

BEADS OF THE EARLY ISLAMIC PERIOD

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Beads from four sites involved in Early Islamic trade (7th to 12th century) are representative of the role the Muslim world played in the Indian Ocean Bead Trade. The continuation of Classical techniques, the Islamic trade's self-sufficiency, and the insight beads provide concerning past behavior are some of the issues explored.

INTRODUCTION

There has been a quantum leap in bead research in the last decade. There are now information stores and networks of communication established, and many papers have been written on beads, some discussing how to study or to describe them (Karklins 1982; Kidd 1983; Spector 1974; Sprague 1985). All of this is gratifying, but bead research must go beyond mere description to realize its full potential.

Bead research is an interdisciplinary inquiry, closely allied to archaeology (Francis n.d. e). However, the high variability of beads has deterred archaeologists from studying them. That is changing, and where serious studies have been done, as in North America, much has been learned about them. But what is the next step?

This paper presents a tentative answer to that question by outlining a methodology whose utility may be judged by how it is applied here. The raw data of bead research comes from many sources: archival (history and ethnohistory), comparative (archaeology and ethnology), and observational (a detailed cataloguing of an assemblage). Researchers must be familiar with the site involved and its cultural milieu. Following cataloguing using standard descriptions, the data derived are used to answer many questions. These are specific for each bead, but can be grouped into four categories: 1) what is the origin of the bead? 2) how

did it arrive at the site? 3) how was it used at the site? and 4) how did it leave the systemic (living) context of the site to enter the archaeological? These answers in turn are data for regional studies based on related sites, often concentrating on specific aspects, as this one does on trade. Data from many different regions may ultimately lead to hypotheses about the universal aspects of human adornment, aesthetics, the role of visual symbolism and social status, and magico-religious beliefs.

BACKGROUND TO THE SITES

The Islamic world stretches from North Africa to South Asia and beyond. It was quickly formed. The Prophet Mohammed died in A.D. 632, and within 80 years Muslim forces were in Spain and Pakistan. With some additions and a few subtractions, this region remains the Muslim world today.

The people of this region are not homogeneous. They were once pagans, Jews, Christians, Zoroastrians, and Hindus, and spoke Hamitic, Semitic, Turkish, and Indo-European languages. With Islamization, a parallel but more profound process took place: Arabization. People from Morocco to Iraq speak Arabic and call themselves Arabs. This process was resisted at the fringes. Spain (which rejoined Christianity), Turkey, Iran, and the lands to the east are Muslim, but not Arabic. There are also internal divisions, one of which, the 1400-year-old Sunni/Shiite dispute, still rocks the world from the Levant to the Durand Line.

Yet the Muslim world is marked by cultural unity. A common language and script, a common faith, common habits, common customs, common viewpoints, and ultimately common tastes characterize much of

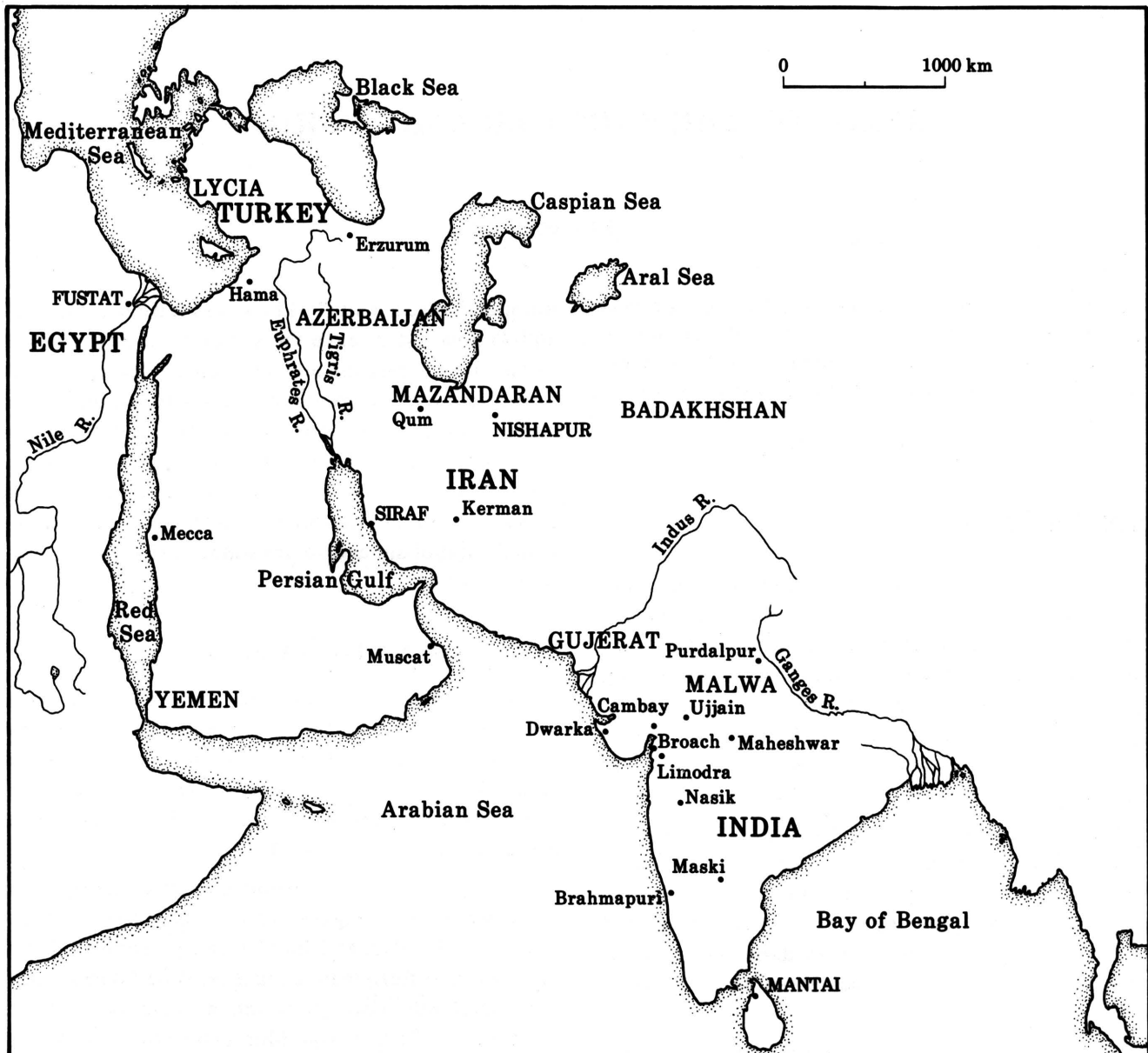


Figure 1. Eurasia during the Early Islamic Period (drawing by D. Kappler).

Islamic art. But it is always a unity with much diversity.

The Islamic world has long been both a link and a barrier to other world cultures. Geographically, it joins Europe, Africa, and South and East Asia. Muslims controlled the vital sea lanes for a thousand years; land trade was also often in their hands. The Early Islamic Period (7th to 12th century A.D.) served as a temporal bridge between the Classical Age and the era of European domination of most of the globe.

Since Islamic history is ignored in our schools and interest in Islamic art lags behind that of other regions, little is known about Islamic beads. This paper opens the study of these beads, presenting results from research of three Early Islamic sites: Nishapur and Siraf in Iran, and Fustat in Egypt (Fig. 1). These were examined as part of a larger project coordinated by the Center for Bead Research to study the bead trade of the Indian Ocean.

These sites are roughly contemporary, occupied from the 7th to the 12th century. Nishapur and Siraf were founded by the Sasanians, the last pre-Muslim dynasty, but both flourished under Islam. Nishapur was one of the largest cities in the world, a cultural and religious center, whose most famous son was Omar Khyyam. It was destroyed by the Mongol, Tili Khan, who captured it in 1221, slaughtered the citizens, razed the city, flooded it for a week, and had barley planted on the spot. Isfizari said 1,747,000 people died (Melville 1980:109). Siraf grew quickly to become a major port by the 9th century. Then it declined slowly after a week of earthquakes in 977 and the fall of the Buyid dynasty (ca. 1050), who favored the port.

Fustat was founded in the year 20 Hegira (A.D. 641), as a tent city pitched next to the Byzantine stronghold, Babylon (Door of Colors). Fortified Cairo grew up next to Fustat, which remained the commercial and social hub of Egyptian life. At the approach of the Crusaders, Vizir Shawar ordered 20,000 vessels of naphtha to be poured into the center of Fustat, and on 22 November 1168, the rampartless Fustat was put to the torch. It burned for 54 days and smoldered for months afterwards (Scanlon 1965:7-8).

A fourth site is also considered here. Mantai, Sri Lanka, was not an Islamic city, but is contemporary with the other sites, being abandoned by the 10th century. It was a vital trade link for the whole Arabian Sea/Indian Ocean Trade.

Despite similarities between these cities, each played different roles in international trade. Fustat was the link between the Mediterranean and the Red Sea, the preferred destination for many goods, and a world-class mart. Siraf, on the north coast of the Persian Gulf, was an active port, trading with Zanzibar and Madagascar and with China until the Canton massacre of Persian merchants in 878. Mantai was a major exchange depot for goods coming from the East and the West; crews returned home from there after exchanging their cargoes for those coming from the other direction. Nishapur was far inland, but lay

astride the Silk Route, which joined the Mediterranean world with China and India.

Since the quality of artifact studies depends upon how the artifacts were gathered, the excavations at Siraf by David B. Whitehouse, at Mantai by John Carswell, and at Fustat by George Scanlon furnish us with scientific data. Each of these excavators has kindly allowed me to study his beads, though the Siraf material in the British Museum is only part of what was uncovered, and much from Fustat is scattered. Nishapur was excavated before World War II by Charles K. Wilkinson for the Metropolitan Museum of Art, New York. A Hagypop Kevorkian Fund grant allowed me to catalogue these beads for the Islamic Department (Francis 1987a). They were excavated according to the highest standards of the time, but modern advanced techniques sometimes makes us yearn for more data.

The Fustat material presents the most problems. Aside from Scanlon's work, most Fustat beads in the Islamic Museum, Cairo, are from private collections picked up at the site or purchased. The most important of these are those of Dr. Foqui, bought by the (then) Arab Museum in 1893, and of King Fouad (1922-1936), Farouk's father. Hence, we cannot treat these beads statistically as we can those from the other sites, a regrettable but inescapable situation.

THE MATERIAL AND THE ORIGINS OF THE BEADS

It is common to first identify the materials from which beads were made, as this may lend clues to their origin. As for glass beads, the method by which they were made should be identified at this stage as well. Despite similarities among these sites, there were also marked differences. While glass predominated at Fustat and Mantai and accounted for 46.2% of the beads at Siraf, jet was the most common material at Nishapur, accounting for 40.8% of the beads. The differences between two contemporary Persian sites can be seen in Table 1.

Table 1.
Bead Material Groups
at Siraf and Nishapur.

<i>Material</i>	<i>Siraf</i>		<i>Nishapur</i>	
	<i>n.</i>	<i>%</i>	<i>n.</i>	<i>%</i>
Mineral	62	24.7	159	23.2
Organic	33	12.7	325	47.5
Synthetic	156	62.5	202	29.4

Organic Materials

The only organic material found at all four sites was precious coral (*Corallum rubrum*). Two beads each were found at Siraf, Nishapur, and Mantai, and an 11th-century cache was uncovered at Fustat (Scanlon 1988: pers. comm.). The coral trade at Fustat/Cairo is well documented in papers found in a Jewish *Genizah*, preserved because they contain the name of God. Egypt was the hub of this trade, especially to India (Goitein 1961: 170; 1963: 198). In one letter Issac Nishaburi (Issac of Nishapur) boasted of his coral's high quality in 1119 (Goitein 1973: 247-248).

Jet was the most abundant material at Nishapur, but found only there, except for one bead at Mantai. Jet is a form of coal, sometimes called "vitrain" or "bright coal" (Pettijohn 1957: 490-495). Some or all of the beads identified as jet may be some closely related form of coal (Pollard, Bussell and Baird 1981). There are no reported jet sources in Iran, but there are coal deposits near Kerman (Ganji 1970: 571), and some nearer Nishapur (Crabbe and McBride 1979: 207). Otherwise, the nearest known sources are in Turkey, in Lycia, exploited in Classical times (Eichholz 1962: 113), and in the west around Erezrum, currently being worked.

Marine-shell beads were found at Siraf (12 specimens) and at Nishapur (38 specimens); *Conus* was the most common genus. *Conus* spires severed from the base and ground into rings accounted for half the shell beads at Siraf (Fig. 2,a). At Nishapur such shells were left whole, and a small clay bead shaped like a *Conus* shell was also found. Other shells included *Oliva* and probably *Olivella*, *Cypreae moneta* (the money cowrie, at Nishapur), and *Dentallium* (at Siraf). At Siraf, bangles were made from the conch, *Turbinealla* (*Xan-*

cus) *pyrum*, and the columella of the shell was apparently used to make beads; similar beads were also found at Nishapur.

An object marked "pearl?" from Siraf is a much-foliated specimen, stabilized with some chemical. Istakhi in the 10th century said that Siraf was a "great market for pearls" (Sastri 1937: 437). Whitehouse (1972: 67) examined local shell middens, concluding that they were not exploited for pearls, but the market need not be located where the oysters are fished.

Bone and ivory were used for a few beads, mostly at Siraf, and especially for spindle whorls. A back material used for beads from Siraf may be bitumen or asphalt. Nishapur was the only site with amber, most likely from the Baltic region; the significance of this will be discussed later.

Mineral Materials

At Siraf and Nishapur, minerals accounted for a quarter of the beads. Quartz minerals (rock crystal and amethyst; the chalcedonies, including agate and carnelian; and the jaspers) dominated, with carnelian being especially popular (37.1% of stone beads at Siraf and 35.8% at Nishapur).

Lapis lazuli accounted for 8.3% of the beads from Nishapur and 14.5% from Siraf. Turquoise, mined near Nishapur, was not very common, with only three pieces from Nishapur and four from Siraf. Of these, only one from each site was a bead, the rest being cabochons to mount into metal jewelry. This emphasizes the friable nature of this stone and its relative scarcity as a bead in the past.

All the important stone beads traveled eastward to these sites. Lapis lazuli came primarily from the Lajwurd Valley of Badakhshan in northern Afghanistan. Jenkins and Keene (1982: 26-32) suggested that Nishapur may have been a lapidary center for lapis, but there is no evidence to that effect, and the larger number of beads at Siraf may suggest otherwise. Hamd-Allah Mustawfi, the State Accountant of Sultant Abu Said (1316-1355) mentioned Iranian lapis sources in Manzadaran and Azerbaijan and near Kerman, but the first seems unlikely on geological grounds and the other two may have been worked for only a short time (Herrmann 1968: 27).

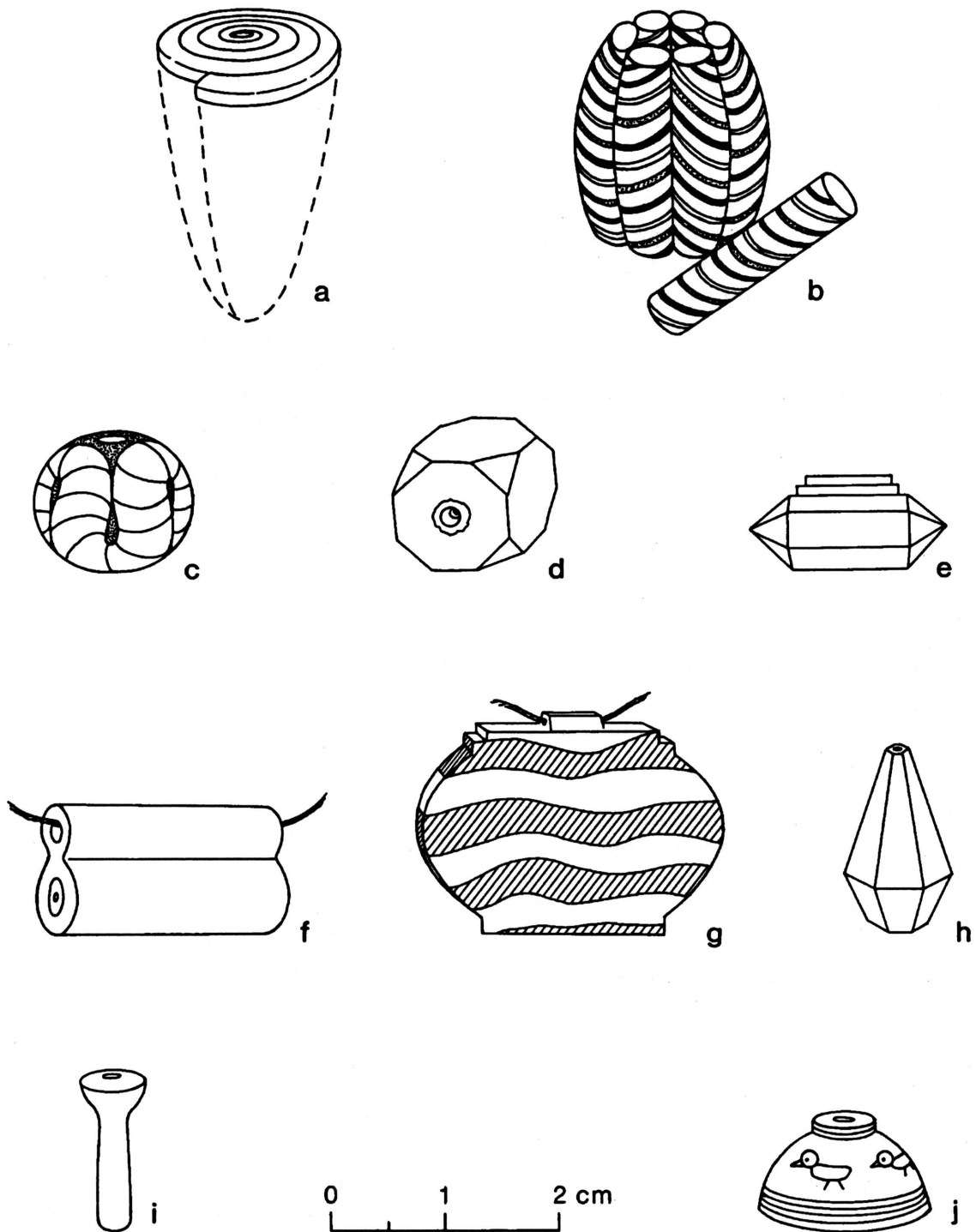


Figure 2. Selected beads of the Early Islamic Period: a, Conus, shell top disc, Siraf; b, Fustat Fused Rod Bead and cane (rod); c, Torus folded glass bead, Siraf; d, green jasper cornerless cube, Siraf; e, rock crystal charm case bead, Nishapur; f, soft red stone double tube bead, Nishapur; g, flat Babaghoria agate pendant; h, octagonal drop Imam bead of carnelian, Nishapur; i, stud-shaped opaque yellow glass Imam bead, Nishapur; j, ivory spindle whorl, Nishapur (drawing by D. Kappler).

The quartz minerals, especially carnelian and onyx, are particularly abundant in western India, where nodules have been gathered for millennia along the banks of the Narmada River. By Roman times they were cut in and around Ujjain, and sold through Broach. In the 11th century the Solankis of Gujarat defeated the Paramaras of Malwa, taking the Narmada Valley, Malwa's only link to the sea. The lapidaries were moved to Limodra, now a sleepy village, but once called *Manipur Shahr* or "Bead City." This remained the lapidary center until replaced by Cambay in the 16th century (Francis 1982).

However, quartz is the most widespread mineral on earth, and its gems are found in many places. Al-Hamdani (died 945) wrote in *Al-Iklal* that onyx and carnelian were mined in Yemen (Faris 1938: 28-29), and Niebuhr (1774: 125) reported the same thing eight centuries later. Yet these stones were imported into Yemen and its neighbors from India steadily since at least the 10th century (Hassan 1928: 127; Francis n.d. d). It may be that Yemen produced stones only for seal rings and not beads.

Whitehouse (1975) called attention to carnelian sources near Siraf and elsewhere around the Gulf. Beadmaking evidence at Siraf includes a few roughouts, chips, unfinished beads, and some pebbles that may have been raw material. The work was done in Locus E, a residential area with mostly late (14th-15th century) buildings. The beads are crude, and no faceting was done. India probably accounted for the lion's share of beads in the region and virtually all of the trade.

Although we have no statistics, ornamental stone use at Fustat paralleled the Persian sites. A collection of 15 9th-10th-century seals donated to the Islamic Museum by Dr. Henry includes eight of carnelian and one each of yellow chalcedony, black chalcedony, red jasper, green jasper, garnet, blue glass, and a soft green stone. In the 12th century Al-Khazini, in the *Book of the Balance of Wisdom*, said that stones were so common that they were devalued. Turquoise with any matrix, lapis lazuli, rock crystal, and amethyst were all cheap; only onyx was prized. Of carnelian he said, "men have long tired of the cornelian, so that it has ceased to be used for seal-rings, even for the hands of the common people, to say nothing of the great" (Khanikoff 1860:64).

Two stone bead technologies found at Nishapur deserve attention. The one is the glazing of quartz crystal by applying soda and adding heat. Beck (1935) pointed out the antiquity of this practice, but its survival into Early Islamic times is significant. Most quartz beads at Nishapur were glazed (11 of 16), and were crude oblate beads or pendants with white surfaces and deep blue, probably cobalt, glazes.

The other technique is widely called "etching," even though acid is not involved. Soda is added to the surface of the stone, and it is more appropriate to refer to these as "soda-etched carnelians." They are known from Harappan and contemporary Mesopotamian sites, and were likely made in both places (Reade 1979). In Early Historic India there were at least two centers of manufacturing (Dikshit 1949). The Sasanian Persians learned the technique (Francis 1980), and now we have evidence of their being made in Early Islamic times. The shapes and patterns of these beads match those in Beck's Period III (ca. A.D. 600 to 1000), and they are distributed west of India, as far as Russia and Scandinavia (Beck 1933; Francis 1980; 1987a).

Synthetic Materials: Faience

Faience was the second most common bead material at both Siraf and Nishapur (11.6% and 20.3% of all beads, respectively). It is a ceramic, less homogeneous than glass, with a core of partially fused (sintered) silica particles, usually quartz, and a glaze, a layer of true glass. Since the core and glaze expand differently under thermal conditions, nearly all ancient and medieval faience beads have lost their glaze completely.

Faience can be made by any of three methods, all of which were used in ancient Egypt (Tite, Freestone and Bimson 1983). In modern Qom, Iran, bead cores are packed in a glazing mixture and fired, and removed afterwards (Wulff 1966; Wulff, Wulff and Koch 1968). The beads from Siraf and Nishapur, like those from Persepolis a millennium earlier (Schmidt 1937: Table III; Persepolis Museum, personal observation), resemble the modern Qom product. We appear to have an unbroken faience tradition in Persia from at least the time of Alexander.

However, it has been assumed that faience production died out in Persia only to be revived in the 12th century (Allan, Llewellyn and Schweitzer 1973: 171; Lane 1947: 9), and that the Qom beadmakers may have then come from Egypt (Wulff, Wulff and Koch 1968). The Siraf faience beads come from later deposits, from Locus E and from other late levels (Whitehouse 1988: pers. comm.). At Nishapur a faience pendant is dated from the late 8th-10th century, but it is impossible to tell how many beads may have been surface finds. It is tantalizing to suggest that we have evidence here for the continuation of faience production in Persia, but more data are clearly needed.

The faience beads at these sites are large and crude, usually suboblates, sometimes poorly scored to make gadrooned or "melon" beads. Some from Fustat are short cylinders retaining some glaze. Nishapur has a few crudely-molded pendants. Better beads in small numbers were found at Nishapur and Siraf, perhaps indicating a different source. Although no manufacturing sites have been identified, this faience seems to have been made only in Egypt and Persia, and hardly ever exported.

Synthetic Materials: Glass

Glass was the major bead material at Siraf, Mantai, and Fustat, taking a back seat only at Nishapur. A state of matter rather than a substance, it is made by melting metals and cooling them below their point of crystallization without allowing them to crystallize. As used here, glass is always a man-made product, with silica as the primary ingredient.

There is no evidence for glass beadmaking at Nishapur. Siraf has glass kilns and made objects from glass, but apparently not beads. Fustat was a glass beadmaker, and one problem is to determine which beads were made there.

In the case of Siraf we are at a disadvantage because the environment is ideal for the corrosion of glass. Many beads have a black or white incrustation, and fragile interiors. This type of corrosion is believed to be the result of an imbalance in the glass formula, either too much lime in relation to the silica or too little silica in the batch (Griffiths 1980: 87). Corrosion types may furnish clues to the origins of

beads, but much more work needs to be done along these lines.

There are many ways to form a bit of glass into a bead. We shall discuss these beads according to their manufacturing methods. Edward Hill of Glassblowers of Greenwich consulted with me on some of these techniques.

Wound Beads. The oldest way to make a glass bead is to dip a rod (a mandrel) into a crucible at a furnace and twirl it until a bead is built up. Lamp-winding, as practiced in Venice and elsewhere, is a relatively new development. All Early Islamic wound beads were made at the furnace, but few are distinctive enough to be associated with a particular industry. Some beads from Nishapur with wave and blob designs are similar to contemporary Syrian glass (Francis 1988a: 79), and a combed black and white bead resembles one from Hama, Syria (Riis, Poulson and Hammershaib 1967: 68, 212A).

Several of the wound beads from Fustat and Nishapur are decorated with slices of fancy mosaic cane, widely thought to have been a mostly Egyptian industry. Some eye beads made with simple canes are like those being illegally dug at Jenne-Jeno, Mali.

Drawn Beads. In this process, a glass tube is pulled (drawn) from a hollow gather of glass. The tubes are then cut into short segments, packed in ash, and stirred over heat to round off the sharp edges. The largest group of drawn beads — the small, monochrome Indo-Pacific type — was found at Siraf. These beads are widely distributed and were made in several centers (Francis 1989), but those at Siraf were most likely from Mantai (Francis n.d. a). The large number of Indo-Pacific beads at Siraf (39.7% of the glass beads) is as significant as their absence elsewhere, as we shall see later.

A small drawn tube bead with an opaque yellow core and a translucent green coat was found at Nishapur, and a similar bead was found at Mantai. These beads are most common in the Deccan or peninsular region of India, and are known from Early Historic Nevasa (Deo 1960: 355) and Navadatoli (Deo 1971: 361), as well as medieval Nevasa (Deo 1960: 361) and Brahmपुरi (Sankalia and Dikshit 1952: 104).

There are other complex drawn beads in the Foqui collection in the Islamic Museum. They are discussed separately below.

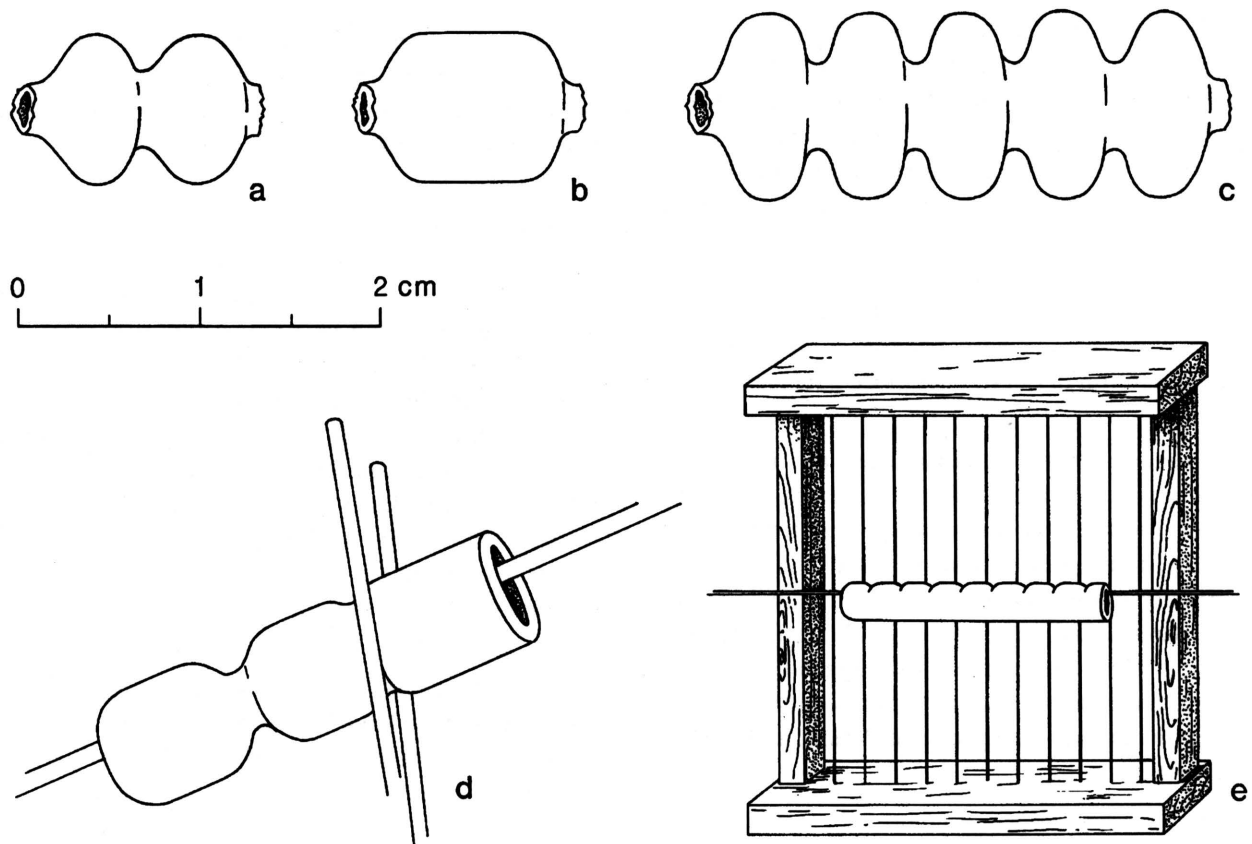


Figure 3. Segmented Early Islamic beads and their hypothetical production: a, "onion" double-segmented bead, Mantai, Siraf and Nishapur; b, fine segmented bead, Siraf; c, segmented tube, Fustat; d, glass tube being segmented with a pincher or two wires; e, segmented beads made by being rolled in a frame with wires or blades (drawing by D. Kappler).

Segmented Beads. Segmented beads also begin as tubes, which are placed on a wire, and held near the furnace while being constricted along their lengths. The resulting bulges are then cut apart to form one or a series of beads (Fig. 3,a-c). Precisely how this was done is not known; the process has not survived to our day, although it was once quite important. Hill (1988: pers. comm.) has suggested that in addition to a pinching device already proposed to constrict the tube (Fig. 3,d), the operation may have been done on a box or frame mounted with wires or blades (Fig. 3,e).

The most remarkable segmented beads are the gold-glass (or gilt-glass or goldfolium) beads, made from two tubes of glass, the inner one being covered with gold or other foil, and the outer one protecting the foil. They have a pan-European (Callmer 1977:

88-89) and a pan-Asiatic (Francis n.d. a) distribution. At least some were made in Coptic Egypt (Boon 1966), while India has been suggested as a manufacturing center (Dikshit 1969: 56-58; Singh 1983).

Segmented beads have received scant attention, but were once clearly an important class of beads. Not only are they found at these four sites, but they are known in Europe, Southeast Asia and beyond. This is not the forum to discuss the many types of segmented beads, as they deserve a study of their own, but two types deserve mention here. One was apparently made in Fustat, as waste tubes are in Dr. Foqui's collection. They are short cylinders with wide diameters (about a centimeter) and thin walls in opaque yellow and translucent green, blue, and colorless (Fig. 3,c). The other type was made by folding a striped ribbon into a tube

and constricting it. These were made at Mantai (Francis n.d. a), and a few were found at Siraf.

Fustat Fused Rod Beads. The term "fused rod" was coined by Scanlon (1988: pers. comm.) to describe an unusual and highly conspicuous bead (Fig. 2,b; Pl. ID). They were made only during a short time around A.D. 900, but were well-traveled. One is in the Seligman collection of Chinese beads in the British Museum (acc. no. 1940-12-14-82), while another was found in Birka, Sweden (Pinder-Wilson and Scanlon 1987: 71).

Superficially, these beads look like barrel beads with zones combed into an ogee pattern. However, they were made by bundling six spirally-decorated glass canes (rods) around a central perforation. The canes are of a bubbly translucent-green glass with opaque white, yellow, red, and blue stripes; both right- and left-handed twists were needed. The precise manufacturing process is not known. Red clay in the perforations and sometimes on the surface may suggest a mold, but Hill (1988: pers. comm.) has opined that the work could have been done on a wire, with the clay as a separator.

Scanlon (1988: pers. comm.) uncovered about 50 of these beads, many of them broken lengthwise, and a single cane. Some 30 more are in the Islamic Museum. They are fairly large, up to two centimeters in length. Some have added eye decoration. Because they are easy to spot, their origin is known and they are widespread, investigators should become aware of them as temporal indicators.

Folded Beads. Another beadmaking technique consists of heating a plaque or ribbon of glass, bending it over a wire, and joining the edges to make a bead. A seam usually parallels the perforation. A few folded beads were found at Nishapur, Siraf and Mantai. This was also once an important technique, though not as important as segmenting. We know nothing about where such beads were made.

One notable folded bead type has been called "torus folded" by Summerfield (1985: pers. comm.). It was made in two parts, with a spherical core and an outer ring (torus) of striped and twisted glass. The ring was folded onto the core so that it covered the surface with an undulating polychrome line (Fig. 2,c). These beads were once thought to be Roman (Neuburg 1949: Pl. XXXI, no. 109), but their uncovering in a Muslim

context at Kilwa (Chittick 1974: 467-468) and at Siraf strongly indicate an Early Islamic date for them.

Mosaic and Polychrome Drawn Beads: Dr. Fouqi Collection. The collection of beads and wasters donated to the Islamic Museum by Dr. Fouqi has already been mentioned. Nothing definite about him has been learned, but it is believed that the material is from Fustat. Some of it is so surprising and potentially important that it deserves special consideration.

The collection has drawn beads, tubes, mosaic canes, and similar material of high-quality glass and fine workmanship (Pl. IIA). For example, one tubular bead has an inner layer of red, followed by white, red, white and red layers, with a surface decoration of six compound white/blue/white stripes. In all, there are eleven tubes or cut segments, most of them striped and some of them twisted; four similar unperforated flattened pieces; ten mosaic canes; two beads made of concentric red and white mosaic canes without cores; and nine other pieces of beadmaking waste, including bent and unusable tubes.

This material comes from a beadmaking site, but where? At first it strikes one as modern, but could it have come from early Islamic Fustat? The following seem to be the most likely possibilities:

- 1) *The material is local, but of Ptolemaic-Roman or Coptic date.* This seems unlikely, as there are no beads known to me at such an early date that are made from multiple-layered or striped drawn tubes.
- 2) *It is local, but much later, and represents an attempt to duplicate European (Venetian) beads.* Glassmaking continued in the area after Fustat burned. A decree of 1309 attempted to minimize the danger of glasshouse fires to Cairo; Ibn Douqmak (ca. 1400) noted glasshouses in Fustat itself (Clerget 1934: 270). Starting in the 15th century, glassmakers rarely produced their own glass, importing cullet from Venice or melting down old bottles (Clerget 1934: 272-273). Travelers in the 18th and 19th centuries commented on the low quality of Egyptian glass and the limited range of production (Clot-Bey 1840, II: 316; Fesquet 1843: 93; Raymond 1973, I: 341, 354). The debased tradition continues to the present; only a few workers make crude beads using recycled glass (personal observation).

- 3) *The material is not local. Maybe some friend of Dr. Foqui went to Venice and came back with...* The collection may be badly contaminated, with Venice the most likely source. However, while these beads could have been made in Venice, none have any molded elements. There are no tubes with star or wavy (chevron) layers and no mosaic canes with molded elements. This does not prove that the material is not Venetian, but molding has been a hallmark of Venetian work since the late 15th century (Buckley 1939: 19; Zecchin 1968), and a Venetian collection of mosaic glass without molded elements would be most unusual.
- 4) *The material represents a Venetian attempt to start an Egyptian industry.* The history of Venice is full of workers going elsewhere to set up shop, the selling of secrets, and the smuggling of canes (Francis 1988c: 44-45). Nothing is known of any Egyptian venture, and one would think that the census at least would have taken note of it. There is the peculiar assertion by Morazzoni (1953: 64) that by 1900, Egypt, Albania and Turkey were giving Venice heavy competition. The Turkish industry could never have been a threat (Francis 1979b: 2-7), Albanian beadmakers are completely unknown and, on the face of it, Egypt looks doubtful as well.
- 5) *The material is from Early Islamic Fustat.* The process of elimination brings us here, and upon reflection, it is not so impossible. Striped drawn beads are known from early centuries A.D. at Mantai and Noruzmahale, Iran (Oda 1966: 31), from medieval Mantai (including a cut tube end) and Siraf, 9th-century Igbo-Ukwu, Nigeria (Shaw 1970: 230-239), and from many sites in Southeast Asia, as early as the 7th century (Francis 1989). Mosaic canes are also known in medieval contexts, such as on beads from Nishapur.

However, precise parallels for the beads from Dr. Foqui are not evident, and though a medieval Islamic date may be possible, the case is hardly closed. Any new evidence, discussion or hypotheses are most welcome.

BEADS AND THE BEAD TRADE

The trade in beads and bead materials is very ancient, and it is an important topic for researchers. Here

we are concerned with the Western sector of the Indo-Pacific trade, from the Red Sea and Persian Gulf to the Palk Strait. Fustat, Siraf and Mantai were all on this route, while Nishapur was on the parallel Silk Road.

It is clear from what we have seen that some beads were locally made, while others were imported. Among the imports are five bead types which were found at all four sites and constitute the staples in the Muslim sector of this trade. They are: 1) coral, from the Mediterranean and sold especially in Alexandria and Fustat; 2) lapis lazuli, from northern Afghanistan, whose lapidary center is not yet identified; 3) gold-glass beads, some of which were probably made in Egypt; 4) carnelian, from western India; and 5) onyx from the same source.

A site's role in trade may be determined by the degree of participation in each of four activities: importing, exporting, producing, and consuming. These categories are not mutually exclusive. An importer may reexport beads, and a producer may make beads for local consumption only. The sum total of these activities reveals how involved in trade a site was.

Mantai was primarily a bead producer, and well over 80% of the beads were made there; 83% of them were Indo-Pacific beads, mostly for export. Fustat exported beads (coral and the fused rod beads), but also imported semiprecious stone beads; only the faience was likely for local consumption. Both sites were active in the bead trade, importing for local use as well as reexporting and making beads for export.

Although statistics from Fustat are not reliable, and the analysis for Mantai is not complete, we may compare the patterns of bead trade between Siraf and Nishapur. The figures in Table 2 are based on the following assumptions: 1) beads imported to a site were usually consumed there; 2) local manufacture includes jet and faience from Nishapur; 3) beads made for export include *Conus*-shell tops at Siraf and soda-etched carnelians at Nishapur; and 4) the Indo-Pacific beads at Siraf were made at Mantai and were to be sent to Africa, as Siraf had trade relations with both places, and these beads are very scarce in Iran (none were found at Nishapur, and they are rare on the antiquities market; personal observation).

Table 2. Characteristics of the Bead Trade at Siraf and Nishapur (in percent of total bead assemblage examined).

<i>Characteristic</i>	<i>Siraf</i>	<i>Nishapur</i>
a. Locally manufactured	10.5	53.6
b. Imported for consumption	<u>47.8</u>	<u>27.7</u>
Total locally consumed (a+b)	58.3	81.3
c. Manufactured for export	2.8	0.9
d. Imported for Reexport	<u>18.9</u>	<u>0.0</u>
Total for export (c+d)	21.7	0.9
e. Unclassified	20.6	17.8
Total involved in trade (b+c+d)	69.5	28.6

Considering the figures in Table 2, and bearing in mind the roles of Fustat and Mantai, we may tentatively conclude that the Indian-Ocean route was more heavily involved in the bead trade than was the Silk Route, represented by Nishapur. We may also note that, except at Mantai, there are no beads in the sector that can be identified as East Asian, although a Fustat Fused Rod Bead did go the other direction.

A special trade pattern has been identified at Siraf: Indo-Pacific beads being transshipped from Mantai to Africa. The *Conus* shell tops may also have been part of this trade. These became important trade items in East Africa, a trade which preceded the Portuguese (Harding 1981), and which may well have been in the hands of Arabs, as may have shell columella beads, though not *Conus columella* (Schofield 1958: 185). The possibility of Siraf making these beads at the opening of this trade should be investigated further.

At Nishapur another pattern is seen in the recovery of both amber and soda-etched carnelians; the only site where either were found. The Sasanians and Early Islamic Persians outflanked the Romans and Byzantines to trade with Russia and the Viking world (Frye 1972: 266-267; Harper and Meyers 1981: 22-23). Silver plate with Sasanian motifs and soda-etched carnelians were traded for furs, dried fish, wax, honey and amber. Nishapur was a link in that trade.

Istakhi said in the 10th century of Siraf: "The imports are aloes wood (for burning), amber, camphor, precious gems, bamboo, ivory, ebony, paper,

sandalwood, and all kinds of Indian perfumes, drugs, and condiments" (Sastri 1937: 437). All these products, except amber, would have come from India or further east. Ebony and ivory also come from East Africa, which also produces copal, often mistaken for amber. Unless it is Burmese amber, Istakhi's amber might be something else entirely, such as ambergris, lac, or Chinese or Korean copal. If this were Baltic amber, it would have been the only bead product to have come from western Europe at that time.

Finally, we must consider who actually moved the beads around the region. At the eastern terminus (Mantai), we have the comments of a Chinese and two Western observers. Fa-hsien (A.D. 414) said that the Sa-bo, that is Sabeans or Sea Arabs, controlled the trade. The historian Procopius recounting the Emperor Justinian's experience (525 to 565) and the traveling monk Cosmos Indicopleustes (ca. 550) both said that the Persians controlled the trade (Francis n.d. b). The Buddhist pilgrim Kanshin (Kien-Tchen) noted ships around Canton about A.D. 750 coming from India, Malaysia and Persia (Takakushu 1929: 446).

The Muslim literature testifies to the ports serving this trade. Most striking is the commentary of Masudi in the 9th century, as he repeats like a mantra the names of Siraf and Oman (Muscat) in three passages. He tells us that they sailed on the seas of China, India, Sind, Azania (Africa), Arabia, Erythraea (Red Sea), and Abyssinia. They went as far east as Kedah and Java and as far west as Sofala and Zanzibar (Hasan 1928: 125, n. 3-5).

To summarize, the carriers and traders of most of the beads we have examined are likely to have been the mariners on either side of the Persian Gulf, and Siraf in particular. The assemblage of beads from Siraf fits this pattern well.

THE USES OF THE BEADS

Unless beads are found in specific contexts (e.g., burials), their uses in the systemic context of a site may be hard to discern. We often rely on a knowledge of the cultural background of a site to help us understand how beads were used. Locational analysis will also prove useful.

No formal locational analyses have been done on the sites in relation to beads. Siraf and Mantai are expected to be published soon, and work may be done on them at that time. Even now, however, the interim reports on Siraf by Whitehouse (1968-1975) allow us to form some hypotheses regarding the find-spots of the beads.

Beads were uncovered in nearly every trench at Siraf, but not evenly distributed. Four loci (called "sites" in the reports) had no beads, while Locus J, a military warehouse, had only one. On the other hand, Locus B, the site of the "Great Mosque," contained over half the beads examined.

Why was there a concentration of beads at the mosque? For one thing, the area was occupied for a long time. The mosque was built on the site of a Sasanian fort, and at least three beads are actually Sasanian seals, one of which may have been an amulet (Francis 1988b). The mosque was built in five stages (Whitehouse 1970: 2-8) and many beads may well have been in the infill of walls. Moreover, this area was extensively excavated.

All the wasters of a conch-bangle industry and half the shell beads were found around the mosque, suggesting that a bangle- and beadmaker worked nearby. Only a quarter of the Indo-Pacific beads were found here, but 80% of the segmented beads were. This may be because the Indo-Pacific beads were involved in international trade, while segmented beads were consumed or sold locally. Both coral beads and all eight examples of a particularly well-made segmented bead (Fig. 3,b) were found around the mosque. Both would have served well on prayer strands.

Mosques are well-known as sites of bead marts; Mecca is a famous example. It is not too much to expect that Siraf's Friday Mosque, dominating a city with international connections and streams of visitors, would have shared shade with small bead shops, as the expression goes in Persian.

Another approach to understanding these beads is offered by ethnography. The widespread belief in the Evil Eye (Maloney 1976) is quite strong in modern Iran. The Eye, which certain people possess, brings misfortune to anyone caught by its first glance. The Quran echoes this belief. "The Pen" (Surah 68, lines 51-54) has been interpreted as saying:

The unbelievers wellneigh strike thee down with their glances, when they hear the Reminder, and they say, "Surely he is a man possessed!" (Arberry 1964: 601-602).

Precautions against the Eye are obviously prudent. One may attract it to something not harmed by its glance or repel it. In Iran one is told to wear a cowrie (*Bibin Tarak* or "eye cracker"), brown agate, carnelian or onyx, anything blue, or anything resembling an eye (Allgrove 1976: 45; Budge 1961: 301-320; Spooner 1976). These things attract the Eye. To repel it, one pokes it out with a hand, a star, a crescent, horns, a phallus or the like.

Many beads from Siraf and Nishapur have one or more eye characteristics: 44.2% of those from Nishapur and 30.4% from Siraf (36.1% when the spindle whorls are included). Every one of these beads may not have been selected primarily as an eye amulet, but given the strength of the superstition, it was probably at least one factor in their selection.

A large group of eye amulets is composed of blue faience beads. The only advantage these crude and poorly-made beads have is that they are blue. They hardly ever seem to have been exported, and they are so badly made that one doubts that even the poor would wear them. Similar modern beads are never worn by people, but put on livestock, which is especially susceptible to the Eye. It is probable that this was also their older function.

In some cases particular shapes or materials can help us identify the uses of beads:

- 1) *Cornerless Cubes of Green Jasper*. Schienerl (1985) called attention to this bead, suggesting that it was an eye amulet among Bedouins. The bead was known in Iran (Francis 1986a), but its excavation at Siraf places it in an Early Islamic context. Similar beads and a green jasper heart pendant are in the King Fouad collection from Fustat (Pl. ID, bottom of upper strand). None of this tells us if they were amulets (Fig. 2,d).
- 2) *Charm Case Beads*. Metal tubes containing written charms were worn as early as the XII Dynasty in Egypt. In Roman times they were hung horizontally, and in the Islamic Period square packs, sometimes of leather, were introduced (Petrie 1914: 29; Schienerl 1980). Solid beads shaped like charm cases may have been an eastern Is-

lamic development; a carnelian specimen is known from 7th-8th-century Dwarka, an early Muslim community in India (Deccan College Museum, personal observation). There were four such beads at Nishapur (Fig. 2,e). A bronze one resembled the leather pouch, while those of jet, green "Abassabad stone" and rock crystal hung horizontally. The role of doubly-terminated quartz crystals in developing this style (Keen 1986: 30; Jenkins and Keene 1982: 26) is questionable.

- 3) *Paired Tube Beads*. These are usually made of two wound tubes of glass, one smaller than the other, joined along their lengths. They are most common in Persia. Smith (1957: 222) thought that they might have been charms, but their use as spacer beads and whether they hung from the larger or smaller tubes has been debated. We are now a bit closer to the answers. At Nishapur, a paired tube bead cut from a soft red stone could only be strung through the smaller loop, as the other tube was left solid (Fig. 2,f). A black-glass specimen with red, yellow and white-line decoration found at Chong-tim by Aurel Stein (1921: Pl. IV; British Museum acc. no. MAS 1120) indicates use as a charm case, since the larger tube was closed at one end only.
- 4) *Flat Pendants of Badaghoria Agate*. These distinctive large flat pendants are shaped like an ellipse with "shoulders" at the top and bottom (Fig. 2,g). There are several variations, but they are nearly always made of Babaghoria agate, a grey- or brown-and-white agate from western India, named after the patron saint of the industry (Francis 1986b).

Budge (1961: 68, Pl. VI) thought the pendant to be special to Shiite Muslims. They were once thought to be Moghul in origin (Francis 1979a: 73), as a coin in this shape was issued by Akhbar in 981 A.H. / A.D. 1573 (Gupta 1979: Pl. XXVI, no. 274), and it was popular for Moghul jades (Brunel 1972: Pl. 67). The Bohemians imitated these in glass (Francis 1988c: 39, Pl. G.3). Nishapur puts the shape into an Early Islamic context. Not only was a pendant found, but one was represented on a stucco figure dating from the mid-8th to mid-9th centuries (Wilkinson 1986: 262, Fig. 4.3). An unfinished pendant of steatite in

this shape was also recovered. Though associated with Islam, the origin and meaning of this peculiar shape are not fully understood.

- 5) *Faience Disc Amulet Pierced with Holes*. This amulet is well known in the Islamic world and thought to be derived from Roman prototypes (Schienerl 1982). They are round discs with holes punched into the face, today usually six holes surrounding one. One amulet from Siraf has this configuration, but two others have only two holes, and one from Nishapur has six holes.
- 6) *Prayer Strand Beads*. Muslim prayer strands usually have 33 or 99 beads upon which the names of Allah are recited. The beads are rarely distinguishable from other beads. At the end of the strand, however, usually hangs a long *Imam* bead. One of faceted carnelian (Fig. 2,h) has been noted in the Nishapur material (Jenkins and Keene 1982: 30). Three stud-shaped beads from Siraf in bright opaque yellow glass (Fig. 2,i) are similar to old style Imam beads made in Purdampur, India (personal observation).
- 7) *Spindle Whorls*. These are small objects used to lend weight to a stick or spindle to give momentum while spinning thread. Typologically, they must be evenly balanced around the axis of perforation, and they are usually uneven in profile (Liu 1978). At present, they are often strung with or confused with beads; the question is, "How were they regarded in the past?" (Francis 1988b). Scanlon's (1988: pers. comm.) discovery at Fustat of a hempen (?) string with a glass mosaic bead and three highly decorated bone or ivory spindle whorls is important in showing that at least in some cases they were worn (Corning Museum of Glass, acc. no. 71.11.1).

Time did not permit the cataloguing of the many spindle whorls at Nishapur. At Siraf they were an important group, with 39 of bone or ivory (9.7% of all objects studied), six of glass (labeled "abacus beads"), and one of low-grade amethyst. Most of the bone and ivory ones were decorated with zones and circle/dot motifs. Five had birds, with heads made by adding a beak to the circle/dot (Fig. 2,j), and three had trees. An ivory one bore traces of ochre, and a bone one had an iron pin stuck in the perforation.

THE DISPOSAL OF THE BEADS

The last human act in which most beads are involved is their transfer out of the systemic context. The implications of this have not been much considered (but *see* Schiffer 1971), but in terms of beads it promises to be rewarding. These preliminary remarks are presented here in hopes that this topic may generate more discussion.

Beads leave the systemic context in one of four ways: 1) purposeful deposition, as in burials, foundation deposits, or caches; 2) purposeful discard when broken, heavily worn, or out of favor; 3) loss; and 4) abandonment. Collectively, we shall refer to these processes as "transfers" from the systemic to the archaeological contexts.

Deposition and abandonment are static events, usually happening only once, while loss and discard are diachronic, resulting in an accumulation of beads over time. Loss and abandonment have built-in negative feedback, as scavengers recycle beads into the systemic context. Since larger, more showy and more valuable beads are most likely to be curated and scavenged, the usual excavated assemblage of beads is poorer in these attributes than the group of beads worn during the life of a site. Conversely, purposely deposited beads are often the best ones available (Francis n.d. c).

Although loss and abandonment probably account for the bulk of excavated beads, only those deposited or discarded (especially when broken) can be recognized archaeologically and treated statistically, at least at the moment. At none of our sites was purposeful deposition noted, except at the cemetery at Siraf and the coral cache at Fustat. All sites had broken beads, and rather than deal with the number of beads involved, it may be more significant to compare the rate at which they accumulated in the assemblage. This can be calculated by using the formula

$$T.D. = \frac{b}{ty} \times 10^4$$

in which "T.D." is the rate of Transfer by Disposal, "b" is the number of broken beads in the assemblage, "t" is the total number of beads, and "y" is the number of years the site was occupied. The results of computing the rate for Siraf, Nishapur and the imported beads at Mantai are presented in Table 3.

Table 3. Rate of Transfer by Disposal (T.D.) of beads per century.

<i>Site</i>	<i>Broken beads</i>	<i>Total beads</i>	<i>Years occupied</i>	<i>T.D.</i>
Siraf	25	251	c. 500	1.99
Nishapur	19	684	c. 600	0.46
Mantai	34	223	c. 900	1.69

The rates for Mantai and Siraf are quite close, while those for Nishapur are much lower. This may not be because beads were curated better there, but because the excavation techniques of someone digging for an art museum 50 years ago were not as likely to uncover or be concerned with fragments of broken beads as are those of modern excavators.

INTRUSIONS

Few bead assemblages are not contaminated with later intrusions. Beads are small and very portable, and modern villagers throw their refuse on ancient tells. Especially common are European glass trade beads of the last five centuries.

At Fustat, many Venetian (Pl. ID) and a few Bohemian beads were collected and are now in the Islamic Museum. Until recently, several large (up to 4.5 x 6.2 cm) seven-layered chevrons were displayed as being Fustat material. The staff is now convinced that they are Venetian from around 1480 to 1580 or so.

At Nishapur intrusions also caused some confusion. A few have been published by the Metropolitan Museum, and others were until recently on display in the Nishapur Gallery. Some 3.3% of the assemblage consisted of intrusions. This was less a problem at Siraf, where under one percent of the beads were modern, with the one made of plastic being recognized by the excavators.

This is not the place to discuss all possible intrusions and their consequences. Excavators cannot be expected to recognize them; this is the task of the bead researcher. Even if one is interested only in older beads, it is necessary to know something about the history of styles, advances in glassmaking, and changes in beadmaking techniques.

EARLY ISLAMIC BEADS IN THE INDIAN OCEAN TRADE: TOWARD A SYNTHESIS

The four sites discussed in this paper were studied as part of a larger project involving the bead trade of the Indo-Pacific region. They may also be considered a unit in themselves, representing the Early Islamic Period.

The bead trade was lively at these sites. Mantai and Fustat were beadmakers, often producing for export, and Fustat and Siraf were both transportation hubs. Only Nishapur was basically a consumer of largely locally-made beads. The bead trade seems to have been more active along the sea than the land routes between East and West.

Although international in scope, trade was selective. There is no evidence for trade with western Europe and little with the Far East. Europe was shunned for ideological reasons, while Mantai, and not the Islamic world, was the point of contact with the East. Yet, the Islamic sites traded extensively: with East Africa, Northern Europe (Scandinavia and Russia), and the Indian subcontinent. The five staples in the bead trade — coral, gold-glass, lapis lazuli, carnelian and onyx — were available at the fringes of the Islamic world. Shortly after the 12th century, Muslims gained control of the western-Indian agate-bead industry by taking over both the sources of the stone and the lapidaries (Francis 1986b).

Trade is not the only human activity which may be better understood through a study of beads. Many beads discussed here have ideological content, especially at Nishapur, with its many potential eye amulets, several charm case beads and two of the peculiarly-shaped flat pendants of Babaghoria agate. Moreover, many jet beads had Arabic inscriptions, and the designs on the soda-etched carnelians probably had significance.

At Siraf there was a marked difference. Save for the yellow glass *Imam* beads, none were clearly Islamic in character. There were no charm case beads, Babaghoria pendants, or beads with Arabic inscriptions. They are typical Early Islamic beads, but not especially Muslim in character. This may support Whitehouse's (1974: 29-30) hypothesis that the population was mostly non-Muslim or nominally Muslim,

a situation favored by the Buyid dynasty, with its emphasis on reviving the pre-Muslim glory of Persia.

One important lesson to be drawn from this study is the role Early Islamic society played in providing a link to, rather than a sharp break from, the earlier Classical Age (Huzayyin 1942). Three beadmaking technologies which had been assumed to have died out upon the coming of Islam (glazing quartz, soda-etching carnelians, and making faience) are now understood to have been given premature obituaries. The continuity between the Classical and Early Islamic Periods causes problems of ascription, some of which have been partially resolved here, as with the green jasper cornerless cubes, the torus folded bead, and the Fustat Fused Rod Bead.

Our overall impression is one of self-sufficiency among the sites in the Islamic sector of the Indian Ocean trade. Some of these sites were beadmakers or controlled important aspects of the bead trade. Siraf and other ports were responsible for actually moving the beads from one place to another. The Early Islamic world controlled the sources of the staples of the bead trade (carnelian and onyx falling into their hands a bit later). The region traded widely but selectively, importing few beads from outside and being responsible for many of its own beads traveling widely.

REFERENCES CITED

- Allan, J.W., L.R. Llewellyn and F. Schweitzer**
1973 The History of So-Called Egyptian Faience in Islamic Persia: Investigations into Abu'l Qasim's Treatise. *Archaeometry* 15(2):111-120.
- Allgrove, Joan**
1976 Jewellery. In *The Qashqa'i of Iran*, World of Islam Festival, pp. 44-51. Whitworth Art Gallery, Manchester.
- Arberry, Arthur J.**
1964 *The Koran Interpreted*. Oxford University Press, Oxford.
- Beck, Horace C.**
1933 Etched Carnelian Beads. *Antiquaries Journal* 13:384-394.
1935 Notes on Glazed Stone. Part Two: Glazed Quartz. *Ancient Egypt and the East* I:19-37.

Boon, G.C.

- 1966 Gilt Glass Beads from Caerleon and Elsewhere. *Bulletin of the Board of Celtic Studies* 22(1):104-109.

Brunel, Francis

- 1972 *Jewellery of India: Five Thousand Years of Tradition*. National Book Trust, New Delhi.

Buckley, Wilfred

- 1939 *The Art of Glass*. George Allen and Unwin, London.

Budge, E.A. Wallis

- 1961 *Amulets and Talismans*. University Books, New Hyde Park, NY.

Callmer, Johan

- 1977 Trade Beads and the Bead Trade in Scandinavia ca. 800 - 1000 A.D. *Acta Archaeologica Lundensis* 4(11).

Chittick, Neville

- 1974 *Kilwa*. British Institute in East Africa, Nairobi.

Clerget, Marcel

- 1934 *Le Caire, Étude de Géographie Urbaine et D'Histoire Économique*. 2 vols. E. & R. Schendler, Cairo.

Clot-Bey, A.-B.

- 1840 *Aperçu Général sur l'Égypte*. Fortin, Masson, Paris.

Crabbe, David and Richard McBride (eds).

- 1978 *The World Energy Book: An A-Z Atlas and Statistical Source Book*. Nicholas Book Co., New York.

Deo, S.B.

- 1960 Beads, Pendants, and Amulets. In *From History to Prehistory at Nevasa*, by H.D. Sankalia and others, pp. 346-375. Deccan College, Poona, India.
- 1971 Beads. In *Navadatoli*, by H.D. Sankalia and others, pp. 351-372. Deccan College/M.S. University, Poona/Baroda, India.

Dikshit, M.G.

- 1949 Etched Beads in India. *Deccan College Monograph Series* 4.
- 1969 *History of Indian Glass*. Bombay University, Bombay.

Eichholz, D.E. (ed.)

- 1962 Natural History. *Loeb Classical Library*, vol. 10. Harvard University Press, Cambridge, MA.

Faris, Nabih Amin (ed.)

- 1938 *The Antiquities of South Arabia: A Translation from the Arabic with Linguistic, Geographic, and Historic Notes of the Eighth Book of Al-Hamdani's Al-Iklal*. Princeton University Press, Princeton.

Fesquet, M. Goupil

- 1843 *Voyage D'Horace Vernet en Orient*. Challamel, Paris.

Francis, Peter, Jr.

- 1979a A Short Dictionary of Bead Terms and Types. *World of Beads Monograph Series* 4.
- 1979b Third World Beadmakers. *World of Beads Monograph Series* 3.
- 1980 Bead Report II: Etched Beads in Iran. *Ornament* 4(3):24-28.
- 1982 Indian Agate Beads. *World of Beads Monograph Series* 6.
- 1986a A Bit More on the Cornerless Cube. *Bead Forum* 8:8-10.
- 1986b Baba Ghor and the Ratanpur Rakshisha. *Journal of the Economic and Social History of the Orient* 29:198-205.
- 1987 Report on the Beads from Nishapur in the Metropolitan Museum of Art. *Contributions of the Center for Bead Research* 2.
- 1988a Bead Report: Nishapur, An Early Islamic City of Iran. *Ornament* 12(2):78-93.
- 1988b Bead Report: When Is a Bead Not a Bead? *Ornament* 11 (3):33, 66-76.
- 1988c The Glass Trade Beads of Europe: Their Manufacture, Their History, and Their Identification. *World of Beads Monograph Series* 8.
- 1989 Beads and the Bead Trade in Southeast Asia. *Contributions of the Center for Bead Research* 4.
- n.d. a The Beads from Mantai. In *Mantai Excavation Report*, edited by John Carswell (in press).
- n.d. b Classical Western Knowledge of Sri Lanka and Mantai ca. 325 B.C. to A.D. 550. In *Mantai Excavation Report*, edited by John Carswell (in press).
- n.d. c From the Systemic to the Archaeological: The Case of Lost Beads (in preparation).
- n.d. d The Indian Ocean Bead Trade in the First Half of the 17th Century. Manuscript on file, Center for Bead Research, Lake Placid, NY.
- n.d. e The Roots of Bead Research. Manuscript on file, Center for Bead Research, Lake Placid, NY.

Frye, Richard N.

- 1972 Byzantine and Sasanian Trade Relations with North-east Russia. *Dumbarton Oaks Papers* 26.

Ganji, Mohammed Hasan

- 1970 Iran — Economy. In *Encyclopedia Britannica* 12:520-525.

Goitein, S.K.

- 1961 The Main Industries of the Mediterranean Area as Reflected in the Records of the Cairo Geniza. *Journal of the Economic and Social History of the Orient* 4.
- 1963 Letters and Documents of the India Trade in Medieval Times. *Islamic Culture* 37(3).
- 1973 *Letters of Medieval Jewish Traders*. Princeton University Press, Princeton.

Griffiths, D.R.

- 1980 The Deterioration of Ancient Glass. Unpublished Bachelor of Science thesis, University of Wales, Cardiff.

Gupta, P. Lal

- 1979 *Coins*. National Book Trust, New Delhi.

Harding, J.R.

- 1961 Conus Shell Disc Ornaments (*Vibangwa*) in Africa. *Journal of the Royal Anthropological Institute* 91:52-66.

Harper, Prudence O. and Pieter Meyers

- 1981 *Silver Vessels of the Sasanian Period. Vol. 1: Royal Imagery*. Metropolitan Museum of Art/Princeton University Press, New York/Princeton.

Hasan, Hadi

- 1928 *A History of Persian Navigation*. Methuen, London.

Herrmann, Georgina

- 1968 Lapis Lazuli: The Early Phases of Its Trade. *Iraq* 30.

Huzayyin, S.A.

- 1942 *Arabia and the Far East: Their Commercial and Cultural Relations in Greco-Roman and Irano-Arabian Times*. Société Royale de Géographie D'Égypt, Cairo.

Jenkins, Marilyn and Manuel Keene

- 1982 *Islamic Jewelry in the Metropolitan Museum of Art*. Metropolitan Museum of Art, New York.

Karklins, Karlis

- 1982 Glass Beads. *History and Archaeology* 59.

Keene, Manuel

- 1981 The Lapidary Arts in Islam. *Expedition* 24(1):24-39.

Khanikoff, N.

- 1860 Analyses and Extracts of the *Book of the Balance of Wisdom*. *Journal of the American Oriental Society* 6.

Kidd, Kenneth E.

- 1983 Problems in Glass Trade Bead Research. In "Proceedings of the 1982 Glass Trade Bead Conference,"

edited by Charles F. Hayes III. *Rochester Museum and Science Center, Research Records* 16:1-4.

Lane, A.

- 1947 *Early Islamic Pottery: Mesopotamia, Egypt, Persia*. London.

Liu, Robert K.

- 1978 Spindle Whorls, Part I: Some Comments and Speculations. *Bead Journal* 3(3-4):87-103.

Malleret, Louis

- 1962 *L'Archéologie du Delta du Mékong, Tome 3, La Culture du Fou-Nam, Texte*. École Française d'Extrême-orient, Paris.

Maloney, Clarence (ed.)

- 1976 *The Evil Eye*. Columbia University Press, New York.

Melville, Charles

- 1980 Earthquakes in the History of Nishapur. *Iran* 18:103-120.

Morazzoni, Giuseppe

- 1953 Le Conterie Veneziane dal Secolo XIII al Secolo XIX. In *Le Conterie Veneziane*, by G. Morazzoni and M. Pasquato, pp. 5-74. Società Veneziane Conterie e Cristallerie, Venice.

Neuburg, Fredric

- 1949 *Glass in Antiquity*. Salisbury Square, London.

Niebuhr, Carsten

- 1774 *Description de L'Arabia*. S.J. Bualde, Amsterdam.

Oda, Sachiko

- 1965 Chemical Studies on the Materials of Beads from the Ghalekuta I Site. In *Dailaman I*, by Manio Egami and others, pp. 33-55. Institute for Oriental Culture, University of Tokyo, Tokyo.

Petrie, W.M.F.

- 1914 *Amulets*. Constable, London.

Pettijohn, F.J.

- 1957 *Sedimentary Rocks*. Oxford University Press, Calcutta.

Pinder-Wilson, Ralph and George Scanlon

- 1987 Glass Finds from Fustat: 1972-1980. *Journal of Glass Studies* 29:60-71.

Pollard, A.M, G.D. Bussell and D.C. Baird

- 1981 The Analytical Investigation of Early Bronze Age Jet and Jet-Like Material from the Devizes Museum. *Archaeometry* 23(2):139-167

Raymond, André

- 1973 *Artisans et Commerçants au Cairo au XVIIIe Siècle*. 2 vols. Institute Français de Damas, Damascus.

Reade, Julian

- 1979 Etched Beads in Mesopotamia and the Indus Civilisation. *British Museum Occasional Papers* 1.

Riis, P.J., Vagn Poulsen and E. Hammershaib

- 1967 *Hama, IV, 2, Les Verreries et Poteries Medievales*, Copenhagen.

Sankalia, H.D. and M.G. Dikshit

- 1951 Excavations at Brahmapuri (Kolhapur) 1945-46. *Deccan College Monograph Series* 5.

Sastri, K.A.N.

- 1937 *The Cholas*. Vol. 2, Part 1. University of Madras, Madras.

Schienerl, Peter

- 1980 Historical Survey of Tubular Charm-cases up to the 7th C. A.D. *Ornament* 4(4):10-14.
 1982 Crescent to cross: Roman and Byzantine Glass Pendants. *Ornament* 6(2):8-9, 54.
 1985 Cornerless Cube Stone Beads in Egypt and Palestine. *Bead Forum* 7:8-9.

Schiffer, Michael B.

- 1976 Toward a Unified Science of the Cultural Past. In *Research Strategies in Historical Archaeology*, edited by Stanley South, pp. 13-40. Academic Press, New York.

Schmidt, Erich F.

- 1937 *Persepolis II*. University of Pennsylvania, Philadelphia.

Schofield, J.F.

- 1958 Beads: Southern African Beads and Their Relation to the Beads of Inyanga. In *Inyanga*, by Roger Summers, pp. 180-229. Cambridge University Press, Cambridge.

Shaw, Thurstan

- 1970 *Igbo-Ukwu: An Account of Archaeological Discoveries in Eastern Nigeria*. Northwestern Press, Evanston.

Singh, Ravindra N.

- 1983 The Antiquity of Gold-glasses in India. *Puratattava* (dated 1981) 12:157-159.

Smith, Ray Winfield

- 1957 *Glass from the Ancient World*. Corning Museum of Glass, Corning.

Spector, Janet D.

- 1976 The Interpretive Potential of Glass Trade Beads in Historic Archaeology. *Historical Archaeology* 10:17-27.

Spooner, Brian

- 1976 Arabs and Iranians: The Evil Eye in the Middle East. In *The Evil Eye*, edited by Clarence Maloney, pp. 76-84. Columbia University Press, New York.

Sprague, Roderick

- 1985 Glass Trade Beads: A Progress Report. *Historical Archaeology* 19:87-105.

Stein, Aurel

- 1921 *Serindia: Detailed Report of Explorations in Central Asia and Westernmost China*. Oxford University Press, Oxford.

Takakushu, J. (transl.)

- 1929 Le Voyage de Kanshin en Orient (742-754) par Aomi-No Mabito Genkai (779). Part 2. *Bulletin Ecole Française d'Extreme-Orient* 28(3-4):441-472.

Tite, M.S., I.C. Freestone and M. Bimson

- 1983 Egyptian Faience: An Investigation of the Methods of Production. *Archaeometry* 25(1):17-27.

Whitehouse, David B.

- 1968 Excavations at Siraf: First Interim Report. *Iran* 6:1-22.
 1970 Excavations at Siraf: Third Interim Report. *Iran* 7:1-18.
 1972 Excavations at Siraf: Fifth Interim Report. *Iran* 10:63-86.
 1974 Excavations at Siraf: Sixth Interim Report. *Iran* 13:1-30.
 1975 Carnelian in the Persian Gulf. *Antiquity* 49:129-130.

Wilkinson, Charles K.

- 1986 *Nishapur: Some Early Islamic Buildings and Their Decorations*. Metropolitan Museum of Art, New York.

Wulff, Hans E.

- 1966 *The Traditional Crafts of Persia*. M.I.T. Press, Cambridge, MA.

Wulff, Hans E., Hildegard Wulff and Leo Koch

1968 Egyptian Faience: A Possible Survival in Iran. *Archaeology* 21(2):98-107.

Zecchin, Luigi

1968 Fortuna d'una parola sbagliata. *Journal of Glass Studies* 10:110-113.

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