether they were manufacturing larger (*a speo* finished) or smaller (*a ferrazza* finished) beads, indicating that both chemical and morphological bead characteristics can be utilized to distinguish the products of the two bead-manufacturing guilds.

Karklins (1993) identified different varieties of these *a speo* imperfections. Perhaps more careful bead analysis, paying attention to the detailed characteristics of these imperfections, would enable us to identify communities of bead makers that held and manipulated the spit in characteristic, patterned ways. In the Mission Santa Catalina assemblage, this type of analysis, combined with elemental characterizations of glasses and historical documentation for the emigration of bead makers from the Paternostri guild, led Francis (Blair, Pendleton, and Francis 2009:chapter 8) to hypothesize that a large number of beads found at the site were made by expatriate Venetian bead-making members of the Paternostri guild working in France.

After the beads were rounded by the *a ferrazza* or *a speo* methods, they were sorted by size, polished, and strung into uniform, single-type strands by female bead stringers (Karklins and Adams 1990; Ninni and Segatti 1991; Trivellato 1998). In addition to being transported as strands, beads were sometimes shipped loose in boxes or barrels (e.g., Bruseth and Turner 2005:87).

This specific order of operations has important implications because, presumably, glass canes would be delivered to the bead factories in batches from individual glass houses. The bead makers would then process the canes into beads utilizing the finishing technique of their respective guilds, and the bead stringers would then string beads from a common glass batch and finishing technique into lengths for distribution and sale. The chemical and morphological characteristics of those beads composing a “finished” bead strand would therefore index only a single bead factory and (probably) a single glass factory. Therefore, sets of beads continuing their itineraries, not just individual beads, would collectively index specific manufacturing communities.

THE DISTRIBUTION OF BEADS

Beads made their way into the Americas along different itineraries. There has been much discussion of goods entering La Florida through unsanctioned channels as foreign corsairs traded illicitly with the inhabitants of the region (Bushnell 1981; Deagan 1987; Skowronek 1992), but many of the beads also arrived through the officially permitted avenues. For Venetian beads, "sales were controlled by the same guilds which produced them," and the women responsible for stringing the beads were also likely those responsible for selling the beads to Venetian shopkeepers, who subsequently sold them to other merchants (Trivellato 1998:64–65). The beads then traveled by ship to Seville, where, most often, Genoese merchants and middlemen (Pike 1966) were involved in procuring them, registering them in Seville with the Casa de la Contratación de las Indias, and sending them to the Americas as part of the Carrera de Indias, the official Spanish convoy of trade goods (Deagan 2002; Kelly 1992; Torre Revello 1943).

During the seventeenth century, these convoys rarely stopped in St. Augustine, on the eastern coast of northern Florida, or in the Caribbean, making it difficult for Florida residents to obtain European goods. Besides the aforementioned illicit trade occurring in the region, the primary route for beads and other goods into Spanish Florida was through the *situado*, or subsidy. Most often, these goods were delivered elsewhere, rather than to St. Augustine. To retrieve the goods, the governor of Florida would appoint a *situador*, who was responsible for collecting the situado. As described by Bushnell (1981:71–74), this individual would give a bond and receive his instructions and power of attorney from the governor before being issued a boat and crew. The situador would then travel by boat to San Juan de Ulúa in Veracruz and then by road to Mexico City. After collecting the situado, he would return with the goods to St. Augustine, possibly by way of Havana, which would have provided an opportunity to obtain other European goods and Asian items brought by galleons involved in the Manila trade. Once back in St. Augustine, the goods were distributed from the official warehouse.

Distribution to the Mission

After the beads arrived in Florida and the official St. Augustine warehouse, how did they end up in the hands of the Native people at Mission Santa Catalina? At Mission Santa Catalina and other mission sites, beads moved from the hands of Europeans into Native possession in a number of ways (Blair, Pendleton, and Francis 2009:chapter 16; Hally and Smith 2010; M. Smith 1992). Beads were an essential component of what have been referred to as "gift kits" (Brain 1975), and they were usually among the gifts given to Native leaders when they "rendered obedience" to the Spanish crown (Hall 2009; Worth 1998). Beads also served as official payment for the Native labor draft in St. Augustine and as payment for surplus maize sold by the missions to St. Augustine (Bushnell 1994; Worth 1999). In each of these situations, beads were primarily transferred from Europeans to the Native elites and were subsequently redistributed to their followers (Worth 1998). Spanish soldiers were also occasionally issued trade goods as payment, which they then exchanged with Natives for food and other items (Bushnell 1981:105–106).

During the mid-seventeenth century, however, gift giving as the primary distributional mechanism declined, and there was a simultaneous increase in transactional commerce between St. Augustine and the missions. This increased trade resulted in greater access by non-elite Natives to glass beads and other European goods (Hall 2009), but the types of beads being exchanged were significantly less ornate than those earlier in the century. For example, Smith (1987) observed that fewer compound, complex, or composite beads are found in contexts postdating 1630. This change in types of beads in circulation has been attributed to both changes in Native preferences and transitions in European manufacturing practices, though Francis (Blair, Pendleton, and Francis 2009:68) suggested that the most likely explanation is that simpler, cheaper beads were used later in the mission period in an effort to reduce colonial expenses.

Because most beads involved in this process were presumably interred with their owners or were deposited as funerary gifts (67,184 of 68,740 beads at Mission Santa Catalina were recovered in mortuary contexts), this transition can be examined through analysis of the bead patterning in the Mission Santa Catalina cemetery. Burials with artifact assemblages dating to the pre-1640 period generally included greater quantities of beads and included more ornate and rare varieties. These assemblages were often found in more prestigious places in the cemetery, such as near the altar. Burials with later assemblages often included fewer and simpler beads and occurred throughout the cemetery, rather than being concentrated in places of prominence (Blair, Pendleton, and Francis 2009:chapter 16).

The Circulation of Beads at Mission Santa Catalina

European beads arrived at Mission Santa Catalina and passed into the hands of the Guale people living there, but little evidence exists for how the beads were used prior to interment in the mission cemetery. Few of the beads were components of rosaries, and there is little evidence that they were used in embroidery or beadwork. Both documentary and mortuary data suggest that the beads were commonly worn as necklaces, wristlets, and anklets (Blair, Pendleton, and Francis 2009:chapter 15; de San Miguel 2001), though we lack more specific understandings of what meanings beads and beaded objects held in these roles. This is unfortunate because dress and adornment were particularly important as Native peoples performed new colonial identities (Loren 2001, 2010) and the colors, textures, and physical properties of beads likely fostered the embodiment of new social roles (Hamell 1983, 1987).

We do know that strands of beads did not remain in the form in which they arrived in La Florida. Instead, a process of fragmentation and accumulation commenced (Chapman 2000a; Chapman and Gaydarska 2007; see also Gillespie, chapter 3, Haskell, chapter 4, this volume). Beads that had been strung into uniform, monochromatic strands by female workers in Venice, upon arriving at Mission Santa Catalina were subsequently separated, fragmented into individual beads, and then recombined into distinctively patterned strands. These new necklaces—new sets of beads—were often composed of specimens from different manufacturing centers, made of different materials and in a variety of colors and shapes. Three burials in the mission cemetery (Individuals 282 and 307 and Burial B) were found with highly distinctive, nearly identically patterned necklaces composed of specific types of compound Venetian beads alternating with segmented beads of probable Spanish manufacture and numerous faceted jet beads. The beads forming these strands almost certainly arrived at Mission Santa Catalina as components in strings of matching beads, which were subsequently fragmented and formed into a new set of multiple, identical strands. This new set was subsequently also fragmented and then distributed among these three individuals, enchaining them in death and possibly in life (see Gillespie, chapter 3, this volume).

In most cases, it is difficult to speculate on what a specific accumulation of beads was for, but there is some evidence that beads were components of healing kits. One example of this at Mission Santa Catalina comes from the multiple burial of Individuals 348, 349, and 350, three subadults (two two-year-olds and one three-year-old) who were interred in the same grave pit (Blair, Pendleton, and Francis 2009:150–152). Found with this burial was a large assortment of beads; an engraved-shell, Carters Quarter–style rattlesnake gorget; a majolica pitcher; and a *Busycon* sp. (whelk) shell dipper or cup. Rattlesnake shell gorgets in what is now the southeastern United States are almost always found with subadults in mortuary contexts, leading many to interpret them as status or, more commonly, age markers

(Blair, Pendleton, and Francis 2009; Hatch 1975; M. Smith 1987). Hudson (1976:386–387) suggested, however, that such gorgets, and rattlesnake iconography in general, are likely related to healing or curing practices (see also Hally 2008:409; Rodning 2011:166). This seems highly plausible in the Mission Santa Catalina context, considering the high probability that epidemic disease may have been responsible for the death of these three individuals.

The beads found with these three individuals might also be indicative of curing or healing practices. Particularly suggestive of this are five "eye" beads, blue beads linked by a copper chain, and a single large amber bead found with the burial. The eye beads may have been protection against the evil eye, to which young children were thought to be particularly susceptible. Interestingly, the eye motif of these beads echoes the large, stylized eye found on engraved rattlesnake gorgets like the one found with this burial (Blair, Pendleton, and Francis 2009:152, fig. 15.23). The amber bead and the metal links between the blue beads are suggestive of a protective amulet, which Deagan (2002:89) observed was "worn most commonly by those who were in need of protection or were considered vulnerable.… Children, as noted, were considered to be particularly vulnerable to both illness and the evil eye, and all classes of society used amulets to protect children." The evidence—the multiple interment of three subadults, well-documented early colonial epidemics, an engraved shell gorget with iconography associated with curing, and glass and amber beads suggestive of components of a protective amulet—strongly indicates that the objects found in this grave were assembled as healing paraphernalia. Although it is not clear that *all* of the beads found with this burial were assembled as objects for healing or protection, additional research along the lines of what Walz (chapter 9, this volume) calls a "medical archaeology" should help us understand the different ways in which beads might have been assembled for healing and other purposes.

The Ongoing Journey

The itineraries of the glass beads at Mission Santa Catalina did not cease with burial. The beads were moved and displaced as new burials intruded into earlier interments, and postdepositional transformations and the processes of excavation, analysis, and curation were also part of the itinerary. The beads from Mission Santa Catalina were restrung into strands during excavation; were measured, typed, and described at the American Museum of Natural History; and are currently curated at the Fernbank Museum of Natural History in Atlanta. As the beads circulated through each of these places, the knowledge, skill, and experience of communities of researchers structured how the beads were studied and organized. My own ongoing elemental analysis of groups of beads has been structured by how previous analysts chose to organize, catalog, and identify groups of beads. The beads are currently organized based on this previous analysis, and future researchers will have to engage with the beads within structures generated by these previous itineraries.

IIA13 BEADS AT MISSION SANTA CATALINA

With the possible itineraries for Venetian beads arriving in La Florida in mind, I now consider a single type of glass bead recovered at Mission Santa Catalina and examine how a richer understanding of object itineraries—the combination of these beads' provenance and provenience (Joyce 2012a)—can enrich archaeological interpretations. Specifically paying attention to elemental composition and technological attributes, as well as archaeological provenience, can provide clues to prior circulation and patterns of distribution. Assemblages of beads with similar chemical compositions, decorative styles, and morphological characteristics serve to link specific places of manufacture and distribution with likely itineraries of distribution, acquisition, and consumption. By understanding the detailed itineraries of categories of glass beads as they circulate through paths of manufacture and distribution and by identifying specific communities of practice of distribution and consumption, we can infer associations between individuals found in this mission cemetery and explore past social relationships between individuals.

The bead type selected for this detailed examination (Kidd and Kidd 2012[1970]:type IIa13; Blair, Pendleton, and Francis 2009:type 23) is a drawn white glass bead of simple construction finished by the *a speo* method by members of the Paternostri guild (Blair, Pendleton, and Francis 2009:39, 160, plate 2-E). As discussed above, such beads were commonly manufactured in Murano and Venice, though they are also known to have been manufactured in Dutch factories (Karklins 1974; Karklins et al. 2002; Karklins et al. 2001; Sempowski et al. 2000). Francis (Blair, Pendleton, and Francis 2009:79) suggested that beads of this type were also manufactured in France (see also Turgeon 2001). Of the 1,357 specimens of this bead type recovered at Mission Santa Catalina, 1,337 were recovered from the mission cemetery, primarily in burial contexts. Simple beads of types such as IIa13 are largely undiagnostic, and it is only because these are drawn beads with the characteristic *a speo* imperfections that we can hypothesize their date of manufacture and point of origin.

To further explore these beads' itineraries, I subjected a sample to portable X-ray fluorescence (pXRF) analysis, hoping that their elemental composition might illuminate further their chronology and origins. I selected 180 beads for analysis, which included all samples found in burial contexts where fewer than 50 beads of the type were present. A subsample of beads was analyzed from each burial context where more than 50 specimens of the type were present.

Chemical analysis can help reveal the source of raw bead-making materials. Low amounts of trace elements can indicate a high-quality silica source, such as the quartz river cobbles that were collected from the Ticino River and shipped to Venice to be used instead of chemically impure sand. The ratios of sodium to potassium to calcium can identify the type and source of the fluxing material used in manufacture. Glassmakers have multiple ways and different ingredients they can use to make glasses that are visually and physically indistinguishable. Chemical analysis can also indicate changes in glass recipes over time or subtle differences between glassmaking houses and individual glassmakers.

Results and Interpretation

The glass beads analyzed in this study, although visually indistinguishable from one another and manufactured by bead makers of the same guild, were not made from the same type of glass. First, two distinct opacifying recipes were used for these beads: lead-tin and calcium-antimonate (Moretti and Hreglich 2005). Analyses conducted on beads recovered from the northeastern United States have shown that glass beads manufactured prior to around 1640 were opacified with tin whereas those made after that date were opacified with antimony (Hancock, Aufreiter, and Kenyon 1997; Hancock et al. 1999; Sempowski et al. 2000). Previous elemental analysis of white glass beads recovered at Mission Santa Catalina, in association with other temporally diagnostic artifacts, confirmed that this temporal pattern was similarly true there (Blair 2009). Of the 17 burials with type IIa13 beads, 8 included tin-rich beads (129 tin-rich beads) and 9 were later burials that included antimony-rich beads (51 beads). Figure 5.2a shows the bivariate plot of tin and antimony. No beads were manufactured with any other opacifying agent, nor were any opacified with a combination of tin and antimony.

Figure 5.2b is a bivariate plot of strontium and calcium concentrations. The beads form three distinct clusters. Cluster A is a high strontium/low calcium group, cluster B is a low strontium/low calcium group, and cluster C is a medium strontium/high calcium group. The combination of low

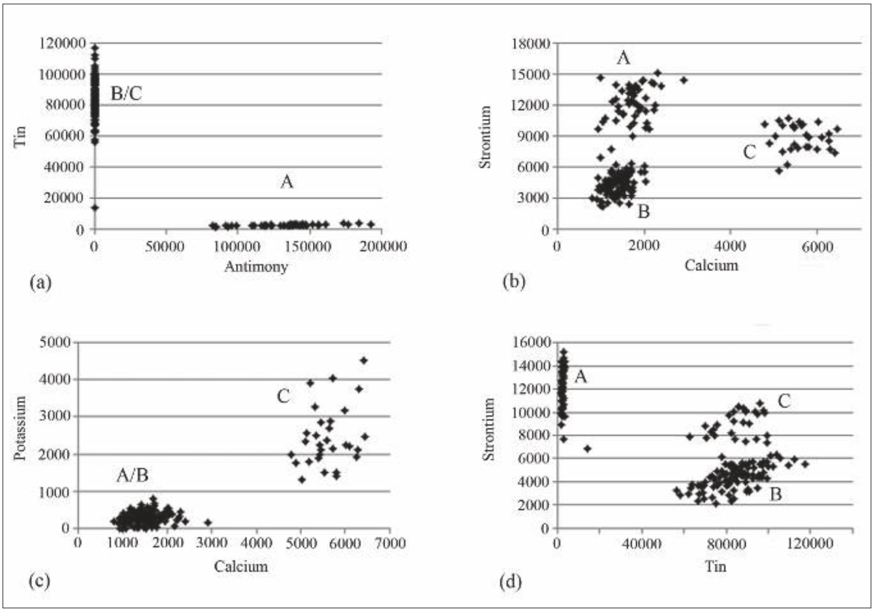

Figure 5.2

Elemental composition of IIa13 beads from Mission Santa Catalina de Guale, with values plotted based on net area beneath elemental peaks, not calibrated concentrations: (a) bivariate plot of tin and antimony; (b) bivariate plot of calcium and strontium; (c) bivariate plot of calcium and potassium; (d) bivariate plot of strontium and tin. Plots by Elliot Blair, used by permission.

strontium/low calcium seen in cluster B is indicative of a glass recipe using a pure silica source and a purified flux, matching exactly the glassmaking practices of sixteenth- and seventeenth-century Murano.

Figure 5.2c is a bivariate plot of potassium and calcium concentrations. Two clusters are evident here: a high potassium/high calcium cluster (cluster C) and a low potassium/low calcium cluster (cluster A/B). The low potassium/low calcium cluster indicates that a purified soda-based flux or plant ash from the Levant was used, again suggesting glass manufacture in Murano. The elevated potassium and calcium present in cluster C suggests that this group may have been manufactured with an inland forest–derived, potash fluxing agent (or at least a mixed alkali flux, since sodium content cannot be determined with the pXRF settings utilized in my analysis), which might be found in beads manufactured in a Bohemian glass house (Burgess and Dussubieux 2007; W. Turner 1956). The ratio seems to match early seventeenth-century, non-bead Bohemian glass (Kenyon et al. 1995). This is a surprising possibility in that there is little to no evidence for drawn bead makers utilizing the *a speo* technique, or any other finishing technique for that matter, in Bohemia at such an early date. Only furnace wound beads have been documented prior to the very late seventeenth century and early eighteenth (Francis 1979a, 1988; A. Jackson 1927). The composition also does not seem to match that of Dutch or of French glass houses, both of which seem to have primarily used soda fluxes, similar to Venetian manufacturers (Dussubieux 2009; Karklins et al. 2002; Karklins et al. 2001).

Figure 5.2d is a bivariate plot of strontium and tin. Again, three distinct clusters emerge. Cluster A contains almost no tin but has the highest strontium content. Cluster C contains moderate quantities of strontium and was clearly opacified with tin. Cluster B was also opacified with tin and has a very low strontium concentration.

To summarize these data, cluster A was opacified with the post-1640 calcium-antimonate recipe and has low calcium and potassium and high levels of strontium. Cluster B was opacified with the pre-1640 lead-tin recipe and contains low levels of calcium, potassium, and strontium. Cluster C was also opacified with tin but contains high calcium and potassium and moderate levels of strontium.

The tin and antimony variation seen in these beads can be readily explained by the use of different opacifying recipes, and the calcium and potassium variation can be attributed to the use of different fluxing agents and glassmaking traditions. The strontium variation among the three clusters is likely related to the source of calcium in each glass, because calcium and strontium function similarly geochemically (Freestone, Ponting, and Hughes 2002:264). Jackson (2005:773) suggested that the coastal sands (containing marine shell bearing calcium and strontium) used as a silica source would likely be a source for elevated strontium. However, because both clusters A and B lack high concentrations of calcium and Murano glassmakers at this time primarily used quartz crystals from the Ticino River as their silica source, marine sands are probably not the source of the elevated strontium found in cluster A. More likely, small quantities of marine shell were utilized as the calcium source for the calcium-antimonate used as an opacifier in cluster A, and the low calcium in clusters B and C derive entirely from the fluxing agent. As Zucchiatti and colleagues (2007:309) observed, high strontium values "can only be found if the source of calcium is biogenic carbonate (shells, plants) and not limestone that has undergone diagenesis" (see Freestone 2006).

The moderate concentration of strontium in cluster C, compared with the low strontium in cluster B, is likely due to the flux purification process used in Murano glass production (cluster B), and the elevated strontium in cluster C is related to the calcium present in the possible forest plant potash flux.

Archaeological Provenience

The beads composing cluster A (the late calcium-antimonate opacified beads likely manufactured in Venice) were found with nine burials in the Mission Santa Catalina cemetery. These burials were distributed across the cemetery, not only in the "high-status" altar region (McEwan 2001). The artifact assemblages with these individuals (particularly the other beads) are entirely consistent with a mid- to late seventeenth-century origin, and with the exception of Individual 276, these individuals were largely found without the elaborate grave furnishings more common during the earlier part of the seventeenth century. This is also consistent with our understanding of how the distribution of beads and other goods changed in the latter half of the seventeenth century (Hall 2009). Although the chemical composition of these beads suggests a Muranese/Venetian origin, Dutch or French manufacture is also possible. These beads were likely provided to the individuals found with them as payment for participation in the labor *repartimiento* in St. Augustine or as compensation for the sale of maize to the presidio in St. Augustine. It is impossible to tell whether the beads entered La Florida through officially sanctioned avenues or through illicit trade.

The cluster B beads, opacified with lead-tin and also very likely manufactured in Murano and Venice, probably arrived at Mission Santa Catalina via officially sanctioned routes and were likely distributed to caciques rendering obedience to the crown in St. Augustine before being redistributed to members of the community (Worth 1998). Supporting this interpretation, these burials were found with significantly more grave goods than were found with the individuals in cluster A, and three of the seven burials that form this group (Individuals 282 and 307 and Burial B) were found with almost identical bead assemblages, including many unusual and elaborate types, arranged in identically patterned strands (Blair, Pendleton, and Francis 2009).

Cluster C is perhaps the most perplexing assemblage (opacified with the early tin-lead formula and potentially formed with a high potassium/high calcium flux suggestive of Bohemian origin), and it is composed entirely of IIa13 beads recovered with Individual 318. In addition to the IIa13 beads, this individual was found with two hawk's bells, a number of distinctive complex beads highly diagnostic of the early seventeenth century, a single Nueva Cadiz bead (a sixteenth-century bead type), and two ruby red, faceted, molded beads. Such molded beads are diagnostic of Bohemian manufacturing techniques (Neuwirth 1994; Ross 2003), though the ones found with Individual 318 are the earliest beads of this type ever identified (Blair, Pendleton, and Francis 2009:97–99). Because of the presence of these two beads, it is tempting to suggest that cluster C's IIa13 beads were similarly made in Bohemia. Could the finished glass have been exported to Venice and subsequently finished into beads there by the *a speo* technique, or were bead-making masters finishing beads by the *a speo* method in Bohemia in the early seventeenth century? Neither of these possibilities is supported by historical documentation (but see Hetteš 1963; Klíma 1984, 1986; Langhamer 2003; Lněničková 2001).

Alternatively, perhaps this compositional group was manufactured by a Venetian glasshouse that did not purify its raw materials, and the elevated calcium and potassium simply reflect a different Venetian glass-making community of practice. Additional quantitative elemental anaysis will be required in order to determine which of these scenarios is correct. Regardless, the itinerary of cluster C's IIa13 beads, as well as some of the beads found with Individual 318, was distinctly different from those of the other IIa13 beads analyzed, along all stages from manufacture to distribution to final consumption.

DISCUSSION

I have presented a detailed case study of the multiple potential itineraries of one of the most common bead types found on Spanish colonial sites. This bead type is often dismissed as being undiagnostic and relatively useless for interpretive purposes, but this chapter shows how a richer concept of object itineraries, one that explores the knots of the meshwork, including places of manufacture, distribution, consumption, and ultimately excavation, analysis, and curation, can help illuminate the important social roles of even the most mundane objects. I suggest that Ingold's (2007b, 2009) notion of the meshwork, in which places have flows and are in flux, usefully complements the object itinerary by highlighting the motion and interaction of objects within and between places. I also suggest that communities of practice (Lave and Wenger 1991), the intersection of learning, social practice, and joint enterprise, are what create the tangled knots of the meshwork and simultaneously provide a methodology for exploring these places.

Multiple communities of practice intersected along the colonial bead trade meshwork. I have demonstrated that a micro-scalar, deeply empirical, morphological and chemical analysis of glass beads can open up places, untangle the knots of the meshwork, and reveal the traces of material and social practices along the object itinerary. This, coupled with an understanding of how beads and bead strands became fragmented and accumulated during their journeys, helps reveal how beads were utilized in social relationships, linking individuals during later portions of their itineraries. Additionally, the concept of object itinerary, like the meshwork, allows the flows of places along the itinerary to be better explored. For example, there is little archaeological context or documentary evidence to suggest how beads were used at Mission Santa Catalina, other than as objects of commercial exchange and during burial. By exploring the traces of prior communities of practice along the itinerary, however, we can examine more detail about how the beads circulated within a community of consumption.

In order to understand objects in motion—to trace their itineraries—it is necessary not just to follow their trajectories from place to place but also to understand their movements within and through places, in interactions with communities of producers and consumers in which specific choices are made among multiple possibilities. The circulation, acquisition, and disposal of the beads at Mission Santa Catalina can be understood only by considering networks of transport and distribution, which in turn can be understood only by knowing the previous itineraries of manufacture of both the glass and the beads. Indeed, an object's life history must be understood through detailed object itineraries, through the untangling of the knots in the meshwork (Ingold 2007b, 2009), not just by identifying nodes along a route. As Joyce (2012a, 2012b) argued, it is only through a combination of both the provenance and provenience of archaeological objects, revealed by exploring the traces of past practices along all places in the itinerary, that the roles of objects in the social world, both in the past and into the future, can be more completely understood.

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