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KARLIS KARKLINS, *editor*

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BOOK REVIEWS

INFORMATION FOR AUTHORS

1. Papers submitted for publication must by typed double-spaced, justified left, with 1 in. margins. Submissions should not exceed 50 pages including references cited. The hard copy should be accompanied by the text as an e-mail attachment or on a 3-1/2 disk or CD in Word Perfect 8/9 (.wpd), Word for Windows 6.0 or later (.doc), or Rich Text File (.rtf).

2. All manuscripts must be prepared with the following internal organization and specifications:
   a. First Page: place title and author's name(s) at top of the page.
   b. Abstract: an informative abstract of 150 words or less is to comprise the first paragraph.
   c. Acknowledgements: these are to be placed at the end of the article, before the references cited.
   d. Author's Affiliation: place author's name, affiliation, and address adjacent to the right margin immediately following the references cited.
   e. Tables: each table must have a short title and be typed double-spaced on a separate page. Do not embed tables or illustrations in the body of the report.
   f. Figure Captions: list the captions for black and white illustrations (Figures) sequentially on a separate page using Arabic numerals; color illustrations (Plates) should be listed separately using Roman numerals.

3. Number all pages consecutively from the title page through the references cited.

4. All headings should be situated three (3) spaces below the preceding text and flush with the left margin.
   a. **PRIMARY HEADINGS** are to be capitalized and bold.
   b. **Secondary Headings** are to be typed using bold upper and lower case letters.
   c. ***Tertiary Headings*** are to be the same as the secondary headings with the addition of italics.
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5. Reference citations and the references cited should follow the style of *Historical Archaeology* <http://www.sha.org/publications/documents/SHA%20Style%20Guide-Dec%202006.pdf> (pp. 22-38).

6. Illustrations:
   a. All drawings and photographs should be of publishable quality, with color and B&W images having sharp focus and contrast.
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   f. When several items are shown in a single frame, each object is to be designated by a lower case letter, and the caption should include references to these letters.
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9. Manuscripts will be judged on the accuracy of their content, appropriateness for an international audience, usefulness to other researchers, and consistency with the research and ethical goals of the Society.

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HEIRLOOM BEADS OF THE KACHIN AND NAGA

Barbie Campbell Cole

The heirloom beads of the Kachin and Naga – known respectively as khaji *and* deo moni *– were discussed at length in British-colonial literature, but remained unidentified until the present day. The homelands of the Kachin and Naga straddle the northern Burma/Northeast India frontier. Safe from the great civilizations which rose and fell in the plains, the cultures of these hill peoples remained relatively intact until the arrival of the colonial British in the 1830s. The author's research reveals that* khaji *and* deo moni *are orange Indo-Pacific beads of a type traded from southeast India – probably Karaikadu – between 200 B.C. and A.D. 200. They were found by the Kachin and Naga in ancient graves. The trade that brought these beads to the region operated on a considerable scale. Ivory and fragrant oils destined for the Mediterranean world were exchanged for Indo-Pacific beads, cowries, chank shells, and carnelian beads, ornaments still worn by the Kachin and Naga today.*

INTRODUCTION

To quote J.P. Mills, ethnographer and British-colonial administrator in Northeast India in the 1930s, "The spade, the chief tool of the archaeologist, has hardly been used in Assam" (Mills 1933:3). Although more work has been undertaken in recent years in Northeast India (Medhi 1990:37-44; Singh et al. 1991), many of the prehistoric and early historic sites have yet to be accurately dated, and the region is poorly documented in publications on the archaeology of South Asia. Kachin State in Burma's far north has been equally overlooked by archaeologists whose efforts have been focused on the great river valleys to the south. Moreover, in Northeast India and Kachin State there is little discernible reference in the literature to ancient beads.

India's Northeast – known in British-colonial times as Assam – forms a physical and cultural bridge between India, Southeast Asia, and China, and through it lay the great migration and land trade routes between east and west (Fig. 1). Its history therefore is that of the meeting of Austro-Asiatic, Indo-Aryan, and Tibeto-Burman cultures. No other part of India has such ethnic diversity; nearly two hundred separate tribes still live in the region today. The earliest inhabitants are thought to have been of Austro-Asiatic/Negrito stock. Isolated islands of Austro-Asiatic speakers still remain, both in Assam as well as in eastern India, Bangladesh, and Southeast Asia, a record of a far distant period when Austro-Asiatic languages were spoken throughout northern (and possibly southern) India and Southeast Asia. The remains of monoliths and stone tools belonging to these peoples are scattered over the hills and

Figure 1. Northeast India and Burma during the British-colonial period, showing the main trade route to China via Yunnan (Stevenson 1944: inside cover).

plains of Assam (Bareh 1985:5; Sharma 1991:47). The Austro-Asiatic peoples later retreated to the Khasi/Jaintia Hills, supplanted by successive waves of Mongoloid Tibeto-Burmans who are thought to have originated in northern China and arrived in Northeast India during the middle of the Neolithic period (Gopalakrishnan 1991:13-22; Langstieh and Reddy 1999:265).

By the first millennium B.C., a kingdom known as Pragjyotisha had arisen in northern Assam. Its capital was near present-day Guwahati on the river *Lauhitya*, the ancient name of the Brahmaputra. Pragjyotisha was first recorded in the ancient Vedic text, the *Mahabharata* (Badadur 1933:1, 16). Its early inhabitants were referred to as *Kiratas* and *Cinas*, a "golden skinned" people thought to be of Indo-Tibetan origin (Lahiri 1991:10-11). In the *Periplus of the Erythraean Sea* (1st century A.D.) (Schoff 1974) and Ptolemy's *Geographia* (2nd century A.D.), the region is called Kirrhadia, thought to refer to its *Kirata* population. Kamarupa, as *Pragjyotisha* was later known, probably stretched west as far as Nepal and south to West Bengal (J.N. Choudhury 1991:89).

Aryan tribes from Central Asia spread across the Ganges plain in the late 7th century B.C. The Ayranisation of Pragjyotisha is implied in the *Ramayana* and *Mahabharata* by the legend of the semi-mythical king Naraka who killed the *Kirata* king Ghataka, conquered Pragjyotisha, and settled Aryans in his kingdom. Naraka's true origin is obscured by the legend in which he stole the earrings of Aditi and was subsequently killed by Lord Krishna (Badadur 1933:20; Lahiri 1991:10). It is said, however, that Pragjyotisha's population remained mainly non-Aryan, probably inhabited by Indo-Tibetans of the Bodo or Boro group, the *Kiratas* of the ancient texts (Badadur 1933:20-21). Linguistic evidence implies that at one time the Bodo people extended over the whole of the Assam Valley, northern and eastern Bengal, and the surrounding and intervening hills, with the exception of only the Khasi/Jaintia Hills (Badadur 1993:20; Barua 1951:6). The kingdom of Pragjyotisha/Kamarupa lasted until the 10th century A.D. Over the successive centuries, groups said to be of Bodo origin built kingdoms in the Brahmaputra Valley under various tribal names, among them the Chutiya, Kacharis (13th century), and Kocches (16th century). The Ahom, a Tai/Shan group from Burma's Hukawng Valley, entered the Brahmaputra Valley in the 13th century and by the 18th century held most of the region, successfully resisting Mughal invasion. The Ahom gave their name to the region, softened from Ahom to Assam. In the 19th century the Ahom were fatally weakened by the Burmese and Assam finally came under British administration in 1836. British India's capital was Calcutta, in Bengal, to the south of Assam.

After India's Independence and Partition in 1947, much of the state of Bengal was lost to India, becoming East Pakistan, later Bangladesh. As a result, Assam lost Chittagong, its main seaport. In 1911, the capital of British India had been transferred from Calcutta to the old Mughal capital, Delhi. This left Assam both geographically and politically isolated, almost completely landlocked by foreign states, and accessible from the rest of India only by a narrow north-south corridor some 30 miles wide through the Indian state of East Bengal. Economic stagnation, political tensions, and separatist movements followed. The Assam of British-colonial times was divided into seven separate states: Arunachal Pradesh, Nagaland, Meghalaya, Manipur, Mizoram, Tripura, and Assam, known collectively as Northeast India. Political tensions continue today. Permits are required for several of the seven states which are time-consuming to obtain, creating hurdles for the fieldworker. Foreigners also require permits to enter most of Burma's Kachin State.

Overall, conditions are not favorable for the archaeologist or ethnographer. Much of the region is still covered with dense tropical forest, with an exceptionally high rainfall, high humidity, and a fertile but acidic soil. Northeast India in particular lies at the foot of the vast Himalayan range at the point of impact of tectonic plates. It is therefore prone to earthquake and flood, and in the plains much must lie buried deep below layers of silt deposited over millennia by the frequent flooding of the mighty Brahmaputra (Bhuyan 1993:27; Gait 1905:20).[1] Monoliths of the prehistoric period still remain, however, particularly in the formidable hill ranges to the south and east of the Brahmaputra plain. These remote and inhospitable hills, which spill across the border into Burma, became places of refuge for peoples who, for whatever reason, were forced to migrate or flee from the fertile plains below. Safe from the predations of the great civilizations which rose and fell in the plains, the cultures of these hill peoples – the Kachin (Singpho), the Naga, and many more – remained relatively intact until the British arrived in the 1830s. Their migration myths and heirlooms, particularly their heirloom beads, were passed from generation to generation over the centuries, and reveal much about their ancient origins.

HEIRLOOM BEADS

The concept of handing down property from one generation to the next is an ancient one.

Formal patterns of what bead scholar Peter Francis, Jr., has called "bead heirlooming" still exist among many

minority groups, including those in India and in island and mainland Southeast Asia. As we have seen, many of these hill peoples were marginalized, driven by newcomers to more protective mountainous regions where they kept themselves apart. Heirloom beads played an active role in this isolation. They were social diacritical marks, announcing their owner's social status, gender, wealth, religion, age, birth order, position in the family, or marital status, and above all, ethnic identity (Francis 1994:95; 2002:181-182). Valued beads probably became true heirlooms only when they were either irreplaceable or very difficult to obtain. Their origins became obscured over time and they were sometimes ascribed with a magical source, or associated with their owners' ancient past or migration myths.

Strict rules generally governed the care, use, and inheritance of heirloom beads, and they were often used in marriage and burial rituals. Their rarity gave them great value, and they represented stored wealth in communities that had no coinage. They were sought as booty in raids against nearby villages, and in times of great need they could be bartered. Although heirloom beads were worn by men, they were normally worn in greater profusion by women, often the only form of wealth women controlled. They were frequently part of a girl's bride price. The most valuable heirloom beads were often stored and worn only at feasts. Some beads were considered too valuable to wear and were just displayed in the houses of the wealthy during feasts.

Francis poses the question: Do the oldest heirloom beads of Southeast Asia date to a period of cultural crisis in the history of their owners? Did heirlooming begin when the peoples involved experienced a traumatic event, such as being driven into the uplands. About two-thirds of the groups studied by Francis fit this hypothesis (Francis 2002:181, 192).

Heirloom beads were frequently copied by successive generations of glass artisans or entrepreneurs. The imitation beads were often made from a different material and were sometimes cheaper. These beads were generally recognized as fakes but could nevertheless be successfully bartered by outsiders for local goods, and were worn by the less wealthy. Along with other novel beads of exotic origin which traders thought might appeal, these imitation beads traveled along a network of much later local and international trade routes in subsequent centuries, and in Southeast Asia came from as far away as China and India, and later from Venice, Germany, Holland, and Bohemia. These beads sometimes acquired a mystique of their own and can be found alongside much older beads in heirloom necklaces, their source being the subject of the author's present research.

THE ORIGINS OF *KHAJI*, THE HEIRLOOM BEADS OF THE KACHIN

Like the Naga, the Kachin (or Singpho) are a mountain people of Tibeto-Burman origin. They occupy a large horseshoe of inhospitable territory in northern Burma which overlaps into Assam to the west, extending from the Hukawng Valley eastwards along the Tibetan frontier and down to and overlapping the Chinese frontier as far south as Kentung in Shan State. The Kachin claim origins in the Tibetan plateau. From there they migrated gradually south through Yunnan, arriving in northern Burma in the 16th and 17th centuries, to the exclusion of the Chin, Palaung, and Shan. Always a warlike group until the British-colonial period, the Kachin spent much of their time in inter-tribal warfare and in raiding the Burmese and Shan in the adjoining plains (Stevenson 1944:8). *Khaji* (also spelled *kaji*, *kadji*, and *kashi*), the heirloom beads of the Kachin, were frequently referred to in British-colonial literature, although the material from which they were made was little understood and contemporary photographs do little to reveal their origins (Fig. 2):

> The ornaments generally worn by (the Kachin) are amber ear-rings, silver bracelets, and necklaces of beads, a good deal resembling coral, but of a yellowish colour, and these are so much prized by them that they sell here for their weight in gold (Pemberton 1873:104).
>
> A woman's most prized ornament is a Khaji – a necklace of terracotta coloured stones which is only obtainable in the Hkanung country in the Putao district.[2] These are difficult to obtain and are kept as heir-looms in a family. A Duwa (local chief) may stipulate that a Khaji for his daughter should be sufficiently long to equal the girth of the largest house post in his house (Carrapiett 1929:16).
>
> Lords and rich people wear round their neck a string of precious pearls, kashi, of a yellow colour…. Besides necklaces, well-to-do ladies also wear kashi resembling that of the men (Gilhoedes 1922:148).

Despite the many ancient beads available on the Burmese antiquities markets in Rangoon and Mandalay, no information is available about the *khaji* of the Kachin. In Myitkyina, the capital of Kachin State, the author was shown a necklace of small, opaque, orange glass beads arranged on either side of a central silver bead (Pl. IA), interspersed with wound red and black-and-white-eye glass beads dating from the 19th or early 20th century (*see also* Fig. 2). The orange beads were clearly much older and were ancient Indo-Pacific beads. This raises the question: How had Indo-Pacific beads reached the very far north of Burma to become the heirloom beads of the Kachin?

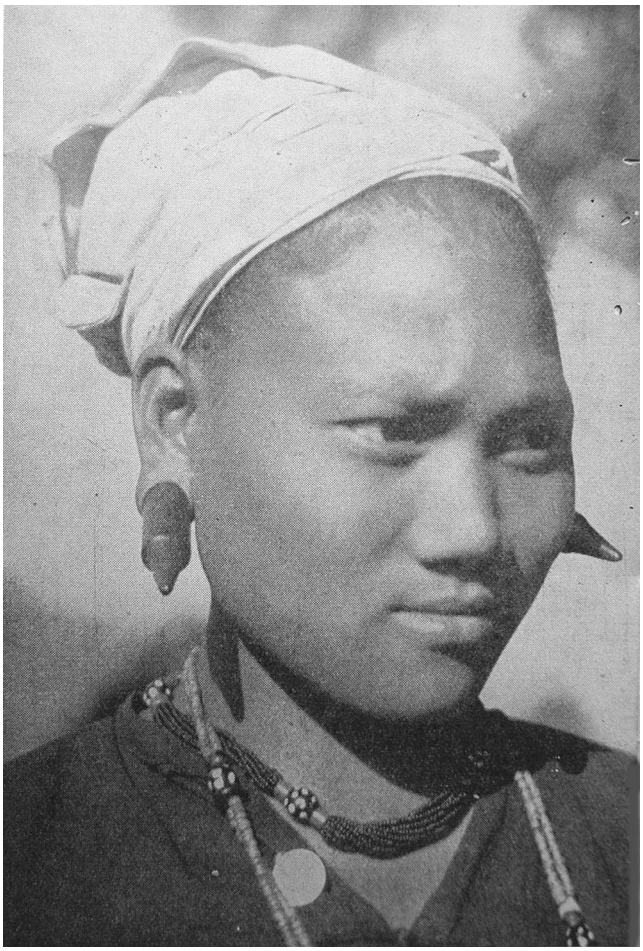

Figure 2. A Hkahku Kachin girl. The longer necklace appears to consist of *khaji* beads. She also wears amber ear plugs. According to British-colonial sources, amber earplugs were very costly. Today they are still regarded as heirlooms by the Kachin. The amber comes from mines within Kachin State which today are much depleted. It is rare to find amber of sufficient size to make large plugs (Stevenson 1944: opp. p. 8).

Indo-Pacific beads, also called *mutisalah* (Francis 2002:19; Lamb 1965a, 1965b) and "trade wind beads" (Sleen 1958:208-212; 1966:244), are small, monochrome, drawn glass beads first made in Arikamedu and Karaikadu in South India by a unique method developed around 200 B.C. The glass was drawn hot from a furnace into a long tube by the *lada* technique and then cut into sections which were then heat rounded. Production later spread to Mantai in Sri Lanka, Oc Eo in Vietnam, Klong Thom in Thailand, and Kuala Selinsing in Malaysia. The beads were made of an opaque glass in a limited range of colors (reddish brown, orange, yellow, green, black) and in semi-translucent green, blue, amber yellow, and violet. The glass is generally of poor quality, with streaks, bubbles, and other impurities. Indo-Pacific beads are found in large quantities at archaeological sites that span nearly two thousand years and stretch – to quote bead historian Peter Francis, Jr. – "from Ghana to China, Mali to Bali, and South Africa to South Korea" (Francis 2002:19-84). They are undoubtedly the most widespread trade bead of all time.

Once the drawn glass tube was chopped into segments, the rough Indo-Pacific beads were heat rounded. This involved putting them in a metal container with charcoal and ash which was heated over a hot fire or in a cooler furnace. The beads were then agitated, probably with a shovel-like instrument. The heat and agitation gradually rounded the sharp and uneven edges. The longer the beads were subjected to this process, the greater their "roundness" (Francis 2002:25). The *khaji* of the Kachin are distinctive in that the heat-rounding process was relatively short, resulting in somewhat irregularly shaped beads which range from standard cylinders to cylinder discs (Beck 1928: Pls. II-III).

Because the Kachin grade their *khaji* beads by size, a string resembles an irregularly segmented tube of varying diameter. Another distinctive feature of *khaji* is their size. Indo-Pacific beads are rarely more than 5 mm diameter. Beads of the *khaji* type are found up to 10 mm and more in diameter (Pls. IB-IC). For the Kachin, the larger the bead, the greater its value. In Myitkyina today a necklace of *khaji* cannot be acquired for less than US$150, a vast sum in Burma. When in need of money, villagers sell one bead at a time.

In Myitkyina, information about the origins of *khaji* beads was limited, and a field trip to villages to the north of Kachin State was arranged. This region, stretching north to the border of Tibet, remains one of the least touched and most remote in the world (Kingdom-Ward 1921, 1937, 1949; Rabinowitz 2001). Access by foreigners is restricted by the present Burmese government. Apart from a few miles of paved road in the immediate surroundings of Putao (known as Fort Hertz in British-colonial times), field trips must be made on foot (Fig. 3).

In the small villages scattered around Putao, many households own a string of precious *khaji*, also known as *shawana*, meaning "heirloom" in the Rawang language.[3] Informants in Putao and the neighboring villages of Machanbaw, Langtao, and Namkhan recount a variety of myths about the origins of *khaji*. Many claim that they are made from "a naturally occurring extrusion or tube found underground and already pierced for threading." Others claim they are sometimes found beneath "mounds in the ground as if made by burrowing insects," from which the beads can be retrieved by sticking a fine rod of bamboo into the mound which pierces the *khajis'* naturally made hole. *Khaji* are also said to be found occasionally in the stomachs

Figure 3. Carrying wood in the Putao area, Kachin State, Upper Burma, one of the most remote regions in the world. Apart from a few paved roads in the immediate vicinity of Putao, journeys must be made on foot (photo by author).

of jungle fowl. In former times, anyone wanting to find *khaji* had to make an offering to the *nats* (animist spirits), but since the Kachin became Christians as a result of missionary activity in the 19th and early 20th centuries, *khaji* are now rarely found.

The village of Gong Lu or Gon Lu (Hill People Mound or Tall People Mound), some 95 km (60 mi.) west of Putao in Machanbaw Township, was often mentioned as a site where *khaji* beads had been found. This very remote and, even today, inaccessible village is in eastern Kachin State towards the Chinese border, on what the Rawang claim to be their ancient migration route into Burma. The ruins of an ancient Rawang village are said to be found near Gong Lu, with evidence of the smelting of local iron ore. Two miles from Gong Lu, near the Gitkat River,[4] is said to be a mountain called Galumkhi Bum which is shaped like one rock on top of another. This distinctively shaped mountain was mentioned by informants in several villages, each time with a different name: *Bum Pang* (Root Mountain), *Khinze Magaung* (Two Stone Mountain), and *Galumkhi Bum* (Red Stone Mountain); also *Shet Bum Magun*.

Khaji are also said to have been found in the last thirty years at villages nearer the Chinese border and at a village called Namtumku near the Assam border, but these beads "were brown, and not the true natural product." All of these reports appear to confirm that *khaji* came from ancient graves.

Informants also reported that the Naga – whose homeland adjoins that of the Kachin to the west and spans the Assam/Burma border – were said to have found *khaji* near a mountain called Leik Taung (Bead Mountain) near Shinbuyang in the Hukawng Valley. A reference from British- colonial times also mentions *khaji* in connection with the Naga. Carrapiett reported that prior to the First World War, cheap glass imitations of "*kagyi* stones from Germany" were worn by the Kachin, "although acknowledged as worthless substitutes" (Fig. 4; Pls. ID, IIA). These were said to be brought to the Sinlum Hills annually and traded to the Kachin by Naga tribesmen (Carrapiett 1929:16, 18). Why would 20th-century imitation *khaji* beads from Germany be available in the Naga Hills? Did the Naga also value *khaji*?

Figure 4. *Khaji* are still worn at Kachin festivals with cheap imitations being utilized by young girls. Langtao village, southeast of Putao, Kachin State, Burma (photo by author).

THE *DEO MONI* BEADS OF THE NAGA

In many Naga necklaces seen in collections today, cylindrical orange-glass beads of various types and sizes predominate (Pl. IIB, top; cf. Pl. IIB, bottom). These beads are not ancient and must have been traded into Nagaland in more recent centuries from Europe, or perhaps earlier from India or China, but their resemblance to *khaji*/Indo-Pacific beads is remarkable (Pl. IIC). Are ancient Indo-Pacific beads found in Naga heirloom necklaces? Are the *khaji* of the Kachin the *deo moni* heirloom beads of the Naga?

Like the Kachin, the Naga are a Mongoloid people who migrated over millennia from north or northeast China into Southeast Asia. Little is known of the Naga's early history, but their arrival in Southeast Asia appears to predate that of the Kachin. The Greek geographer Ptolemy mentioned the Naga around A.D. 150, their name thought to derive from *nanga*, meaning "naked" in Sanskrit (Johnstone 1896:5). In the steep jungle-clad hills and gorges lying between the Brahmaputra Valley and the Chindwin Valley in Burma, various Naga groups immigrated, coalesced, or were absorbed by others. This remote and inhospitable region with its infrequent passes formed a forbidding physical barrier between Assam, Burma, and China (Beal 1884:198).[5] This isolated the Naga and sequestered tribe from tribe, reinforcing their introversion and resulting in a highly distinctive culture. Head-hunting and a warlike reputation further limited external contact until the beginning of the British-colonial period in the 1840s. The Naga were, however, never totally isolated. The groups nearest the plains maintained limited trading contacts with the peoples of the Brahmaputra Valley where the great kingdoms of the Kacharis, Koch, and Ahoms were centered. To the east, trade was also maintained with the peoples living in the Chindwin Valley. The Naga exchanged wild cotton, ivory, and ginger for salt, metals, shells, and beads, for no other tribe valued and wore ornaments in such profusion as the Naga (Fig. 5).

From the start, British-colonial administrators were struck by the creativity of Naga jewellery. Made from bone,

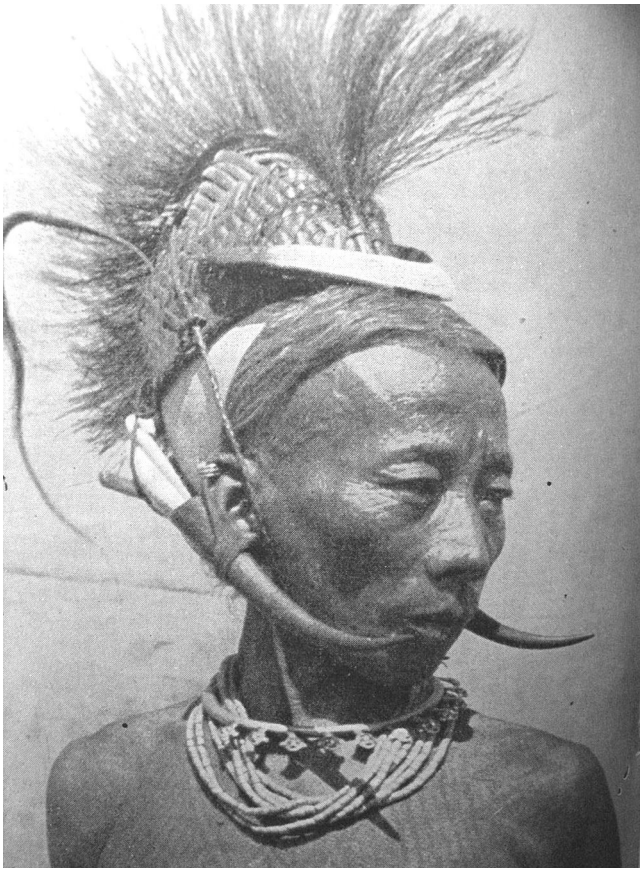

Figure 5. A Naga chief wearing a brass head-hunter's torque. Each of the eleven or so pendant "heads" indicates a head taken. He also wears what may be a *deo moni* necklace (Stevenson 1944: opp. p. 1).

tusk and horn, feathers, shell, glass, carnelian, wood, brass, and seeds, each Naga group assembled ornaments from these materials in a unique way to declare tribal identity, status, wealth, and head-hunting prowess. Of all Naga ornaments, the British observed that beads known as *deo moni* [6] (also referred to as *deo mani*, *deo monnees*, "god beads," and "spirit stones") were the most highly prized, but like *khaji* beads, their origin remained obscure.

Despite the many books on Naga culture which have appeared over the last thirty years (Ao and Liu 2003; Jacobs et al 1990; Stirn and Van Ham 2003; Untracht 1997), much confusion has remained over the identification of *deo moni*. In the glossary of Macfarlane's Cambridge University on-line Naga Database, *deo moni* are described as "a variety of bead from a reddish-brown stone flecked with black, much valued, 'god-bead'" (Macfarlane 1985-1992). Macfarlane (2009: pers. comm.) was unable to identify for the author photographs of *deo moni* in his co-authored and well-illustrated book *The Nagas* (Jacobs et al. 1990).

Deo moni are also not illustrated in Untracht's *Traditional Jewellery of India*, but are described as "made of glass although they resemble stone. As the Nagas possessed no glass-making technology, these beads must be foreign.… They were probably imported in the unremembered past from an origin outside Nagaland" (Untracht1997:68). Ao and Liu (2003) also refer to *deo moni*. The beads are not illustrated and their origin is described as "maybe Nepal or unknown sources."

Bead historian Jamey Allen attributes *deo moni* to the 19th century, describing them as:

> ... drawn brick-red glass beads, probably from Venice (but also possibly Indian). Because of their color and structure they look like jasper and have a structure that looks like segments of a tubular construction…. Ethnographers who were not familiar with the movement of trade beads, and thought these might be local beads… speculated that the material was a fossil.… But they are just glass trade beads (J.D. Allen 2008: pers. comm.).

Kanungo (2006, 2007) makes no mention of *deo moni* when discussing Naga beads, but does refer to Indo-Pacific beads as having been "traded by sea from the southeast Indian coast." He, however, appears to use "Indo-Pacific beads" as a generic term for the many green, red, and yellow beads worn by the Naga today (Kanungo 2007:5) and doesn't seem to differentiate between ancient orange Indo-Pacific beads of the standard-cylinder/cylinder-disc *deo moni* type (which ceased being made by A.D. 300) and the many, more recent, beads which are found in Naga necklaces today. These include small drawn glass "seed" beads and other larger drawn glass beads, furnace- or lamp-wound beads, and machine-molded "tile" beads made by the Prosser method in Bohemia and France in the 19th century (Jacobs et al. 1990:308-321).

In British-colonial times, at least three references specifically link *deo moni* to the Kachin (Singpho) rather than to the Naga. Edward Dalton (1872:11) – later seemingly quoted by Hunter (1879:316) – reported of the Singpho: "They are fond of a particular enamelled bead called deo-mani."[7] In referring to *deo moni* as "enamelled," Dalton and Hunter may have been quoting H. Piddington, Curator of the Museum of Economic Geology, Calcutta. In 1847, Piddington had been sent samples of *deo moni* beads by a Captain Smith. Smith's letter and Piddington's subsequent chemical analysis were published in the *Journal of the Asiatic Society of Bengal* (Piddington 1847:713). Captain Smith wrote:

> I send you some of the Deo Monnees so prized by the Singphos and without a string of them a wife is not

> to be had. I send small ones, as I should have to pay 5 Rs. for a large size *one*; those similar in grain to the *Ash* wood and irregularly bored are most prized, they should be of both the colours I send; they are valued most because they are supposed to be the real Deo Monnee, and are said to be found ready bored. Those that are particularly smooth outside, and regularly bored are not so valued,[8] as they are thought to be the work of man's hands, whereas the others are by the gods themselves.
>
> Piddington replied:
>
> These singular objects of veneration… are small flat circular disks, about from one to 1 $^{1}/_{2}$ eighth of an inch thick and from one to two eights in diameter, with holes in the middle or towards it. The colours are from a dirty greenish yellow to a bright sealing wax red; some are yellowish and marbled with the red color in veins like Jasper, but the red ones are not marbled with yellow. These disks at first sight are like sections of the jasperized stems of gramineous plants, or small pithy wood, and at the edges some of them (the yellow more than the red) appear marked with stroe exactly like part of a small petrified twig. When polished however no traces of vessels can be discerned on the transverse section of either the green or the red ones by a magnifier.

Piddington subjected the beads to a number of chemical tests and concluded:

> The filtered solution [of the beads] gave traces of Iron, and faintly but distinctly of Copper… [the beads are made of] an enamel, in which the oxides of copper are frequently used as the red colouring matters; and it is not difficult to suppose that the Singphos obtain these, fabricated to imitate Jaspers of these colors, through tribes in intercourse with the Chinese of Yunnan.

Some eighty years later, Piddington's report was quoted by Mills (1926) in his book, *The Ao Nagas*. Unfortunately, Mills does little to unravel the mystery of *deo moni*:

> The curious brown beads known in Naga-Assamese as "deo-moni".... No one knows what they are made of and the Aos[9] as in the case of many of their ornaments, state vaguely that they came from Maibong, the last capital of the Kacharis (Mills1926:49).

In a footnote by J.H. Hutton, Dr. O. Hanson describes the Kachin "as wearing what are apparently 'deo moni' and says they are made of petrified wood" (Hanson 1914:48; Mills 1926:48).[10] Hutton goes on to say: "The few that still find their way into the Naga Hills are imported from Nepal" (Mills 1926:49).[11]

Significantly Mills (1926:48) does add that *deo moni* were said to be "found ready bored in graves" echoing the myths of the Kachin. Bower (1950:111–112, 114), who lived among the Naga in the 1930s, confirms that this belief was persistent and recounts the following:

> All through the Barail area, tucked away behind ridges, on precipitous spurs, at the heads of hidden ravines, were the lost villages of a vanished people. The Zemi (Naga) said they were the relics of the jungle-folk, the Siemi, who had preceded them in the occupation of the country. Tradition had it that the Kacharis had wiped them out; certainly the sites were, one and all, in places easily concealed and easily defensible, and most of them had... double or triple ditches, banks, and even complicated defences, and walls of dry stone[12].... Small settlements, recognizable by their house-platforms, which, sometimes stone-faced, cropped out on otherwise smooth hillsides, were legion. But some of the larger sites were of more interest. There was one in the Jiri Valley.... On this, beside some denuded house-sites and a peculiar type of bamboo, the *gareo*, associated, for reasons never fathomed, with most of these remains, were two large slabs, apparently gravestones, of which the smaller bore several engraved designs. Some were probably phallic. The others were the curious outlines of bare feet. The large stone had been tilted up by a tree which grew, a good yard thick, almost from under it. A man could crawl by now into the vacuity below, and men had, if report were true, for legend said that from this hole the "Nagas of old" had fished out some of the old, dull-golden-yellow *deo-moni* beads, which were to them of such immense value; beads of unknown origin, which looked like stone, and were, so unexpectedly, of primitive glass; beads which were in themselves a major mystery. Every Zemi [Naga] of consequence wore a string of them. They were heirlooms, handed down from father to son, and a good string might, at a conservative estimate, cost Rs 200/-.... The Zemi believe that the Siemi made the beads, and that a bamboo container of them – a fortune at present-day rates – had been buried as part of every Siemi's grave-furniture.... For this reason, they hold, the Siemi concealed their graves. Being great magicians, the [Siemi] either split rocks, placed their dead inside, and then sealed them up again; or by means of incantation they caused great stones to fly from a distance and pile

> up over the grave, so that its exact position could not be found….
>
> The Siemi were, it is said, an uncanny race – magicians, 'small and dark'. They lived in the forested hills; and, by a secret process involving the use of fire, made precious *deo-moni*, the 'spirit-beads,' from slender, carefully-cultivated *gareo* bamboo. One day, when the Siemi of a village near the present Guilong were making beads, the smoke of their fires poured up in such volume, a smoky haze, that it was seen by the Kacharis in Maibong below. The King, his curiosity roused, sent men into the unknown hills to find out what was burning. When they came back with a group of captured Siemi, the King demanded who and what they were. They answered that they were a jungle-people; that they did not live by digging or cultivation, but that they made, and traded the yellow beads, and from these derived a living. At this, the King insisted that they tell him the process. The Siemi refused (Bower 1950:111-112).

As we have seen, when the Mongoloid peoples of which the Naga form a part began to spread south into Southeast Asia, they supplanted earlier Australoid or Negrito populations. The influence of these early aboriginal populations is seen today in certain aspects of Naga culture – in their tools, stone monuments, forked wooden posts, and occasional dark skin or frizzy hair (Bower 1950:114). Cultures with these traits – found among the Naga as well as in other cultures throughout island Southeast Asia – erected stone monoliths to commemorate their dead. In both South India and Southeast Asia, Indo-Pacific beads have been found in their graves.

It was Beck, expert on ancient beads and father of modern bead study, who was the first to become aware of the widespread occurrence of Indo-Pacific beads in archaeological sites. In the early 1930s, while assessing material recently excavated at Kuala Selinsing in Malaysia, he remarked on the "unmistakable" likeness of the small glass beads found there to beads found in sites at Pemba, Zimbabwe, Zanzibar, the Philippines, Korea, and in megalithic graves in South India and added that "the bright orange cylindrical beads so much prized by the natives in South India are found here [in Kuala Selinsing] in considerable numbers" (Beck 1930:166-182; Francis 2002:19; Mills 1937:330). It is interesting to note that Beck seems to refer here specifically to "cylindrical" Indo-Pacific beads of *deo moni/khaji* type. It would appear that these beads were also regarded as heirlooms by certain tribes in South India.

Shortly after writing the above, Beck received some *deo moni* beads for identification, possibly from Mills.[13] Beck's response (Mills 1937:330) provides final confirmation that *deo moni* can be positively identified as Indo-Pacific beads. Likening *deo moni*, as he had Indo-Pacific beads from Kuala Selinsing, to ancient Saxon glass, Beck (1930:166-182) reported: "Ancient glass beads, which seem to be very similar, are also found [in graves] in South Sumatra....[14] There, too, they are searched for in river-beds." Today on the Indonesian islands of Timor, Flores, Sumba, and elsewhere, orange Indo-Pacific beads (of a more rounded shape than *deo moni*) are also regarded as heirlooms and are known collectively as *mutisalah* or "false pearls" (Adhyatman and Arafin 1993:6; Allen et al. 1998:135; Francis 1994:95). In Timor they are known as *pusaka* meaning "heirloom" (I.T. Glover 2009: pers. comm.) (*see* cover).

To confirm Beck's identification of *deo moni* as Indo-Pacific beads, the author contacted Harry Neufeld who, with his Ao Naga wife Tiala, owns one of the largest collections of Naga jewellery. Neufeld was not familiar with *deo moni* and was unable to identify any in his collection. Naga dialects are often mutually unintelligible, however, and Neufeld's Naga niece Ayinla Shilu Ao (2009: pers. comm.) suggested that heirloom beads known to the Ao Nagas as *nupti* might be *deo moni*. Neufeld confirmed that *nupti* are opaque orange beads, the oldest and most prized of Naga heirloom beads. Three necklaces in the Neufelds' collection incorporating *nupti* beads subsequently confirmed beyond any doubt that *nupti* are *deo moni*. Neufeld had believed that *nupti* were traded to the Naga by the Dutch (Neufeld 2009: pers. comm.). Mills confirms that "the curious brown beads known as 'deo moni'" had several names, known by various Naga tribes as *reptong techir* ("the mother of reptong beads"), *puram* (Mills 1926:49), *tutsera*, *avuwang*, *khongpsu*, and *atsongko* (Mills 1937:32, 35). Neufeld (2009: pers. comm.) reported that today Naga necklaces containing *deo moni/nupti* beads are very rare, accounting for less than one per cent of the many orange glass beads found in Naga necklaces. He added that *nupti/deo moni* are sometimes found in Konyak Naga chokers or in bib necklaces combined with chank shell and carnelian beads (Pl. IID), but are most often seen in multi-strand necklaces called *Wakching mala*[15] (Pls. IIIA; IIIB, top). According to Neufeld, *deo moni/nupti* are particularly associated with the Konyak Naga, but in the only three photos which the author has managed to locate from the British-colonial period which are credited as showing *deo moni* beads, necklaces of large *deo moni* seem to be worn by boys from the Sema and Eastern Rengma Nagas (Figs. 6-7). Bower (1950:194) reported that Zemi Naga men wore simple strands of *deo moni* throughout their lives, removing them only when preparing for death (Fig. 8). Mills (1937:32) also mentions *deo moni* being worn by the Rengma Nagas. Reporting on the Koupooee Naga tribe of Manipur to the south of Nagaland, McCulloch (1959:52) noted:

Figure 6. The sons of a Sema Naga Chief. The boy on the left wears a double string of precious ancient beads (*deo moni*). Sheyepu (Shehepur) village (photo: J.P. Mills; courtesy of School of Oriental and African Studies, London).

> In their festivals, the men wear their peculiar ornaments of which the most prized are necklaces of a red pebble. A single stone of this sort is sometimes valued at five methins (mithuns), but such stones are usually heir looms and are sacredly preserved.

It seems possible that the red pebbles referred to were *deo moni*. It would seem therefore that the use of *deo moni* among the various Naga tribes was far more widespread than previously thought.

According to Neufeld (2009: pers. comm.), *Wakching mala* are often, but not exclusively, associated with the Konyak village of Wakching in the Mon district of the Naga Hills. Throughout the plains, trade into the hills was dominated by the tribes or sub-tribes living in villages at the foot of the passes leading to the hills, which were part of a vast network of trade routes. By the 19th century, Wakching had for a long time been the center of Naga trading. Known by its earlier name, Jaktoong, it was one of the Naga villages sited on the passes leading to the Naga Hills. This gave the Konyak an intermediary role both in terms of trade and in protecting the plains population from raiding by the interior tribes (Jacobs et al. 1990:21). It also gave them privileged access to plains goods. This suggests that the Konyak Naga, or more probably the ancient inhabitants who preceded them, had privileged access to *deo moni* because they were traded from the plains from a source outside the Naga Hills.

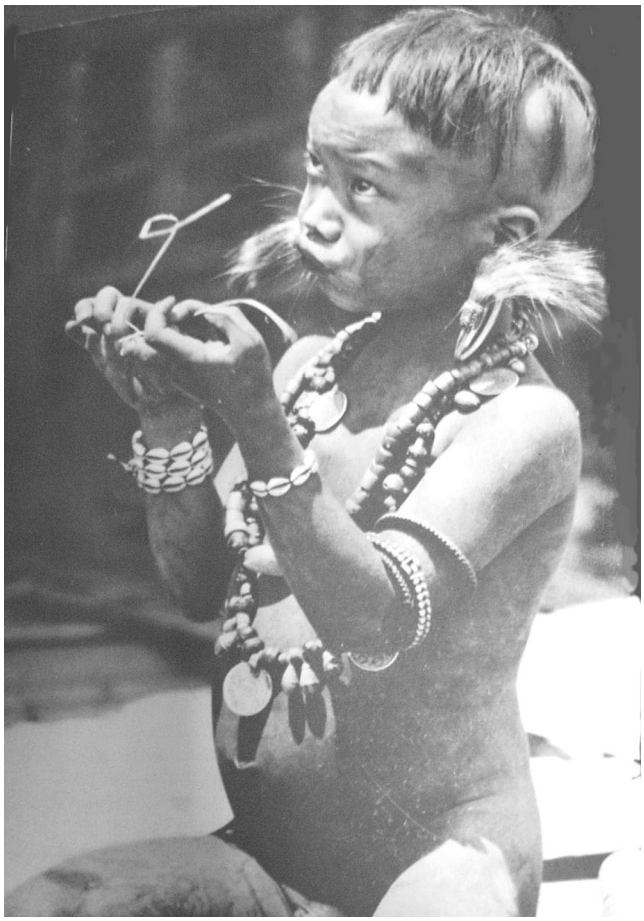

Figure 7. A young Naga boy wearing a necklace of "yellow 'spirit' stones" (Fürer-Haimendorf 1939: Pl. 6; courtesy of School of Oriental and African Studies, London; 94/JPM/JPM).

Chemical analyses by Dussubieux and Gratuze (2000) show that drawn, orange Indo-Pacific beads are of two chemical types. The rounder, smaller beads belong to the m-Na-Al glass group, with a probable Sri Lankan or South Indian origin. The cylinder disc *deo moni/khaji/nupti* type have no dominant oxides and a very specific mixed composition of around 10% copper, a mixed alkali flux, and alumina sand. The origin of Indo-Pacific glass beads of this chemical type is uncertain because they are not found in high concentrations in any particular region (Dussubieux 2008: pers. comm.). Similar beads have been found in Cambodia at Phum Snay in contexts dating from the 2nd century B.C. to the 2nd century A.D., but they are quite common in South

Figure 8. Namkia, Ursula Graham Bower's Zemi Naga guide and translator, wearing necklaces of *deo moni* beads (Bower 1950: Pl. XX; courtesy of Alison Betts and Catriona Child).

India and Sri Lanka, in contexts of 300 B.C.-A.D. 300 (Gratuze 2008: pers. comm.).

Glover proposes Karaikadu in South India as the source of Indo-Pacific beads of the *deo moni/ khaji* type (Glover 2008: pers. comm.). Karaikadu and nearby Arikamedu (Poduke of the *Periplus*), south of Chennai (Madras), were occupied in the last few centuries B.C. (Francis 2002:30) and were stone- and Indo-Pacific-beadmaking sites.[16] The area surrounding these sites was rich in minerals: rock crystal, amethyst, beryl, garnet, diamonds, corundum, carnelian, and agate as well as the raw materials to make glass (Francis 2002:116). Arikamedu had trading contacts with the Mediterranean world, importing pottery and glassware (Francis 2002:114-115)[17] and exporting gems and beads both west to the Mediterranean and east to Southeast Asia. Indeed, Indo-Pacific and stone and glass collar beads were traded eastwards as far as Java, Bali, Vietnam, South China, Korea, and Japan.

New ideas as well as goods traveled along these routes. From early times, Buddhist pilgrims visited sacred Buddhist sites, many sent by Ashoka, king of the Mauryan Empire in the 2nd century B.C. (Fig. 9). To quote Glover (2008:4):

> This westerly trade from South to Southeast Asia during the period from about 400 B.C.-A.D. 500 was not a mere "trickle of trade," nor can it be described simply as the "drift" of a few exotic and precious items to the east from India; rather it operated on a considerable scale at pan-regional, regional, and local levels, it was developed as a commercial enterprise by Indian and perhaps other Asian merchants, and there is little doubt that Southeast Asian sailors and traders were also active in the exchanges.

It is not clear who was responsible for making the drawn Indo-Pacific beads at either Karaikadu or Arikamedu. Francis suggests it was the Tamils, a Dravidian people who were inhabitants of the region, or the Pandukal, who expanded through the central regions of southern India in the first millennium B.C. The Pandukal, like the Naga and the *Siemi*, are associated with megaliths. The earliest Pandukal sites are found in India's central "tribal belt" and range from the middle to late second millennium B.C. Pandukal sites are also found further north in central India at Vidarbha, Mahurjhari, where hardstone beads were made. Indo-Pacific beads are found in Pandukal graves in South

Figure 9. Kaung Mulon pagoda (also known as Maungmulon), overlooking the Mali Kha River, 10 km north of Putao, northern Kachin State, Burma. This is one of Burma's three most sacred sites, said by local tradition to have been built 2,000 years ago by King Ashoka. It was one of the last settlements of the Shan (photo by author).

India, as well as Pandukal stone beads. The Pandukal people introduced ironworking to South India, and ironsmithing and glassworking often paralleled each other. Young Pandukal men are likely to have furnished at least the colorants for glassmaking, along with the stones for lapidary work (Francis 2002:113-118).

DEO MONI/KHAJI "COARSE CORE" BEADS

Close inspection of the *deo moni/khaji* necklaces studied by the author reveals that they sometimes contain two other types of orange glass beads which are superficially very similar to the drawn Indo-Pacific beads discussed above. The first is a smoother, more uniform orange-brown glass bead (Pl. IIIB, bottom) which has none of the streaks, bubbles, or impurities associated with drawn Indo-Pacific beads. The age and origin of these brown beads is not clear. The second type has a distinct core of dark red or brown glass, covered with a thin external layer of orange glass (Pl. IIIC, top) very similar in appearance to the glass from which the drawn Indo-Pacific *deo moni/khaji* beads were made. This thin external layer, under magnification, has the same streaks parallel to the perforation as the drawn Indo-Pacific beads. Magnification of the core reveals a mixture of at least two colors of imperfectly fused glass, producing a scrolled or marbled effect which encircles the perforation. Beads of this "coarse core" type are reputed to have been found quite widely at sites of coastal East India and Southeast Asia, and are thought to have been made somewhere in India and having some antiquity, as with the *deo moni/khaji* drawn beads.

One type of "core bead" made of orange glass with a black core has been found at Ta Rua-Nang Yon, an early but undated coastal site in Krabi province, southern Thailand (Pongpanich 2008:42, 66, 67). The "coarse core" technique was also used to make Jatim beads, thought to have been made in East Java from as early as A.D. 300 to A.D. 900 (Adhyatman and Arifin 1993:63; Francis 2002:134, 135). A cross-sectional cut through a Jatim bead (Adhyatman and Arifin 1993:56) reveals a circular marbling of the poorly fused glass colors similar to that found in the cores of the much smaller *deo moni/khaji* core beads. Drawn tubular beads, both with and without a core, often have swirls around the perforation. This is because when the initial glass gather is removed from the furnace, the pontil has to be turned both to gather glass onto it, and subsequently to keep the glass from sagging or falling off. Low quality, poorly-mixed glass was frequently used for the base gather of "coarse-core" beads to save time, effort, and money. The better-quality glass was then marvered onto the surface of the base gather so the finished beads would have a better color and appearance (Karklins 2009: pers. comm.).

Perhaps, as suggested for Jatim beads (Adhyatman and Arifin 2008:65; Munan 2005:28), the *deo moni/khaji* core beads had a base of locally made or recycled glass while the more brightly colored orange glass forming the outer layer was imported, perhaps – in the case of the *deo moni/khaji* beads – from workshops where the *deo moni/khaji* beads without a core were made. Unlike the simpler *deo moni/khaji* drawn beads, the coarse-core beads are compound beads made with a more complex two-stage method of production. Although perhaps contemporary with each other, it seems more likely that the coarse-core beads were made to imitate the simpler drawn beads, rather than the other way round.

Much more fieldwork is required to establish whether the three types of *deo moni/khaji* (the regular type, the plain brown type, and the coarse-core type) are equally valued as heirloom beads by the Kachin and Naga. Francis (2002:186, 191-192) points out that on some eastern islands of Indonesia, *mutisalah* (literally "false pearl"; *see* cover) is merely a general term used for three different types of small heirloom beads of reddish-brown to brownish-orange glass. All three types are rounded irregular oblates rather than the cylinder disc form of *deo moni/khaji*. The most numerous *mutisalah* are opaque red and called *mutitanah* (*tanah* means earth) in reference to their color. They are worn by the commoners. There is a second more valuable type, the orange *mutibata*, derived from *bata* meaning brick, again because of their color. These two are both drawn Indo-Pacific beads, probably products of the Srivijaya branch of the Indo-Pacific bead industry, and they are at least 800 years old. The elite, however, value a *mutisalah* known as *mutiraja* (*raja* means king). These are not drawn Indo-Pacific beads but wound "coil" beads made by the Chinese. The earliest date for these beads is the 9th to 10th centuries, but the Chinese only began active trade throughout island Southeast Asia at the beginning of the 11th century. Although they are older, *mutitanah* are more plentiful and a strand can be purchased for a few dollars. *Mutiraja*, because of their lead content and the way they were made, are heavier, more glossy, and much more rare, and despite being more recent, they were adopted by the elite. In the early 1990s, a strand was worth a water buffalo – at least US $200-$250. By A.D. 1200, Chinese coil beads had become the dominant beads in Southeast Asia replacing Indo-Pacific drawn beads. In some eastern islands of Indonesia today, both Indo-Pacific and Chinese coil beads play the same role in necklaces and even in beadwork (Hector 1995:10-11). As with *deo moni/khaji*, they are so similar in color and size that it is easy to confuse them (Adhyatman and Arifin 1993:82).

HOW DID *DEO MONI/KHAJI* REACH THE NAGA AND KACHIN?

Glover (2009: pers. comm.) and Dussubieux and Gratuze (2009: pers. comm.) suggest a date of ca. 300 B.C. to ca. A.D. 300 for the drawn, cylinder-disc, Indo-Pacific beads worn by the Kachin and Naga, with an origin in Southeast India. How did these beads reach the Naga in the North Cachar Hills and the Kachin in Burma's far north? The monsoon trade winds which ferried ancient boats from Southeast India direct to Southeast Asia and back were little understood before the first century A.D. Earlier trading vessels heading to Southeast Asia are said to have tracked along the coast of the Bay of Bengal, stopping along the way to trade and obtain supplies (Francis 2002:118). This would suggest that Bengal was involved in this maritime trade from a very early date.

As we have seen, Pragjyotisha, the kingdom which rose in northern Assam in the first millennium B.C., was occupied by *Kiratas* and *Cinas*, "golden-skinned" peoples thought to be of Indo-Tibetan origin (Lahiri 1991:10, 11). The ancient Indian epics, the *Ramayana* and *Mahabharata*, indicate that the territory of ancient Pragjyotisha stretched "as far as the sea." This sea was called *Lohitya Sagara* (estuary of the Lauhitya), the ancient name of the Brahmaputra. Badadur (1933:1, 5, 7) suggests that at this time the still very low-lying and water-logged region south of the Khasi/Jaintia Hills around Sylhet (now part of Bangladesh) formed a "sea" which united the deltas of the Brahmaputra and the Ganges. Small rivers and streams in this marshy area could have provided the Siemi – in whose graves the Naga found Indo-Pacific beads – with access to the ancient trading ports on the Bay of Bengal.

The author of the *Periplus*, a Greek account of the lst century A.D., refers to an important port called *Ganges*, possibly a port known as *Tamralipti* in the Ganges delta (Badadur 1933:188). *Tamralipti* was one of India's five major ports of the period, the others being *Barbaricum* in the Indus delta, *Barygaza* on the Gujarat coast, *Muziris* on the Kerala coast, and Arikamedu on the Coromandel coast (Casson 1989:21-27). We learn that from the port of *Ganges*, merchandise from the whole of Eastern India – malabathrum, Gangetic spikenard, pearls, muslins, ivory, silk cloth, transparent stones, diamonds, and sapphires – was despatched by sea to Arikamedu, from where it was traded east to Southeast Asia and China, and west to Arabia, the Levant, and the Mediterranean world (Gupta 1991:283). Inland, trade routes from the port of *Ganges* followed the Ganges and Brahmaputra rivers and their various navigable tributaries, connecting with land routes east to China via Yunnan, west to India through Taxila, Bactria, and beyond, and north to Bhutan and Tibet.

This is confirmed by the *She ji* (*Records of the Grand Historian*) written by Sima Qian (145-ca. 86 B.C.) which relates how Shang Qian, the famous diplomat-cum-explorer of the Former Han dynasty (206 B.C.-A.D. 220) visited "Daxia" (Bactria) and saw Sichuan goods which he speculated must have been traded from Sichuan via Yunnan, Kachin State in Burma's far north, Assam, and "Yuandu" (India) (Sun 1997:9).

As Indo-Pacific beads of the cylinder-disc *deo moni* type have not been recorded in early sites in the south of Burma or Thailand, it seems likely that they would have arrived by sea from South India at the ancient ports to the north of the Bay of Bengal. The graves where the Naga and Kachin have found their *deo moni/khaji* suggest that these beads were subsequently traded north overland to the North Cachar Hills, then northeast along the ancient China/India trade route into Burma through the Hukawng Valley into northern Kachin State.

Which of the goods traded from the ancient ports of the Bay of Bengal were locally produced and could have been exchanged for Indo-Pacific beads? Ptolemy states that *Kirrhadia*, the country of the *Kiratas*, produced the best malabathrum, a fragrant oil indigenous to Sylhet and northern Assam and much valued in Greece and Rome. Silk and ivory were also locally available (Gupta 1991:283, 286). These valuable goods suggest that the ancient ports of the Bay of Bengal may not have lost their importance once the direct route to Southeast Asia, using the monsoon winds, had been discovered.

IVORY, CARNELIAN, COWRIES, SHANK SHELL, AND CRYSTAL

Untracht (1997:53) suggests that because the archaic culture of remote tribes such as the Naga persisted into the 20th century, the ornaments they wear today – particularly those regarded as heirlooms – could reflect ornaments worn by them (or those who preceded them) in ancient times. This would appear to be true in the case of Indo-Pacific beads. What other goods formed part of this ancient trade?

In ancient times, ivory was traded from the port of *Ganges*. Shang Qian, the diplomat-explorer, reported that in *Shen-Tu* (Northeast India) "the people ride on elephants to fight in battle" (Lahiri 1991:12). On his visit to Kamarupa in the 7th century, the Chinese pilgrim Yuan Chwang commented on the large herds of wild elephants which roamed the country in the southeast (Watters 1905:186). Indian elephants (*Elephas indicus*) are also found in Orissa, Andhra Pradesh, and Karnataka but because those found in Assam in the Garo Hills are of immense size and have

tusks of superior quality, their ivory was considered to be the best in India. This must have created a lucrative trade for Assam in early times. An elephant's tusk is solid for about half its length, the larger root section containing a tapered nerve cavity. The rings which result when the root section of the tusk is sliced must have suggested use as bangles. Hunting elephants was very dangerous (Carey 1919:211) and ornaments and armlets of costly ivory were among the most highly valued by the Naga. Only warriors were entitled to wear them. Ivory earplugs were also worn by some Naga groups (Jacobs et al. 1990:39; Untracht 1997:60, 117, 178).

Because of Hindu restrictions on the taking of life, much of the ivory from Indian elephants came from dead individuals or was cut from domesticated animals, but before the 20th century, the ivory used by the Naga was acquired by hunting. Large pitfalls were dug, the opening disguised with thin branches and leaves covered with a layer of earth. Stout, sharpened sections of bamboo known as *panjies* were stuck in the bottom and injured the elephant when it fell in (Hutton 1921b:86). Before British-colonial rule, Naga chiefs would come down to the plains and offer tribute to the Ahom rulers in the form of slaves, spear shafts, cotton, and "elephant teeth" (Brodie 1873). At the start of the 20th century, however, the use of guns increased the number of elephants being killed; four thousand were killed in the Garo Hills in fifteen years (Carey 1919:211). With the large herds depleted, the Angami Naga bought imported African ivory from plains traders, or from Calcutta or Varanasi.

Dubin (1987:183) suggests (without naming sources) that the trade in carnelian, shells, and glass beads from India into Nagaland began in the 17th century, but it would appear that this trade began much earlier. From very early times, carnelian beads were traded from Arikamedu in Southeast India, as well as from the ancient hardstone beadmaking center in Cambay, Gujarat State, on India's northwest coast. Beadmaking in Cambay has a history dating back more than five thousand years and its trade in carnelian and agate was more extensive than that of Southeast India (Untracht 1997:74). The trade in etched beads from India to Southeast Asia and beyond may go back well into the first millennium B.C., the earliest trading vessels tracking along the Bay of Bengal. Unetched beads of carnelian and agate may have been traded too, but unlike etched beads whose distinctive designs give some indication of their source (Beck 1933: Pl. LXXI), the origin and age of plain carnelian and agate beads is more difficult to establish.

From 19th- and early 20th-century British-colonial sources and ethnographic collections, it is clear that carnelian beads were worn and regarded as heirlooms by a large number of the tribes living in Burma and British-colonial Assam. The Apa Tanis, Kachin, Mishmis (Dalton 1872:17, 20), Miris (Dalton 1872:32), Lushais, Soktes, Siyins, Tachons, Hakas, Mizos, Garos, Nishi, and Lyngngam, as well as the Naga, Kachin, and Chin (Carey and Tuck 1895:172), all wore carnelian beads of various shapes and sizes. This must have created a highly lucrative market. Cambay manufacturer-dealers of the 19th century regularly sent representatives with samples and supplies of finished carnelian beads to plains towns such as Dimapur and North Lakhimpur to the west of the Naga Hills, as well as to the port of Chittagong on the Bay of Bengal (Carey and Tuck 1895:172). They either wholesaled the beads to established Marwari[18] traders or founded shops themselves in the bazaars. Naga traders came regularly to these centers and showed great discrimination when purchasing their carnelian beads. As a result, Cambay dealers sent the Naga only the highest quality beads (Untracht 1997:65).

Carnelian beads of several shapes were worn by the various Naga tribes. For instance, small oval and round beads were worn by the Ao, and each bead shape had its own name (Neufeld 2009: pers. comm.). Long carnelian beads with a hexagonal cross-section were only worn by the Naga tribes and must have been made specifically for them. Beads of this type – clearly of considerable age – are particularly treasured by the Naga today and regarded as heirlooms, but it is not clear how old these beads might be (Untracht 1997:56).

The money cowrie (*Cyprea moneta*) is found in the Indian Ocean, particularly around the Maldive Islands. Because of its attractive appearance, small size, hardiness, and portability, from very early times the cowrie was traded from South India to Southeast Asia and beyond. Several hundred cowries, including *Cyprea moneta*, were found in the Sanxingdui relics near Chengdu, China, in tombs dated 1100 B.C. Tens of thousands of cowries have been found in tombs in Yunnan from between the Warring State period (475-221 B.C.) and the Western Han Dynasty (206 B.C.-A.D. 9). These cowries were from the Pacific and Indian oceans, but particularly from the Maldives. Bin (2008:37) suggests the cowries could have been shipped initially to ports in Burma and subsequently on to Yunnan, but it is more likely that they went first to Bengal by sea, and then to Yunnan by the overland routes through Assam since navigation between the Maldives and Burma was harder than that between the Maldives and Bengal. If so, the route from the Bay of Bengal through Assam to China could be traced back to the middle of the first millennium B.C. (Bin 2008:37-38). Cowries were used as currency in India and parts of Southeast Asia including Arakan, Martaban, Pegu, Siam, Laos, Burma, and Yunnan. The Chinese Buddhist pilgrim Yuan Chwang refers to cowries as a medium of exchange in 7th-century North India (Watters 1904:178). An

8th-century rock inscription at Tezpur in Assam mentions a penalty of one hundred cowries for the infringement of laws regulating trading boats on the Brahmaputra (Barua 1951:102). Cowries have also been found in pre-Ahom graves (R.D. Choudhury 1991:30).

The Khasi, thought to be Northeast India's earliest inhabitants, used cowries (*sbai*) in marriage, divorce, funeral, and divination rituals (Gurdon 1907:37, 62, 80, 116, 136), a bag of netted pineapple fiber in which cowries were stored being found in every Khasi household. Tribal groups throughout India, particularly in Orissa and Assam, still wear cowries today. They are much valued by the Naga and indicate warrior prowess (Fig. 10). In the 19th century, cowries were traded up from the Assam plains or Calcutta by the Angami Naga. The Naga village of Khonoma had more or less a monopoly on cowrie shells for the whole of the Naga area. On the Burma side, they were bought in the bazaar at Tamanthi on the Chindwin River and traded by Naga from the Para and Longpfuri areas (Jacobs et al. 1990:39; Saul 2005:134).

The conch or, more correctly, chank shell (*Turbinella pyrum*) is found off the coast of Tamil Nadu in South India.[19] It is sometimes known as the "sacred chank" because of its importance in both the Hindu and Buddhist religions.[20] The origin of the chank cult in India is lost in antiquity but is thought to date as far back as 2000 B.C. Chank shells were used as horns. In Tezpur in the Assam plains, a stone relief said to date from the 9th century shows two male musicians blowing chank shells (Badadur 1933:172). Indian records from the 13th century refer to *Shankharakas* as a guild for Hindu craftsmen who worked with these shells, which implies that this craft is much older (Untracht 1997:175).

In the 19th century, the most important center for chank work was Dacca (now Dhaka, Bangladesh). Chanks were traded up to the plains and purchased from Bengali or local Marwari traders by Angami Nagas of Khonoma who cut the shell walls to make discoids for necklaces (Pls. IA, top; ID, top; IIA, top; IIB, bottom). They also polished and drilled the axis, or columella, to make beads (Pls. IB; IC; IIB, bottom). The Angami Naga excelled in this work and traded their finished ornaments over a wide area, even as far as Burma (Hutton 1921a:66). Small chank-shell beads were also used as currency (Hutton 1921a:72). Some Garo sub-tribes also wear necklaces and belts of chank-shell beads which they regard as heirlooms. They claim that these were manufactured by the Megam or Lyngngam (Playfair 1909:30), but it is more likely that they were traded from the plains or from the Angami. "Costly sea-shells" (likely chank, although possibly cowries) were also worn by the Dimasa Kacharis (Bordoloi et al. 1987:34), Barmans (Bordoloi and Thakur 1988:21), the Hmar (Bordoloi and Thakur 1988:33),

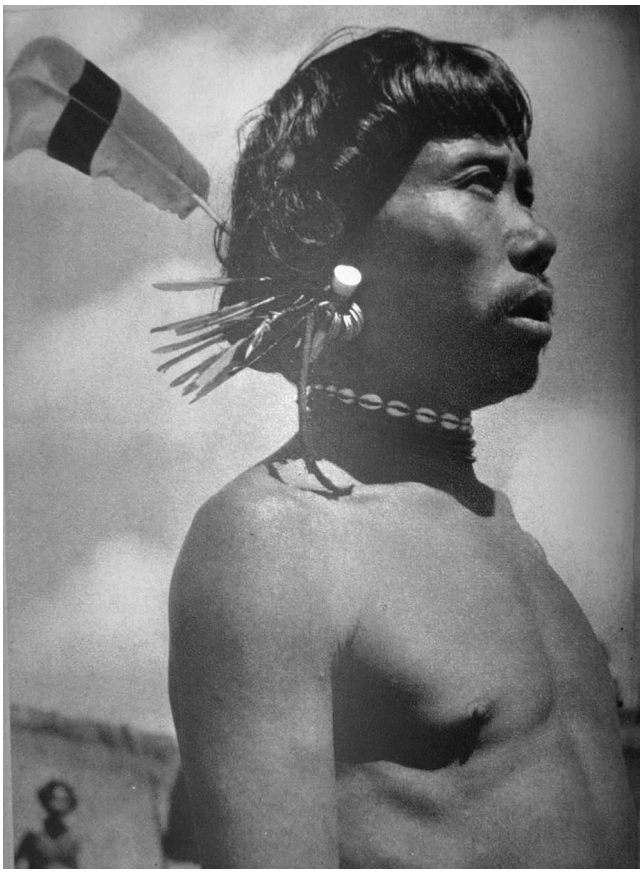

Figure 10. Zemi Naga wearing a cowrie-shell necklace (Bower 1950: Pl. XX; courtesy of Alison Betts and Catriona Child).

the Nishi and Apa Tani, as well as the Kachin. Both the Naga and Garo place a high value on certain "old" chank-shell beads and regard them as heirlooms because of their rarity (Bordoloi 1991:15; Untracht 1997:56, 58), but the age and origin of these beads is again unclear. Mills (1926:48) noted that beads of precisely this pattern made from the columella of the conch shell were found in ancient graves in South India, together with other ornaments of conch familiar in the Naga Hills. After Indian Independence and Partition, the majority of the Hindu chank craftsmen migrated to West Bengal where chank shells are still made into bangles by traditional craftsmen called *Shankaris*, although some work is still carried out in Dhaka (Heppell 2001). Imitation chank-shell beads were formed of wound opaque-white glass (Pl. IIC, top).

Major deposits of rock crystal (quartz) are found in South India and this was the material most commonly worked into beads in ancient Arikamedu (Francis 2002:16, 117). Crystal beads, often mixed with glass beads, are worn by the Phom Naga and are said to have been acquired from the Ao, but these are not regarded as heirlooms and are probably of relatively recent origin.[21]

Large rock-crystal slit-earrings of a rectangular shape up to 5 cm across, known as *tongbang*, are worn by the Ao Naga (Fig. 11). Similar ear ornaments with a circular outline are utilized by the Tanghkul and Ao of Longsa and Sangtam. Each *tongbang* is pierced in the middle with a single slit leading to the edge. The *tongbang* is inserted into a large hole in the earlobe and revolved so the slit hangs downward. The weight of the ornament stretches the lobe to such an extent that it often tears. Most *tongbang*, however, are not crystal but cheap glass imitations said to be bought in Assam or obtained from Angami traders.[22]

The oldest *tongbang* are regarded as heirlooms by the Naga and are called *Maibong naru*, *naru* meaning "ear ornament." In the 1930s, a good pair of old *Maibong naru* were valued at ninety to one hundred rupees, or five or six cows. Maibong was the 16th-century capital of the Kachari kingdom, later destroyed by the Ahom. The circular ear ornaments worn by the Tanghkul and Ao from Longsa and Sangtam were said to come from Burma.[23] Whether *Maibong naru* date back to the 16th century or much earlier is not clear, but similar slit-earrings of the circular type have been found in prehistoric Iron-Age graves (ca. 400 B.C.-A.D. 200) of the Sa Huynh Culture along the Thu Bon river in Central Vietnam and are common throughout South China (Yamagata 2006:175-177).

Figure 11. *Tongbang* ear ornaments made of glass; width: ca. 5 cm (author's collection).

WHO WERE THE *SIEMI* IN WHOSE GRAVES THE NAGA FOUND *DEO MONI*?

The original inhabitants of Northeast India are thought to have been Austric/Negrito peoples speaking the Austro-Asiatic/Mon-Khmer group of languages. They are represented today by the matrilineal Khasi, a small, isolated pocket of Mon-Khmer speakers who live in the Khasi-Jaintia Hills, surrounded by speakers of Tibeto-Burman languages (Gait 1905:5). Linguistic evidence suggests that the Khasi migrated from the east because, apart from the Munda of the Chota Nagpur Plateau which borders East Bengal, the majority of Austro-Asiatic speakers are found in Southeast Asia in Burma (the Mon), Laos, Cambodia, and Vietnam. According to Bareh (1985:12, 14), Khasi migration myths indicate origins in Southeast Asia along the banks of the Mekong.

The Khasi erected monoliths in memory of their dead and monoliths in the region – including the North Cachar Hills where the Siemi graves recorded by Bower were found – have been associated with Khasi settlements (Bareh 1985:5, 12). Khasi tradition suggests they abandoned the North Cachar Hills to exploit the iron ore and other minerals still found today in the Khasi-Jaintia Hills (Bareh 1985:38). Khasi village states were ruled by *Siems* or *Syiems*, meaning "king" in the Khasi language (Gait 1905:288; Gurdon 1907:66). Is it possible that the Khasi are the *Siemi* in whose graves the Naga found their *deo moni* or Indo-Pacific beads?

Oral tradition records Khasi contact with the kings of Tripura, a region southeast of the Khasi-Jaintia Hills and, in ancient times, near the trading ports of the Bay of Bengal. *Manicka* and *Manik* were used as a royal title for both the Tripura and Khasi kings (Bareh 1985:39). The Khasi were great traders (Gurdon 1907:67). One of the ancient South Indian guilds celebrated for its international trade was known as *Manikgraman* and was associated with at least two Srivijayan Indo-Pacific beadmaking centers. *Graman* means "guild" while *manik* is derived from the Sanskrit *manikya* meaning "precious stone" which evolved into the Hindu *mani* and *manek*, meaning "bead" (as in *deo mani* or *moni*). The *Manikgraman* controlled five craft guilds as well as oil pressers. Francis (2002:39) speculates that beadmaking could have been one of their unidentified crafts, and that the *Manikgraman* guild may have controlled the production and export of Indo-Pacific beads to ancient ports along the Bay of Bengal, and further east to Southeast Asia. It is tempting to speculate that the Tripura/Khasi title *Manicka* might have some ancient link with the trading of Indo-Pacific beads. Do the Khasi, like the Naga, value ancient Indo-Pacific beads today? Apart from a profusion of blue-glass-bead necklaces similar to those worn by their Indo-Tibetan neighbors the Garo,[24] we know from 19th-century informants that at festivals, the Khasi wore valuable necklaces of large coral and 24-carat lac-filled gold beads,[25] as well as elaborate silver coronets ornamented with filigree work. Although these were in a style quite distinct to the Khasi and not found anywhere else in Bengal or elsewhere in India, they were not made by the Khasi themselves but by Bengali jewelers in the plains who made a business of supplying the peculiar Khasi pattern. In the 19th century,

coral beads were imported from Calcutta (Gurdon 1907:21-23, 47; Henniker 1905:2, 11). Khasi myths suggest that in the past they ruled as far as Sylhet in the Bengal plains to the south, from where they were driven back into the Khasi Hills by a great flood (Gurdon 1997:10). Their gold and silver jewelry seems to suggests a "plains" rather than a "tribal" tradition, although they may have worn different ornaments in the ancient past.

A second candidate for Bower's *Siemi* are the Lyngngam (also spelled Lynngam and Lyngam), who, like the Khasi, are Austro-Asiatic speakers. The Lyngngam live between the Khasis and the adjoining Indo-Tibetan Garo tribe. Lyngngam chiefs are also called *Siems*.

The ethnic origin of the Lyngngams is disputed (Gurdon 1907:193). Some scholars believe the Lyngngam are not a separate tribe in their own right but a hybrid mix of the Khasi and Garo for, although the Lyngngam are matrilineal Austro-Asiatic speakers and observe some Khasi traditions, their customs are more Garo than Khasi. The Garo regard the Lyngngam as one of the twelve Garo sub-tribes and call them Megam. The Lyngngams dislike being called Garo and believe they are neither Garo not Khasi but descended from a group of warriors of the same name who fought and defended their land (Gurdon 1907:192; Langstieh and Reddy 1999:267-268). A Khasi myth relates their migration into the Garo Hills where they halted in a Lyngngam area in the far west where a local priest called U Mahbah granted them protection and gave them lands (Bareh 1985:115). While some recent genetic studies have proven inconclusive and there is no clear answer as to their origins (Langstieh 2009: pers. comm.), some scholars believe that the Lyngngam are the original inhabitants of the region, succeeded first by the Khasi and then by subsequent Tibeto-Burman groups (Langstieh and Reddy 1999:273).

The Zemi Naga myth relates Zemi migration into the North Cachar Hills where they encountered a handful of *Siemi* survivors. The *Siemi* were "small and dark." Gurdon (1907:3) describes the Lyngngam as "probably the darkest complexioned people in the hills." According to the myth, the Zemi and Siemi intermarried. The Zemi Naga and neighboring Naga tribes still show traces of a markedly negrito type, with dark skins and frizzy hair (Bower 1950:112). Perhaps the *Siemi* graves in which the Naga found *deo moni* belonged to the Lyngngam? Do the Lyngngam value Indo-Pacific beads?

According to Gurdon (1907:194), like their Garo and Khasi neighbors, Lyngngam women wore quantities of blue glass beads, but

> ... rich Lyngngams wear necklaces of cornelian and another stone which is thought by the Lyngngams to be valuable. A necklace of such stones is called *u'pieng blei* (god's necklace). This stone is apparently some rough gem which may be picked up by the Lyngngams in the river beds (Gurdon 1907:195).[26]

As previously mentioned, *deo moni* means "god's bead." The similarity of "god's bead" with the Lyngngams' *u'pieng blei* or "god's necklace" is remarkable. The Garo, with whom the Lyngngam share many traditions, call ancient stone axes *goera gitch* or "axes of God" (Gassah 1984:7), suggesting that both *u'pieng blei* and *goera gitch* were found underground and considered a miraculous gift from the gods. Beck (1930:166-182) notes that in South Sumatra, as with the Lyngngam, local tribes also searched for Indo-Pacific beads in riverbeds, beads probably washed from ancient graves in the rainy season. Could *u'pieng blei* be *deo moni*?

Certainly Lyngngam necklaces today include, among beads of other colors, many 19th- and 20th-century orange and red glass beads reminiscent of *deo moni* (Pl. IIIC, bottom). On a recent field trip to Lyngngam villages, however, the author failed to uncover any Indo-Pacific beads in Lyngngam necklaces. There may be a reason for this. It was, and still is, the custom among both Garo and Lyngngam women to be buried with their ornaments (Carey 1919:115; Langstieh 2009: pers. comm.). Secondly, the Lyngngam, like their neighbors the Khasi and Garo, were early targets of Baptist Christian missionaries who began to arrive in India in the 1830s during the British-colonial period. Today, more than 80% of the Lyngngam, Khasis, and Garo are Christians. Sadly, many missionaries saw traditional tribal dress (regarded as too "scanty") and heirloom beads (Pl. IIID) as part of their converts' animist past and actively encouraged their disposal. Much-valued necklaces called "god's beads" may have been regarded as particularly "unchristian" and targeted for disposal first. Although missionary activity among the Naga is less prevalent, Kanungo (2007:10) recounts that in 2006, converts in the village of Oting near Mon were asked by Baptist missionaries to bury all their tribal beads in a large trench, on top of which the missionaries then built the village church.[27]

Missionary activity among the Lyngngam began in the 19th century and today their tribal beads are very rare (Pl. IVA), found only in the homes of a few old women in remote villages. When these women die, their beads are buried with them (Lanstieh 2009: pers. comm.). More research is in progress, but sadly, it may not be possible to establish whether or not *u'pieng blei* are *deo moni/khaji*, and thus provide a possible link between the Lyngngam and the *Siemi* graves in the North Cachar Hills.

DISCUSSION AND CONCLUSION

It would appear that *deo moni/khaji* are orange Indo-Pacific beads of at least two types, probably made in coastal southeast India between 200 B.C and A.D. 200. These beads have been found in ancient graves on a route stretching from Northeast India's North Cachar Hills into Burma's Kachin State almost as far as the Chinese border. Far from being a historical backwater, Northeast India lay at the crossroads of land *and* sea routes connecting it to Southeast Asia and China to the east, to Central Asia and the Mediterranean world to the west, and to Nepal, Bhutan, and Tibet to the north, part of an active and extensive international trade network. This ancient trade brought cowries, chank shells, and carnelian beads which are still worn by the Naga, Kachin, and many other tribes in the region today.

Nonetheless, many questions remain unanswered. To whom did the graves in which the *deo moni/khaji* beads were found belong? What other artifacts might also be found in these graves? If the *Siemi* people referred to in the Naga myth were indeed the Lyngngam, research to date has failed to prove it.

Do tribes other than the Naga and Kachin also value *deo moni/khaji* beads? Research into the literature on the tribes living in the north of British Assam, today's Arunachal Pradesh, has failed to reveal further references to orange-colored beads which might be *deo moni/khaji*. In British-colonial times, however, there were a multitude of small ethnic groups and sub-groups in this region, and many were not studied to the same extent as were the Kachin and Naga. We lack detailed information. Moreover, the opaque grainy glass from which *deo moni/khaji* were made was not understood by early colonial visitors and references to what may have been Indo-Pacific beads are often obscure and confusing. For instance, Dalton (1872:47) mentions that the Kukis, a tribe spanning the border between Northeast India's Mizoram and Burma's Chin state, wore "pebble beads, [they call] them heirlooms, [and] attach to them an extravagant value. To a stone called *toino*, which is not described, a value equal to Rs. 3000 in cash has been ascribed." Whether the *toino* of the Kuki or *u'pieng blei* of the Lyngngam are *deo moni/khaji* remains unclear.

Once they reached the ancient ports of the Bay of Bengal, how were the *deo moni/khaji* beads traded further north? Were the Tripura or Khasi kings, later known as *Manicka* and *Manik*, involved in this bead trade? Were the Indo-Pacific beads intended for a specific ethnic group, bartered for the fragrant oils and ivory from the nearby hills, and subsequently traded down the line to groups further northeast in northern Burma? Or were they also traded west into Bengal and central India in exchange for produce from further afield?

The route from the North Cachar Hills to northern Kachin State traces in reverse the ancient migration and trade route from China into Northeast India. Is it possible that the beads actually traveled along this route in the same direction as the migrating tribes? This seems unlikely because Indo-Pacific beads of the *deo moni/khaji* type are thought to have been made in southeast India. They have not been found in Thailand, from where they might have been traded overland north into Kachin State.

The shape and color of *deo moni/khaji* Indo-Pacific beads has suggested an origin in coastal Southeast India. Yet no *deo moni/khaji* beads have so far been analyzed to confirm a match with other beads of a similar shape and color. Glassmaking was a highly portable skill. We know that Indo-Pacific beads were subsequently made in large quantities at Mantai in Sri Lanka, Oc Eo in Vietnam, Klong Thom in Thailand, and Kuala Selinsing in Malaysia. Both Francis (2002:39) and Lamb (1965b:95) have suggested the existence of itinerant beadmaking groups, their activities controlled and funded by their guilds, who were despatched to major port cities where there was a demand for glass beads. Could *deo moni/khaji* beads have been made by itinerant beadmakers in one of the ancient Ganges or Brahmaputra delta ports? Or is it possible, as claimed in the Naga myth recounted by Ursula Graham Bower (1952: 115), that the *Siemi* themselves, "by a secret process involving the use of fire, made precious *deo-moni*, the 'spirit-beads,' from slender, carefully-cultivated gareo bamboo?"

At the author's request, on a recent visit to Nagaland, Catriona Betts, daughter of Ursula Graham Bower, agreed to question Naga friends for more information. As this article goes to press, she reports the following, supplied by the Reverend Nriame, a Zemi Naga of Laisong Village in the North Cachar Hills: "The *Siemi* made *deo moni* by burning the outer skin of the *gareo* bamboo into a powder, which was burnt with a mineral, plus soil and another herbal ingredient. The *Siemi* taught the Zemi Naga many things and the Zemi used to make the *deo moni* themselves."

Glass could not be produced from these ingredients, but the basic elements mentioned do indicate some knowledge of glassmaking. Soda-lime glass of the type used for Indo-Pacific beads was made from silica (SiO_2), normally obtained from silica sand or crushed quartz. Sodium carbonate (Na_2CO_3) – usually the soda ash obtained from burning certain plants – was added as a flux to lower the melting point. The soda makes the glass water-soluble, so lime (calcium oxide, CaO) was added, generally in the form of pulverized

limestone or shells from middens. Ash from the *Siemi's gareo* bamboo may have been used as a flux. Dussubieux and Gratuze (2009: pers. comm.) report that beads of the *deo moni/khaji* type were high in copper. Two 11th-century inscriptions refer to copper mines – probably located in the Garo or Khasi Hills – which were worked by the Khasi in the ancient kingdom of Kamarupa (Badadur 1933:138, 140, 186; Barua 1951:102). The "mineral" reportedly used by the *Siemi* might have been copper ore to impart the red or orange color, and the "soil" might be construed as sand. In a Naga myth, smoke from the *Siemi* glass kilns was seen by the Kachari king from his 16th-century capital, Maibong. This suggests the *Siemi* were still making *deo moni* in the 16th century. Is this plausible? Evidence of early raw glass manufacture is rare. Ancient glass kilns were small scale and archaeological evidence rarely amounts to more than patches of charcoal and melted unfinished beads at various stages of manufacture showing either primary (raw-glass manufacture) or secondary production (imported glass reworked for the local market).

Indo-Pacific beadmaking, even in island Southeast Asia, dropped off after A.D. 1200. Perhaps in the 16th or 17th century when the Zemi Naga migrated into the North Cachar Hills, the *Siemi* did indeed operate a lucrative trade in valuable *deo moni* beads, but claimed they made them in order to conceal the fact that they found them in ancient graves. Perhaps the *Siemi* made beads which were simply one of the many later orange-glass beads made to imitate *deo moni/khaji*. According to Munan (2005:30), Western travelers to island Southeast Asia in the 16th and 17th centuries reported that "small reddish brown beads" were available "in India" and were readily bartered for exotic produce in Indonesia.

Many questions remain unanswered on the true origins of *deo moni/khaji* beads, and much research remains to be done.

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ENDNOTES

1. In 1772, a massive earthquake completely changed the direction of the mighty Brahmaputra.

2. The Hkanung are also known as the Rawang, a Kachin sub-tribe.

3. The Rawang are a sub-tribe of the Kachin.

4. Gitkat in the Kachin language; Gitkha in the Rawang language.

5. The Chinese Buddhist pilgrim Yuan Chwang (also written as Hsuan Tsang and Hiuen Ts'ang) reached Kamarupa (Guwahati) in the Brahmaputra Valley in A.D. 638. He wrote that "the mountains and rivers present obstacles, and the pestilential air, the poisonous vapours, the fatal snakes, the destructive vegetation, all these causes of death prevail" (Watters 1905:186).

6. *Deo* from the Sanskrit meaning god and *mani* from Sanskrit meaning bead, gem, or jewel.

7. In describing the ornaments of "the Nagas west of the Doyang river," Dalton (1872:43) must surely have been describing *deo moni* in the following: "They greatly affect cylindrical beads of a yellowish, almost greenish looking opaque substance, but few are rich enough to have a complete necklace of these valuable jewels."

8. These are probably more recent copies of *deo moni*, of which one type from Germany is mentioned by Carrapiet (1929).

9. The Ao are a Naga tribe.

10. Hanson is presumably confusing *deo moni* with *pumtek* beads which were made from fossil wood as well as carnelian and agate.

11. For other references to what appear to be *deo moni*, *see* Hodson (1911:34), and McCulloch (1859:52): "In their festivals, the men wear their peculiar ornaments of which the most prized are necklaces of a red pebble. A single stone of this sort is sometimes valued at five methins."

12. Bower (1950:112) also mentions other pre-Naga remains such as the burial urns of Bolosan. Traces of fortified villages belonging to a vanished tribe were also reported in the Chin Hills (Carey and Tuck 1895:174).

13. The beads were also examined by British Egyptologist Alfred Lucas (1867-1945), consulting chemist to the Egyptian Department of Antiquities in Cairo. Lucas' area of study was ancient faience, the composition of which was a matter of great dispute (Gilberg 1997:31-48).

14. Beck refers to van der Hoop (1932:229): "In a mound which enclosed two kettle drums.... [were] a number of pottery vessels [which]... were disposed around the drums, perhaps containing offerings. Underneath one of the pots, opaque glass beads of a terracotta red colour were found, which may have been the remains of a necklace."

15. *Wakching mala* have spacer bars of brass rather than bone or horn as found on less-valuable necklaces of similar design (Neufeld 2009: pers. comm.).

16. The stone beads were made by two distinct methods: grinding, used by beadmakers in Western India, and pecking, used by the Pandukal. The Pandukal also made etched carnelian beads. Francis (2002:116) notes that stones were fixed on a short stick (a dop) with lac to be ground against a wheel. This method was unique to the Pandukal. The same method is used today at Kangayam but not elsewhere in India. Dops are still used today in Burma, however, showing an influence in hardstone beadmaking between these two areas.

17. Roman amphorae have been found at Arikamedu in large numbers dating from the second century B.C.

18. The Marwari are non-Muslim traders, originally from Rajasthan. In British-colonial Assam, they operated in almost all the important business centers and tea gardens of the state (Singh 2003).

19. Also known as *shankha* (*Turbinella pyrum*). The true conch genera is *Strombus*. The name conch, however, is often loosely applied in English-speaking countries to several kinds of large marine gastropods, including the chank shell.

20. The conch is particularly associated with the Hindu gods Vishnu and Krishna.

21. Imitation crystal beads in bubbly glass were traded from India (Ao and Liu 2003:7).

22. Recent imitations of circular *tongbang* made of perspex (plexiglass) are worn in Myanmar suspended by a cord over the head.

23. Glass imitations of the circular type are said to come from Myanmar (Saul 2005:49, 54).

24. These beads were obtained from the plains markets of Damra (near Goalpara in the Assam plains) and Moiskhola (Gurdon 1907:48, 196). Compared to the Khasis, the Garos had more access to the plains of Assam and also the Chittagong Hill tracts of what is now Bangladesh (Langstieh 2009: pers. comm.).

25. Stick lac was cultivated locally in the Khasi and Garo hills, the insects feeding on pulse plants grown for the purpose. The crude product consisted of twigs with a hard lump of dark gummy substance around them. The gum, when washed, is of an orange color, and the dead bodies of the insects are embedded in it. It was purchased by Marwari merchants who exported it to Calcutta (Carey 1919:20; Gurdon 1907:48).

26. Earlier Gurdon (1914:23) states: "The Lynngam males wear bead necklaces, the beads being sometimes of cornelian gathered from the beds of the local hill streams... the carnelian necklaces are much prized by the Lynngams, and are called by them '*ping blei*, or gods' necklaces." He later corrects this.

27. Today many missionaries are far more tolerant and the wearing of traditional dress and ornaments is often encouraged at Christian festivals such as Christmas and Easter.

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Plate IA. *Kachin/Naga:* **Top:** Necklace of *khaji*, heirloom beads of the Kachin. Orange Indo-Pacific beads predominate (author's collection). **Bottom:** Detailed view (all photos by author unless otherwise noted).

Plate IB. *Kachin/Naga:* Prestigious double-strand necklace of *khaji* worn with a second single strand in Putao, Kachin State. The larger *khaji* beads are over 1.0 cm in diameter. The white cylindrical beads are of chank shell.

Plate IC. *Kachin/Naga:* **Top:** The *khaji* necklaces seen in Pl. IB. **Bottom:** Detail of the above necklaces. Note the white chank-shell and fancy Venetian beads.

Plate ID. *Kachin/Naga:* **Top:** Necklace of imitation *khaji* beads; the central bead is bone. Myitkyina, Kachin State, Burma (author's collection). **Bottom:** Imitation *khaji* detail.

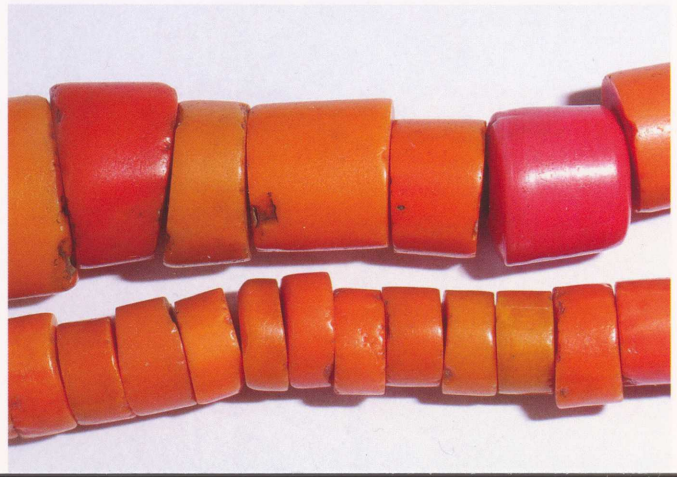

Plate IIA. *Kachin/Naga:* **Top:** Necklace with *khaji* of various sizes, red Venetian beads, and some darker *khaji* imitations. Langtao village, Kachin State, Burma, 2007. **Bottom:** The much-worn *khaji* flanked by imitations.

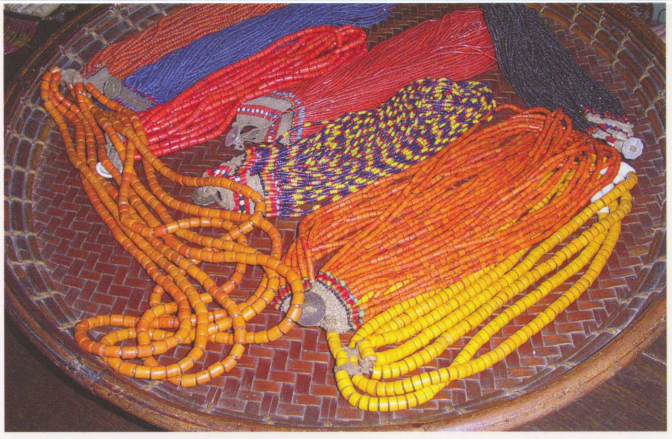

Plate IIB. *Kachin/Naga:* **Top:** Naga necklaces of various types collected in the 1970s and 1980s (Gertrude Anschel collection). **Bottom:** *Khaji* necklace with chank-shell beads and discoid; Putao area, Kachin State, Upper Burma.

Plate IIC. *Kachin/Naga:* **Top:** Naga necklace resembling *khaji* necklaces of the Kachin. The large white glass beads imitate chank shell (author's collection). **Bottom:** Detailed view.

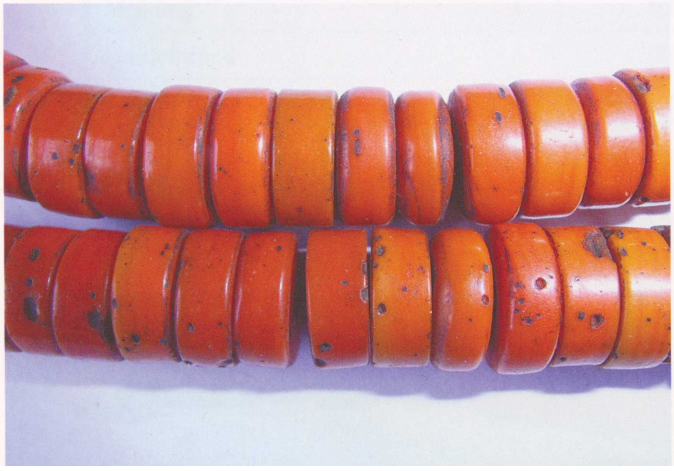

Plate IID. *Kachin/Naga:* Konyak Naga choker (above) and bib necklace (below) incorporating *deo moni/nupti* (Harry L. and Tiala Marsosang Neufeld collection; courtesy Harry Neufeld).

Plate IIIA. *Kachin/Naga:* **Top:** Prestigious Naga necklace (*Wakching mala*) with *deo moni/nupti* and glass beads, chank shells, and brass bells (author's collection). **Bottom:** Detail of the above necklace, showing *deo moni* and brass spacer bars.

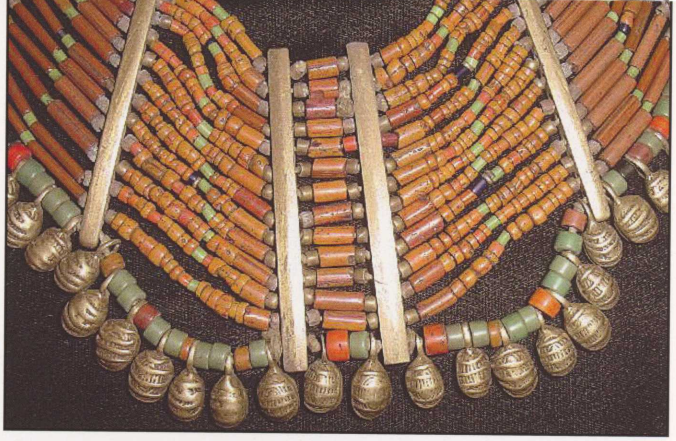

Plate IIIB. *Kachin/Naga:* **Top:** Detail of another *Wakching mala* necklace (Harry L. and Tiala Marsosang Neufeld collection; courtesy Harry Neufeld). **Bottom:** *Deo moni/khaji* necklaces.

Plate IIIC. *Kachin/Naga:* **Top:** Indo-Pacific "core" beads in a *khaji* necklace. **Bottom:** Lyngngam beads from Lashongthiang village, West Khasi Hills, Northeast India (March 2009).

Plate IIID. *Kachin/Naga:* "A distinctive feature of the Lynngam women is the very large blue bead necklaces they wear. They put on such a large number as to give them almost the appearance of wearing horse collars." (Gurdon 1914:22; pl. op. 194).

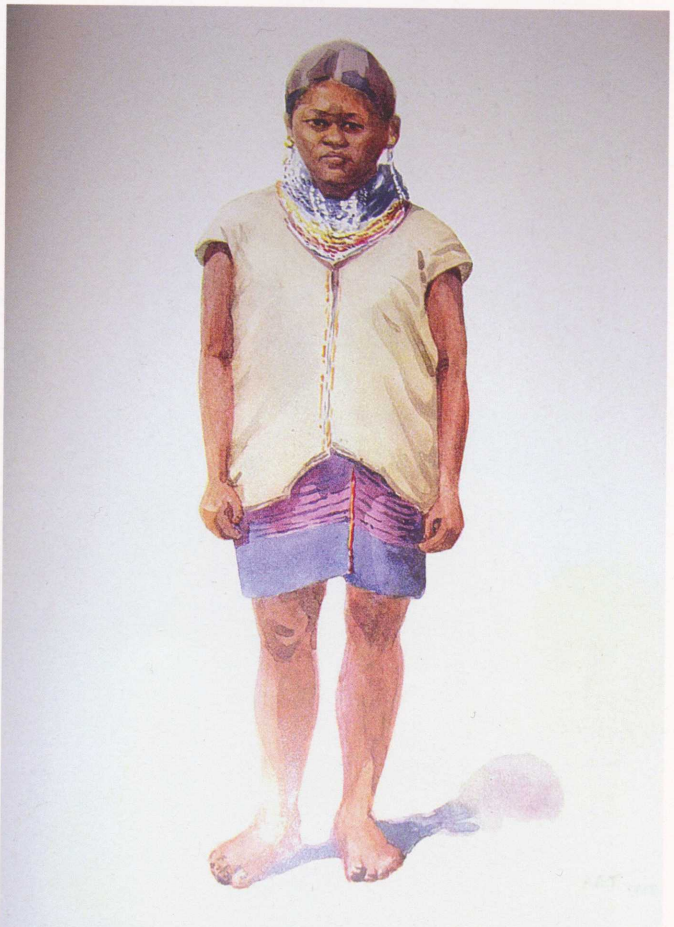

Plate IVA. *Kachin/Naga:* Lyngngam matriarch wearing her heirloom beads in Lashongthiang village, West Khasi Hills, Northeast India; one of only two residents in the village who still retain such beads.

Beads from the *Great White Arabia:* A Mid-19th-Century American Steamboat

Karlis Karklins and David Henneberg

Loaded with 200 tons of goods heading for Omaha, Nebraska, and Sioux City and Council Bluffs, Iowa, the steamboat Great White Arabia *hit a snag and sank near Kansas City in 1856. In 1989, a group of salvors excavated the wreck and recovered almost the entire cargo which was in a remarkable state of preservation. Among the finds were several million glass embroidery beads, as well as several hundred blown specimens in various shapes, sizes, and colors, some of which formed the heads of fancy stickpins. Due to their fragility, blown beads are seldom found in archaeological contexts, so the* Arabia *specimens are especially significant and comprise the largest collection of such beads found at a North American site. Coming from a tightly dated context, the beads reveal exactly what was being brought to a specific area of the American frontier in the mid-1850s. They also provide information concerning the different techniques used to produce them.*

THE *GREAT WHITE ARABIA*

Constructed in Brownsville, Pennsylvania, in 1853, the *Great White Arabia* was a sidewheeler cargo steamer (Pl. IVB) designed to ferry supplies and passengers to riverfront settlements. After spending its first three years on the Ohio and Mississippi rivers in the hands of Captain John Shaw, it was purchased by Captain William Terrill to ferry cargo on the Missouri River between St. Louis, Missouri, and Fort Union, North Dakota. On August 30, 1856, the *Arabia* departed St. Louis bound for the frontier towns of Sioux City and Council Bluffs in Iowa, and Omaha City in Nebraska, carrying 200 tons of cargo and 130 passengers. Most of the passengers were women and children traveling to rejoin husbands and fathers who had gone ahead to build homes in the aforementioned new settlements. On the evening of September 5, as the passengers were sitting down to dinner, the *Arabia* struck a snag beneath the river surface. The boat, with its heavy cargo, sank in about 10 minutes, less than one hour north of Kansas City, Missouri. All passengers and the crew survived, and were taken to the nearby town of Parkville, Missouri, for the night. The boat and its cargo were considered a total loss (Hawley 1989, 1995, 2005).

SALVAGING THE *ARABIA*

The first recovery attempt came in 1877, financed by the Tobener Brothers who were Kansas City tobacco merchants. It was believed that the ship's cargo included Kentucky bourbon, but when all they found were felt hats, the salvage attempt was discontinued.

A second attempt was made 20 years later when Gale Henson of Holt, Missouri, reached the deck of the *Arabia* by constructing a steel caisson tube. The team dug into the cargo in three places, again expecting to find whiskey, but encountered only boots and lumber. Another unsuccessful attempt followed in 1975. By this time the river had changed its course and the wreck, having been silted over, was now under a farmer's field about a half mile from the actual river channel. The project failed primarily because the salvagers could not keep ground water from filling the excavation area.

Finally, in November of 1988, a consortium of eight individuals (Harland "Bob" and Florence Hawley, Greg and Karen Hawley, David and Laurie Hawley, and Jerry and Joan Mackey), operating under the name River Salvage Incorporated, obtained permission from Norman Sortor to dig into his field after the soybean crop had been harvested.

The wreck was located using a magnetometer, a device that detects metal concentrations in the ground. Once the general location had been found, a small drill was used to locate the perimeter of the boat (Fig. 1). On November 13, River Salvage began uncovering the *Arabia*. Using heavy equipment supplied by a contracting company owned by Dave Luttrell and a water pumping system designed by Bob Hawley, the crew excavated an area the size of a football field (Pl. VA). After two weeks of digging, they reached the deck of the Arabia about 11 m (35 ft.) below the surface. For the next 10 weeks, they worked 16-hour days to recover hundreds of wooden boxes and barrels full of cargo and

Figure 1. The site of the *Great White Arabia* prior to excavation. The outline of the boat has been determined by magnetometer readings and drilling (photo: David Hawley).

Figure 2. The cargo included various comestibles including jars of pickles with the contents perfectly preserved (photo: David Hawley).

river silt (Figs. 2-3; Pls. VB-VC). Some of the boxes had been crushed under the weight of the collapsed deck. Approximately 4,000 pounds of cargo were recovered each day, in the end totaling 150 tons.

Once the water was drained to a level below the cargo, the crew knew they had to work fast to reduce the deteriorating effect of exposure to air. Tinware recovered near the end of the project was in significantly worse condition than that which had been removed early on due to the effects of oxidation. A temporary on-site preservation lab was set up to stabilize the artifacts as they were removed. Depending on the material, some were frozen, others were placed in water tanks, while items made of glass, porcelain, and crockery required no special preservation process. Protein-based materials like wool, silk, furs, and leather were found in very good condition, whereas cellulose-based materials such as paper and cotton had almost entirely disintegrated. For example, only the very core of a bolt of cotton calico material survived. Cotton thread had to be replaced in wool jackets, a beaver-hair coat, wool underwear, wool shirts, and leather boots to return them to their original condition.

An archaeologist from the state of Missouri was employed to catalogue the cargo as it was removed, so none of the discoveries could be disputed. The cargo was documented using video and still photography and sketches made by the archaeologist. On February 11, 1989, with the excavation complete, the River Salvage crew turned off the water pumps and let the water reclaim the empty hull of the *Arabia* (Fig. 4).

As a result of the efforts of River Salvage, Inc., the *Arabia*'s historic cargo can now be viewed and studied. The excavation led to the creation of a 30,000-sq.-ft. museum and research facility dealing with life on the American frontier. Located a few blocks from the Missouri River in downtown Kansas City, Missouri, the *Arabia* Steamboat Museum displays thousands of preserved artifacts in hands-on historic exhibits that recreate the look and feel of 1856 steamboat life. On display is a reconstruction of one of the

Figure 3. Uncovering a shipment of felt hats (photo: David Hawley).

Arabia's matching 28-foot paddlewheels. The original stern hull, boilers, engines, anchor, and paddlewheel hub are also on display. The museum contains a full-scale recreation of the *Arabia*'s 171-ft. boat deck, a general store, and a frontier cabin exhibit to enhance the treasure displays. There is also a hands-on tool and hardware display, and an open conservation lab where one can see how the artifacts are preserved. The *Arabia* Steamboat Museum is a few hundred yards from the old Westport Landing, believed to be the boat's last stop on September 5, 1856 (Hawley 1989, 1995, 2005).

THE CARGO

The Treasures of the Steamboat *Arabia* is the largest collection of pre-Civil War steamboat cargo in the world. The 150 tons of artifacts, dating tightly to one day in September of 1856, create a rare historic snapshot of mid-19th-century global manufacturing and trade. They also provide an accurate benchmark to date other 19th-century collections. But more specifically they provide a new perspective on the tastes and quality of life enjoyed by frontier families.

It is not just the quantity but the variety of items recovered from the *Arabia*'s cargo hold that is staggering. Among newly patented items in the 1850s are canning jars, wooden matches, and rubber products. Unexpected items include shoes with eyelets, colored shoelaces, ready-to-wear women's sweaters, and prefabricated plank houses. There are also luxury items such as fur coats, fine jewelry (Pl. VIA, top), perfumes, cognac, wine, and champagne. Footwear is represented by 4,000 leather boots and shoes (Fig. 5), from 3-in. children's sizes to knee-high gentlemen's boots adorned with gold-leaf crests, as well as 100 pairs of India-rubber overshoes made by the Goodyear Rubber Shoe Company. Sewing supplies include pins, needles, scissors, buttons, thimbles, thread, and 65 bolts of fabric, including a 100-yard bolt of black silk from China. There are 150 full leather hides as well as writing pens in 63 different styles and even some marbles. Tableware encompasses over 1,000 pieces of china, including Wedgewood, found packed in straw.

Representing hardware are such items as deadbolts, door knobs, keys, hinges, square nails, wood screws, and chains. Tools include levels, tape measures, wrenches, saws, hammers, picks, shovels, traps, drills, fireplace tools, axes, awls, and augers. In the comestibles category are pickles (Fig. 2), pie filling, peppercorns, catsup, cheese, nuts, sardines, oysters, ale, and whiskey.

Imported commodities include perfume, buttons, pins, needles, and ink pens from France; gilt-decorated dishware, sculpted vases, brass locks, and iron tools from England; trade guns from Belgium; tobacco boxes, chews, and cigars from South America; coffee from Brazil, Java, and Jamaica; allspice and cinnamon from the Orient; and glass beads from Europe.

THE BEADS

All of the beads recovered from the *Arabia* were found in two large general-merchandise boxes situated amidships, marked for delivery to Council Bluffs, Iowa. The boxes were approximately 6 ft. long, 3 ft. wide, and 2 ft. deep. They contained a variety of items such as buttons, jewelry, cosmetics, toothbrushes, slate pencils, eyeglasses, hairbrushes, perfume, powder flasks, and many other common articles used everyday by frontier families. Beads were found scattered loose throughout the boxes. As time did not permit their recovery on site, the silt from the boxes was packed into containers and then screened after the excavation

Figure 4. The hull of the *Arabia* after excavation. The paddle wheels are visible at the sides and the triple-tank boiler and associated water pump are at the rear (photo: David Hawley).

Figure 5. Some of the recovered shoes, boots, and other leather goods on display in the *Arabia* Museum (photo: David Hawley).

was completed. This process resulted in the recovery of an estimated 3.5 million beads. Glass beads predominated but several metal specimens were also recovered.

The glass specimens represent three major manufacturing types: drawn, wound, and blown. These are classified below using an expanded version of the system developed by Kidd and Kidd (1970) as presented in Karklins (1985). Beads that do not appear in the Kidds' lists are marked by an asterisk (*). Colors are designated using the codes provided in the *Color Harmony Manual* (Container Corporation of America 1958) as used by the Kidds as well as the better-known Munsell color notation system (Munsell Color 1976). The *Color Harmony* names are further supplemented, where correlatives exist, by the more descriptive ones provided in the ISCC-NBS Centroid Color Charts (Karklins 1989). Diaphaneity is designated using the terms opaque (op.), translucent (tsl.), and transparent (tsp.).

Drawn Beads

These consist of sections of tubing drawn out from a hollow globe of molten glass. Most of these were subsequently rounded by tumbling them in a heated drum. The circular embroidery beads (also commonly called seed beads) are generally oblate in form but range to very short tube sections with finished ends. There are 4 tubular (Pl. VIA, bottom) and 27 circular (Pl. VIB, top) varieties.

Due to the overwhelming number of circular embroidery beads, most of which remain unsorted, it was not possible to get an accurate count for each variety. Consequently no quantitative data are provided for them below though some comments on relative frequency are provided in the Discussion and Conclusion section. The quantities listed for the tubular beads are based on an actual specimen count.

Ia*. Long tubular; satin sheen, tsl. white (a; N 9/0); unfinished ends; thin walls; 76 specimens.

Diameter: 2.0-2.9 mm Length: 13.1-14.4 mm

Ia*. Long tubular; satin sheen, tsl. olive yellow (1 le; 10.0Y 5/6); unfinished ends; very thin walls; 21 specimens.

Diameter: 1.8-2.8 mm Length: 11.6-14.4 mm

Ia*. Long tubular; satin sheen, tsl. apple green/light yellowish green (23 ic; 10GY 6/6); unfinished ends; thin walls; 51 specimens.

Diameter: 1.4-2.3 mm Length: 9.1-11.0 mm

Ic'*. Long tubular, hexagonal cross-section, twisted; mustard brown (2 pi; 2.5Y 4/6); unfinished ends; very thin walls; 27 specimens.

Diameter: 1.6-2.3 mm Length: 9.0-10.7 mm

IIa*. Circular; tsp. scarlet (7 pa; 7.5R 4/14).

Diameter: 1.4-2.8 mm Length: 1.2-1.9 mm

IIa7. Circular; op. black (p; N 1/0).

Diameter: 1.3-3.2 mm Length: 0.7-2.7 mm

IIa12. Circular; tsl. oyster white/grayish white (b; N 8/0).

Diameter: 1.5-2.0 mm Length: 0.9-1.3 mm

IIa14. Circular; op. white (a; N 9/0).

Diameter: 1.2-2.5 mm Length: 0.7-1.7 mm

IIa*. Circular; tsp. pale blue, opalescent (15 ca; 7.5B 8/2).

Diameter: 2.0-2.8 mm Length: 1.1-1.9 mm

IIa*. Circular; op. sunlight yellow/brilliant yellow (1½ ga; 5Y 8/8).

Diameter: 2.1-3.0 mm Length: 1.9-2.5 mm

IIa*. Circular; tsp. pale sunlight yellow (ca. 1½ ga; 5Y 8/8).

Diameter: 1.2-1.9 mm Length: 0.8-1.1 mm

IIa*. Circular; tsp. lemon yellow/brilliant greenish yellow (1 la; 10Y 8/10).

Diameter: 1.3-1.9 mm Length: 0.9-1.2 mm

IIa*. Circular; op. olive yellow/dark greenish yellow (1 le; 10Y 5/6).

Diameter: 1.6 mm Length: 1.0 mm

IIa*. Circular; op. grass green/strong yellowish green (23 pe; 10GY 5/10).

Diameter: 2.2-3.2 mm Length: 1.3-2.5 mm

IIa*. Circular; op. dark palm green (23 ni; 10GY 4/4).

Diameter: 1.6-1.7 mm Length: 1.2 mm

IIa*. Circular; tsl./op. bright green (22 nc; 2.5G 5/10).

Diameter: 1.2-1.9 mm Length: 0.8-1.4 mm

IIa*. Circular; tsp. dark green (22 pi; 2.5G 3/6).

Diameter: 2.0-3.3 mm Length: 1.0-2.5 mm

IIa*. Circular; op. emerald green (21 nc; 10G 5/10).

Diameter: 2.7-2.8 mm Length: 1.6-2.2 mm

IIa*. Circular; tsp. turquoise green (20 nc; 5BG 4/8).

Diameter: 3.1-3.9 mm Length: 2.0-2.9 mm

IIa*. Circular; tsl. light aqua green (19 ea; 7.5BG 8/4).

Diameter: 1.7-1.8 mm Length: 1.1-1.3 mm

IIa*. Circular; tsp. bright turquoise (18 la; 7.5BG 6/8).

Diameter: 2.1-3.9 mm Length: 1.2-3.5 mm

IIa43. Circular; tsl. bright blue (16 lc; 5B 5/7).

Diameter: 1.8-3.4 mm Length: 0.9-2.4 mm

IIa*. Circular; tsl. cerulean blue (15 nc; 7.5B 4/8).

Diameter: 2.0-2.9 mm Length: 1.2-2.1 mm

IIa*. Circular; op. sky blue/strong purplish blue (15 ic; 7.5B 6/6).

Diameter: 1.4-1.8 mm Length: 0.6-1.1 mm

IIa*. Circular; op. copen blue (13½ ic; 5PB 5/7).

Diameter: 1.2-1.8 mm Length: 0.9-1.5 mm

IIa*. Circular; op. bright Dutch blue/moderate greenish blue (13 la; 7.5PB 4/11).

Diameter: 1.2-2.0 mm Length: 0.6-1.1 mm

IIa*. Circular; op. royal blue (12½ pc; 7.5PB 2/10).

Diameter: 2.0 mm Length: 1.3 mm

IIa*. Circular; op. orchid mist/grayish purplish pink (9 ec; 2.5RP 7/4).

Diameter: 2.0-2.9 mm Length: 1.3-2.1 mm

IIa58. Circular; tsp. light cherry rose/strong pink (7 ga; 5R 7/8).

Diameter: 1.2-1.9 mm Length: 0.7-1.0 mm

IIa*. Circular; op. light cherry rose/strong pink (7 ga; 5R 7/8).

Diameter: 2.0-2.6 mm Length: 1.0-1.9 mm

IVa*. Circular; tsp. scarlet (7 pa; 7.5R 4/14) on op. white (a; N 9/0).

Diameter: 1.4-4.0 mm Length: 1.0-2.6 mm

Wound Beads

These were formed by winding a viscid filament of molten glass around a metal mandrel until the desired size and shape were achieved. Strands or crumbs of contrastingly colored glass were sometimes applied to the surface to decorate the beads. Three varieties are represented and all form the heads of ornate brass stickpins (described below)(Pls. VIB, bottom and VIC, top).

WIc*. Oval; tsl. light gray (c; N 7/0); 12 specimens.

Diameter: 5.8-6.3 mm Length: 6.0-7.0 mm

WIIIb*. Oval; op. white (a; N 9/0) body decorated with an op. turquoise blue (17 pa; 10BG 4/8) band around the middle and a tsp. scarlet (7 pa; 7.5R 4/14) swirl around either end; 15 specimens.

Diameter: 5.8-6.5 mm Length: 6.3-6.8 mm

WIIIb*. Oval; tsp. emerald green (21 nc; 10G 5/10) body (appears black unless held up to a strong light) decorated with op. white (a; N 9/0) and op. redwood (6 ne; 10R 4/8) "crumbs;" 8 specimens.

Diameter: 6.0-6.5 mm Length: 6.7-7.5 mm

Blown Beads

The blown beads were produced using three different methods: 1) free blowing a glass bubble; 2) blowing a bubble in a drawn tube; and 3) heating and constricting a drawn tube. As most of the beads in the latter two categories were on display, it was only possible to get an accurate count for the free-blown specimens. The counts provided for the other varieties are based on figures in an early museum inventory so may be considered minimal though they do reflect the relative frequency of the different varieties as noted in the museum displays.

Free-Blown Beads

These consist of delicate clear glass bubbles that appear to have been individually free-blown. This is suggested by the fact that some of the perforations are off center and, while some specimens are just about perfect spheres, others are slightly lopsided, tending to rule out mold blowing. The edges of the perforations have been fire polished smooth.

There are two sizes. The smaller ones (Size A; 64 specimens; Pl. VIC, bottom) all formed the heads of brass stickpins (described below; Pl. VID, top) while the larger ones (Size B; 196 specimens; Pl. VID, bottom) probably comprised necklaces or were intended for such. Several of the pinheads exhibit traces of what appears to be the original internal colorant – a bright cinnabar. The other specimens exhibit white, gray, pink, brown, and black internal coloration, all of which are probably the result of silt seeping into the beads.

BIa*. Globular; tsp. light gray (c; N 7/0); internally colored.

Size A)
Diameter: 8.0-9.8 mm Length: 7.5-9.0 mm

Size B)
Diameter: 12.3-13.4 mm Length: 12.4-13.3 mm

Bubbles Blown in Drawn Glass Tubes

Beads in this group were made by blowing a series of bubbles in a heated, thin-walled drawn tube of spirally oriented satin-sheen glass which were subsequently broken apart. A tiny portion of the original tube protrudes from either fire-polished end. Two forms are represented: globular and ovate (Pl. VIIA, top), the latter ranging from football shaped to olive-pit shaped. There are five varieties.

BIa*. Globular; spiral satin sheen, tsl. pale ultramarine (13 pa; 6.25PB); 11 specimens.

Diameter: 6.7-11.9 mm Length: 8.3-13.7 mm

BIc*. Ovate; spiral satin sheen, tsl. apple green/light yellowish green (23 ic; 10GY 6/6); 32 specimens.

Diameter: 10.6-13.9 mm Length: 23.0-25.0 mm

BIc*. Ovate; spiral satin sheen, tsl. ultramarine (13 pa; 6.25PB 3/12); 29 specimens.

Diameter: 11.9-13.7 mm Length: 26.3-31.5 mm

BIc*. Ovate; spiral satin sheen, tsl. pale pink (8 ca; 10RP 8/4); 20 specimens.

Diameter: 5.1-9.3 mm Length: 13.4-21.1 mm

BIc*. Ovate; op. gilded; 5 specimens (Pl. VIIA, bottom).

Diameter: 3.9-4.2 mm Length: 5.0-6.6 mm

Constricted-Tube Beads

These beads consist of thin tube sections with constricted ends (Pl. VIIB, top). They were apparently produced by heating a tube over a flame at even intervals, at the same time pulling the tube in opposite directions, thus constricting it. The segments were then cut apart and the rough edges fire polished to round them. All the beads have a satin sheen with a straight grain. A number of specimens exhibit a black sub-metallic patina. There are five varieties.

BI.** Barrel-shaped; satin sheen, tsl. white (a; N 9/0); 6,755 specimens.

Diameter: 3.9-7.6 mm Length: 5.6-9.4 mm

BI.** Barrel-shaped; satin sheen, tsl. lemon yellow/brilliant greenish yellow (1 la; 10Y 8/10); 53 specimens.

Diameter: 4.8-5.5 mm Length: 5.6-7.0 mm

BI.** Barrel-shaped; satin sheen, tsl. apple green/light yellowish green (23 ic; 10GY 6/6); 400 specimens.

Diameter: 3.8-6.5 mm Length: 4.7-14.5 mm

BI.** Barrel-shaped; satin sheen, tsl. ultramarine (13 pa; 6.25PB 3/12); 425 specimens.

Diameter: 7.2-8.1 mm Length: 8.4-9.7 mm

BI.** Barrel-shaped; satin sheen, tsl. pale pink (8 ca; 10RP 8/4); 1,500 specimens.

Diameter: 4.2-7.4 mm Length: 5.4-9.2 mm

Metal Beads

There are two varieties of metal beads represented by three specimens. Each bead exhibits a longitudinal seam and appears to have been formed by rolling.

Silver-plated Brass

Short barrel; large perforation; 1 specimen.

Diameter: 5.1 mm Length: 4.4 mm

Brass

Globular; small perforation; 3 specimens (Pl. VIIA, bottom).

Diameter: 3.3 mm Length: 3.0-3.1 mm

DISCUSSION AND CONCLUSION

The wreck of the *Great White Arabia* is a unique time capsule whose remarkably well-preserved cargo reveals precisely what was being shipped to the American frontier in September of 1856. While one of the *Arabia*'s destinations, Council Bluffs, was relatively well established by this time, nearby Omaha and Sioux City were only surveyed and opened to settlement in 1854. This explains the presence of the large number of tools and hardware items, and two prefabricated frame houses in the hold of the *Arabia*.

The recovered beads were generally found loose in two large wooden crates but the presence of a substantial hank remnant (Pl. VIIB, bottom) as well as several small clusters of aligned seed beads suggests that the circular embroidery beads were doubtless all strung in hanks. Several hanks of blown beads in the author's collection that are of similar form to those found on the *Arabia* suggest that the blown satin-sheen beads were doubtless formed into hanks as well, if they were not already strung as necklaces. It is likely the hanks were wrapped in manilla paper, a common method of packaging bead hanks (Carroll 2004:22).

While beads formed only a minuscule portion of the cargo, their presence nonetheless reveals that even on the frontier, with all its hardships and privations, there was a desire for adornment. The circular embroidery beads may have been intended for some of the settlers but it is also quite possible that a good portion of them was also destined for trade with the Indians in the region as they were far more inclined to decorate their garments and possessions with variously colored glass beads at the time. (Women's publications of the period, such as *Godey's Lady's Book* [1852, 1859] and *Peterson's Magazine* [1859, 1861], call primarily for the use of white and crystal (colorless) beads, as well as small metal beads, in the decoration of various personal and household articles; no mention is made of beads for decorating garments save for an occasional accessory.) In fact, a number of the circular varieties have counterparts at the site of Fort Union, an American Fur Company post which operated on the Upper Missouri River near Williston, North Dakota, from 1828 to 1867 (Ross 2000:108-109). Interestingly, while excavations at Fort Union yielded a number of drawn tubular beads, many wound specimens, and several blown varieties, none are replicated in the *Arabia* material. A list of the beads stocked by some of the traders operating out of Council Bluffs during the decade preceding the sinking of the *Arabia* is presented in Table 1.

Due to their fragile nature, the blown beads were almost certainly meant for the settler's wives. The large and very large ovate and globular specimens are recorded as having found their principal use in necklaces (Neuwirth 1994:280). As such they would have been very comfortable to wear due to their lightness. Some of the smaller blown beads served a similar function (Neuwirth 1994:455) but they also found use in coverings for milady's head (Fig. 6) as well as fringes for shawls (Fig. 7)(Neuwirth 1994:427, 445, 455). They were also applied to such domestic items as needle books (Fig. 8) and pincushions of both White (Weaver 1863:317) and Native American manufacture. In the latter instance, op. white satin-sheen beads of the barrel-shaped constricted-tube variety were noted on four such objects produced by the

Figure 6. A woman's head covering adorned with small crystal beads and blown white satin beads, and a necklace incorporating ovate blown beads similar to those from the *Arabia* (*Der Bazar: Berliner Illustrirte Damen-Zeitung* 1867:96; Neuwirth 1994:455).

Tuscarora for the Niagara Falls tourist trade from the 1850s to the 1870s (Dolores Elliott 2009: pers. comm.). Measuring about 5.5 mm in diameter and 7.5 mm in length, the satin beads were used in combination with colorless seed beads (Pl. VIIC).

Some of the smaller, globular free-blown beads and all the wound beads formed the heads of 64 ornate brass

Table 1. Beads in Traders' Inventories Operating out of Council Bluffs, 1848-1852.

Quantity	Description	Price/Piece	Total Cost
A.S. Papin, August 1, 1848			
58	lbs. Black round beads [$0.25/lb.]	25	14.50
100	lbs. Blue round beads [$0.40/lb.]	40	40.00
15,700	White wampum [1000 beads/hank @ $2.50/hank]	250	39.25
24,550	BLK Wampum [1000 beads/hank @ $3.00/hank]	300	73.65
2¾	lbs. assorted sized beads [$1.00/lb.]	100	2.75
48	pairs 4 in Hair pipe [$0.25/pair]	25	12.00
P.A. Sarpy, July 20, 1849 NY			
30	Blue beads [$0.50/hank?]	50	15.00
30"	Chalk white beads [$0.28/hank?]	28	8.40
30	Black beads [$0.22/hank?]	22	6.60
34"	Carnelian beads [$0.60/hank?]	60	20.40
10	bu Blue agate beads [$0.75/bunch]	75	7.50
4	bu White agate beads [$1.50/bunch]	150	6.00
5	bu Blue barley corn beads [$0.75/bunch]	75	3.75
4	bu Chalk white pigeon egg beads [$0.75/bunch]	75	3.00
4	bu Red pigeon egg beads [$0.875/bunch]	87½	3.50
30,200	Blk wampum [1000 beads/hank @ $2.8125/hank]	281¼	84.94
20,000	White wampum [1000 beads/hank @ $2.375/hank]	237½	47.50
Mesuir, Ellis, Deorine, Cleghorn, and Fuller			
for Omaha trade			
10 lbs.	Black beads [$0.50/lb.]	50	5.00
10 lbs.	White chalk [$1.00/lb.]	100	10.00
for Pawnee trade			
20 lbs.	Black beads [$0.50/lb.]	50	10.00
20 lbs.	Chalk white beads [$1.00/lb.]	100	20.00
Duncan MacDonell, October 1, 1852			
4,000	White wampum [1000 beads/hank @ $4.00/hank]	400	16.00
5,000	Black do [1000 beads/hank @ $5.00/hank]	500	25.00
16	Ruby beads [$1.25/hank]	125	20.00
8	Sky Blue do [$1.00/hank]	100	8.00
20	Orange do [$.75/hank]	75	15.00
10	Garnet do [$1.50/hank]	150	22.50

Based on material prepared December 19, 1969, by Carl Hugh Jones, Curator of Anthropology, Nebraska State Historical Society, Lincoln (Davis 1972:311-312). Lester Ross (2009: pers. comm.) provided the pricing information in brackets.

Figure 7. Garnitures for shawls which incorporate (top) crystal beads, bronzed globular blown beads, and ovate satin-glass blown beads (*Der Bazar* 1865:198), and (bottom) white ovate, globular, and barrel-shaped forms (*Der Bazar* 1864:223)(Neuwirth 1994:427).

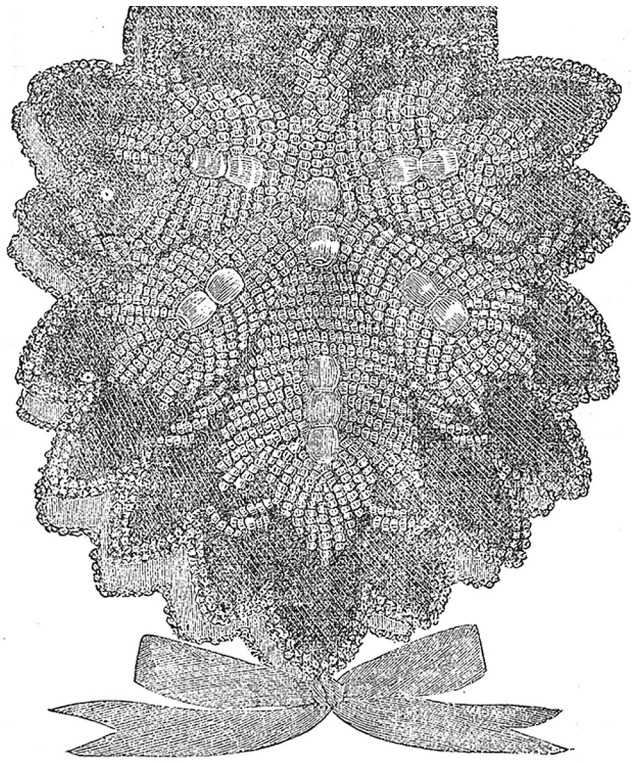

Figure 8. Clam-style needle case decorated with small white beads and white barrel-shaped blown beads (Weaver 1863:317).

stickpins (Pls. VIB, bottom to VID, top) that were commonly used as decorations for cravats. While silt had seeped into the blown beads, a number retained some of the original cinnabar coloration, probably in imitation of precious coral. The pins range in length from 55 to 63 mm (59 mm average) and have round shanks. The ornamental brass caps at either end of the beads are star shaped and have pebbled surfaces.

The bulk of the blown beads and the tubular drawn beads are composed of satin-sheen glass. This type is created by kneading the initial gather to introduce hundreds of tiny bubbles into the glass. When the gather is drawn into a tube, the bubbles become long fine tubes that refract the light and impart a silky appearance. Such beads are known by the trade name “Atlas” (Neuwirth 1994:153).

Although several European countries such as France, Italy (Venice), and Austria produced blown beads, especially in the form of false pearls, it is likely that the *Arabia* specimens originated in Bohemia or possibly Germany. The evidence for German production is in the form of several sample cards of large, globular blown beads similar to those recovered from the *Arabia* produced in Lauscha, Thuringia, Germany, in the 1840s-1850s (Jürgen Busch 1985: pers. comm.). Lauscha is probably best known for its blown

Christmas tree ornaments which continue to be made there today (Krebs Glass 2009). The evidence for Bohemian manufacture is far stronger. Beads practically identical to the very large globular and ovate specimens as well as the smaller barrel-shaped ones are illustrated by Neuwirth (1994:280, 283, 360-361) in her excellent book on the Gablonz bead industry. The globular and ovate beads she shows were produced by H. Göble of Gablonz (now Jablonec-nad-Nisou in the Czech Republic) and are believed to date to around 1837 (Neuwirth 1994:280). The barrel-shaped ones are on a sample card from the company of the Mahla Brothers (Pl. VIID) and date somewhere between 1878, when the company was founded, and 1913, when the card, along with several others, was apparently donated to the Technical Museum for Art and Industry in Vienna (Neuwirth 1994:300). These beads seem to have had a long temporal span as they, along with the globular and ovate types, also appear on several Bohemian sample cards believed to date to the second quarter of the 20th century (Neuwirth 1995:51, 59, 67). The Mahla Brothers also manufactured satin-sheen tubular beads (Neuwirth 1994:352) and it is likely the ones from the *Arabia* are also Bohemian products. Similarly the likelihood is that the circular embroidery beads also originated there as Bohemia was a serious manufacturing rival to Venice during the mid-19th century (Neuwirth 1994:158-159). The stickpins were also probably produced in Gablonz which is well known for its jewelry. The origin of the metal beads remains undetermined.

As mentioned earlier, it was not possible to get an accurate count of the circular embroidery beads. Some idea of their relative frequency is, however, provided by a museum inventory apparently made in the early 1990s when many of the beads had been sieved from their silt matrix (Table 2). The other recorded varieties apparently appeared in lesser quantities. Certainly David Henneberg (1993: pers. comm.) noted that the following colors were especially scarce, less than 50 specimens being encountered while sorting beads for size determination: tsp. scarlet, op. olive yellow, op. grass green, tsp. dark green, tsl. light aqua green, tsl. bright blue, and op. royal blue.

As for the blown beads, the barrel-shaped constricted-tube varieties predominated with white specimens being the most common (6,755 sp.). Pink was the next most common color (1,500 sp.) with blue (425 sp.) and green (400 sp.) in third place. Yellow specimens were scarce (53 sp.). The free-blown beads were next in frequency being represented by 196 necklace-size specimens and 64 pinheads. The globular and ovate blown examples were relatively scarce, each variety being represented by no more than 32 specimens.

In that the recovered beads formed a single shipment, it was hoped that some insight might be gained concerning mid-19th-century bead sizing. To start, a representative sample of the circular embroidery beads (1,150 specimens) was measured and graphed (Fig. 9). Visual inspection of the beads suggested there were five size populations and the recorded measurements tend to substantiate this although the data for the three largest sizes are limited (Table 3). Postulated Sizes A and B predominate in the collection while Sizes C-E are present in minimal quantities and may have only been represented by a few hanks. The means of the proposed size groups are at 0.4-0.6 mm intervals which corresponds fairly well to the intervals determined for bead variety IIa-ops-1 (0.45-0.56 mm intervals) at Hudson's Bay Company Fort Vancouver, Washington, which was in operation from 1829 to 1860 (Ross 1990:42). Although Ross measured and graphed a massive sample of 18,028 drawn beads representing 14 varieties (Ross 1976:697-737), IIa-ops-1 (Kidd IIa14) was one of the few varieties where four sizes were represented. Ross (2000:189) subsequently determined hypothetical historical bead sizes for the extensive glass bead collection recovered from Fort Union, North Dakota, which operated at about the same time (1828-1867) as Fort Vancouver. He postulated three possible sizing systems (A-C) for the circular embroidery beads with six to seven sizes in each. The average least diameters for the first three sizes in System A closely correspond to those determined for the *Arabia* specimens (the latter are in parentheses): Size 1, 1.55 mm (1.6 mm); Size 2, 1.9 mm (2.1 mm); and Size 3, 2.5 mm (2.6 mm). The next two sizes are totally dissimilar: Size 4, 3.8 mm (3.0 mm) and Size 5, 5.25 mm (3.6 mm).

Table 2. Estimated Counts (Based on Weight) of the Circular Embroidery Beads.

Description	Quantity
IIa*. Op. light cherry rose	600,000
IIa14. Op. white	450,000
IIa12. Tsl. oyster white	300,000
IIa58. Tsp. light cherry rose	300,000
IIa*. Tsp. turquoise green	300,000
IIa*. Op. sky blue	300,000
IVa*. Tsp. scarlet on op. redwood	300,000
IIa7. Op. black	150,000
IIa*. Op. sunlight yellow	150,000
IIa*. Tsp. lemon yellow	150,000
Total	3,000,000

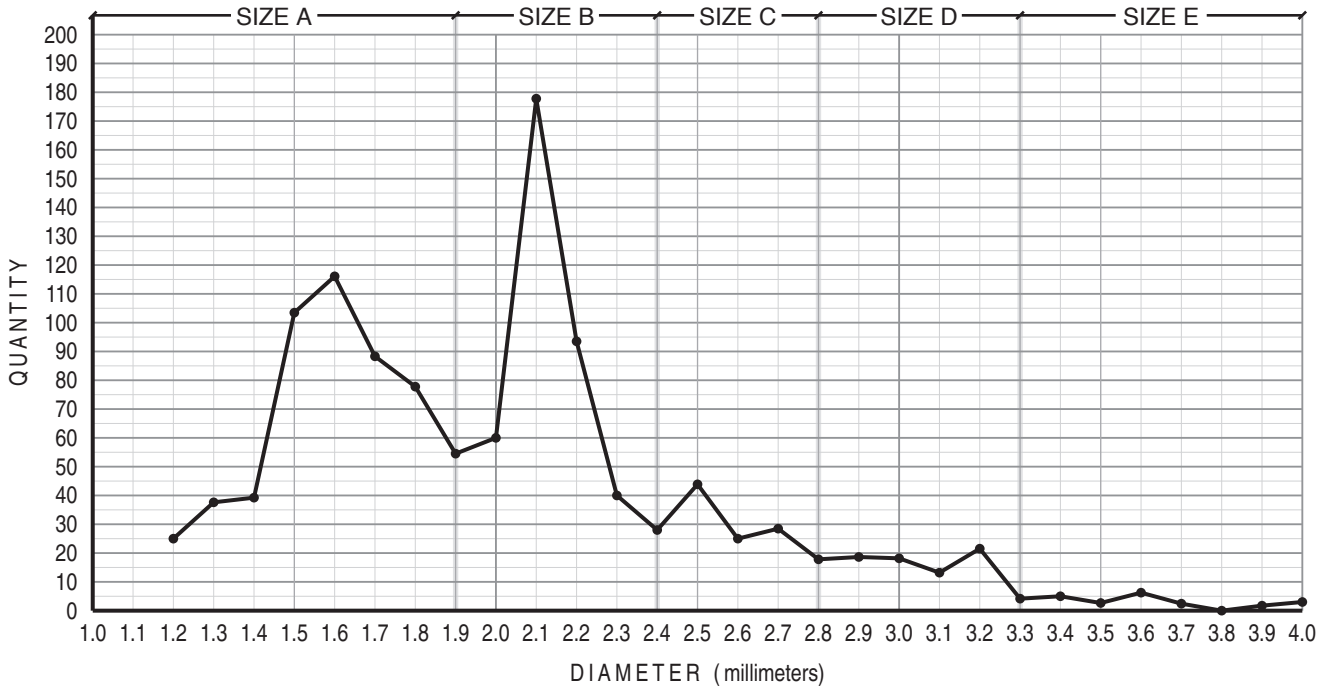

Figure 9. Probable size populations for the circular embroidery beads (n = 1,150)(drawing: David Weisel).

This is doubtless due to the relatively small sample of size 4 and 5 in the *Arabia* sample. In any event, the first three sizes would appear to be historically relevant.

The drawn tubular beads are less varied in size and only two sizes appear to be represented, based primarily on length (Table 4). The wound beads formed one size population (Table 5). Turning to the blown beads (Table 4), two distinct sizes were recorded for the free-blown globular specimens. As for the beads created by blowing bubbles in drawn glass tubes, there appear to be three sizes of the globular variety and four for the oval specimens but these groupings are quite hypothetical due to the small sample size. The constricted-tube beads tend to cluster into two rather broad size groups.

The beads recovered from the *Arabia*, while only a small part of the cargo, provide a great deal of information concerning what varieties were heading to the American frontier in the mid-1850s. The blown varieties are especially interesting as they are infrequently found in archaeological contexts due to their fragility and the *Arabia* specimens provide a wealth of information concerning their manufacture, form, and sizing. The stickpins with bead heads are a unique find with no known correlatives at other contemporary archaeological sites in North America. While the sinking of the *Arabia* was a tragedy for the settlers and merchants, it has turned out to be a blessing for those interested in frontier material culture.

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Sincere thanks are extended to David Hawley and the late Greg Hawley of the Steamboat *Arabia* Museum for allowing the senior author to study the recovered beads on two separate occasions and publish the findings. David also provided many of the photographs of the wreck and its cargo. Special thanks go to Greta Erhardt, a senior guide at the museum, for providing invaluable assistance in locating and measuring the beads. Gratitude is expressed to the Bead Society of Los Angeles for their travel grant which allowed the senior author to revisit the museum and complete the study which was begun in 1993. Dolores Elliott, long-time collector and student of Iroquois souvenir beadwork, is thanked for sharing her knowledge and providing images of relevant pieces in her collection. Last but not least, David Henneberg – with whom the senior author has, unfortunately, lost contact over the years – was instrumental in preparing the historical background portion of this report and providing measurements of an initial sample of the embroidery beads.

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Table 3. Postulated Size Populations for the Circular Embroidery Beads (n = 1,150).

Size	Diameter	Length
A	1.2-1.9 mm (1.6 mm mode; 1.6 mm mean)	0.6-1.5 mm (1.0 mm mode; 1.0 mm mean)
B	1.9-2.4 mm (2.1 mm mode; 2.1 mm mean)	0.9-2.2 mm (1.2 mm mode; 1.4 mm mean)
C	2.4-2.8 mm (2.5 mm mode; 2.6 mm mean)	1.2-2.8 mm (1.5 mm mode; 1.6 mm mean)
D	2.8-3.3 mm (3.2 mm mode; 3.0 mm mean)	1.6-3.2 mm (— mm mode; 2.3 mm mean)
E	3.3-4.0 mm (3.6 mm mode; 3.6 mm mean)	2.0-3.5 mm (— mm mode; 2.5 mm mean)

Table 4. Postulated Size Populations for the Drawn Tubular Beads (n = 35).

Size	Diameter	Length
A	1.4-2.3 mm (1.7 mm mode; 1.8 mm mean)	9.1-11.0 mm (10.4 mm mode; 10.2 mm mean)
B	1.7-2.9 mm (2.4 mm mode; 2.4 mm mean)	11.6-14.5 mm (14.0 mm mode; 13.1 mm mean)

Table 5. Postulated Size Populations for the Wound and Blown Beads.

Wound Oval Beads (n = 15)		
Size A	Diameter: 5.8-6.5 mm (6.1 mm mean)	Length: 6.0-7.5 mm (6.7 mm mean)
Free-blown Globular Beads (n = 22)		
Size A	Diameter: 8.0-9.8 mm (8.8 mm mean)	Length: 7.5-9.0 mm (8.3 mm mean)
Size B	Diameter: 12.3-13.4 mm (12.8 mm mean)	Length: 12.4-13.3 mm (12.8 mm mean)
Globular Bubble Blown in Tube (n = 9)		
Size A	Diameter: 6.7-7.0 mm (6.8 mm mean)	Length: 8.3-8.7 mm (8.5 mm mean)
Size B	Diameter: 8.8-10.7 mm (10.1 mm mean)	Length: 10.8-12.3 mm (11.5 mm mean)
Size C	Diameter: 11.9-14.0 mm (13.0 mm mean)	Length: 13.7-15.6 mm (14.6 mm mean)
Oval Bubble Blown in Tube (n = 22)		
Size A	Diameter: 3.9-4.2 mm (4.0 mm mean)	Length: 5.0-6.6 mm (6.0 mm mean)
Size B	Diameter: 5.1-6.5 mm (5.9 mm mean)	Length: 13.4-15.7 mm (14.3 mm mean)
Size C	Diameter: 8.1-10.6 mm (9.3 mm mean)	Length: 16.0- 21.1 mm (18.6 mm mean)
Size D	Diameter: 11.9-13.9 mm (13.2 mm mean)	Length: 23.0-31.5 mm (26.4 mm mean)
Constricted-Tube Barrel Beads (n = 69)		
Size A	Diameter: 4.0-6.0 mm (4.9 mm mean)	Length: 4.7-7.4 mm (6.3 mm mean)
Size B	Diameter: 6.4-8.1 mm (7.6 mm mean)	Length: 5.7-9.7 mm (8.7 mm mean)

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David Henneberg

Plate IVB. *Arabia:* Artist's conception of the mid-19th-century steamboat *Great White Arabia* (painting: Gary Lucy).

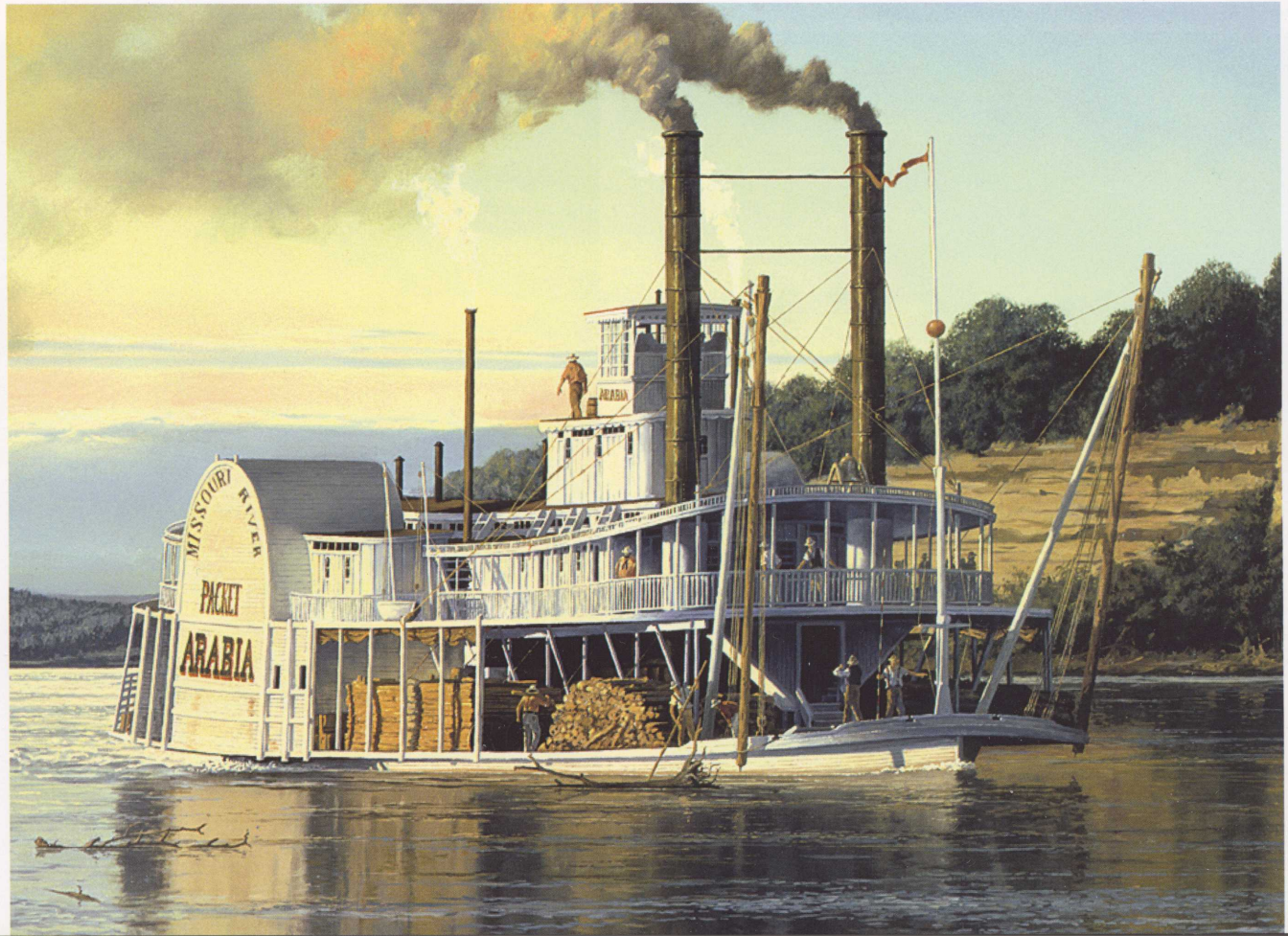


Plate VA. *Arabia:* The stern section of the *Arabia* during excavation. Remnants of the paddle wheels are visible at the top and the bottom of the photo (photo: David Hawley).

Plate VB. *Arabia:* Clearing silt from the cargo with high-pressure water hoses (photo: David Hawley).

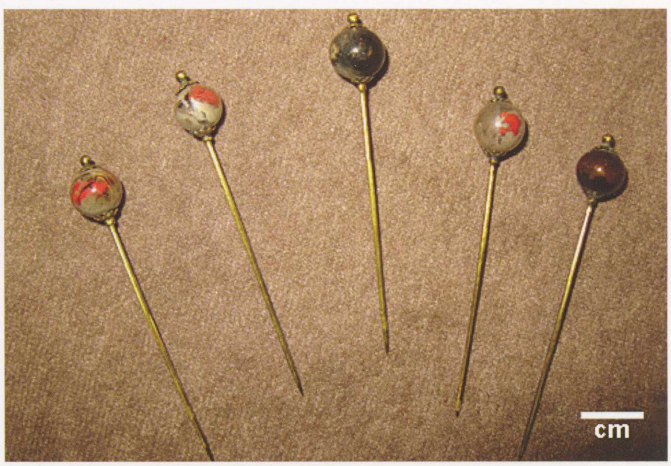
Plate VC. *Arabia:* A box of broad axes with the original wording indicating contents and destination still clearly visible (photo: David Hawley).

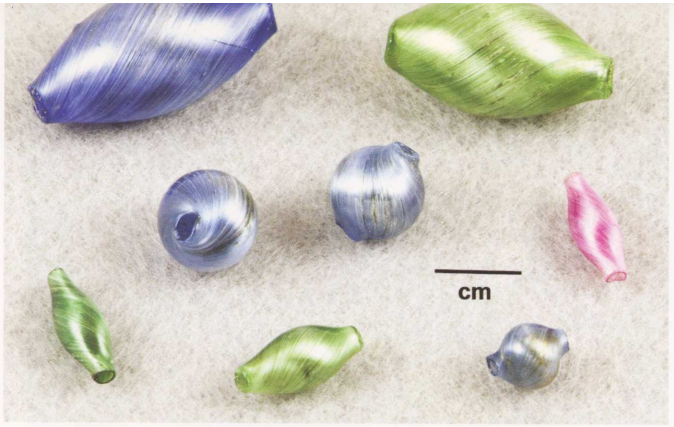
Plate VIA. *Arabia:* **Top:** Fancy earrings, some with aventurine glass insets, and brooches found with the glass beads. **Bottom:** Drawn tubular glass beads (photos: K. Karklins).

Plate VIC. *Arabia:* **Top:** Fancy brass stickpins with wound beads for heads (photo: K. Karklins). **Bottom:** Close-up of the small globular blown beads that form stickpin heads (photo: David Hawley).

Plate VIB. *Arabia:* **Top:** A sample of the circular embroidery beads and some blown beads showing the range in colors and sizes (photo: Greg Hawley). **Bottom:** Close-up of some of the oval wound beads that form the heads of stickpins (photo: David Hawley).

Plate VID. *Arabia:* **Top:** Brass stickpins with free-blown beads as heads. **Bottom:** Large globular free-blown beads, probably artificial pearls (photos: K. Karklins).





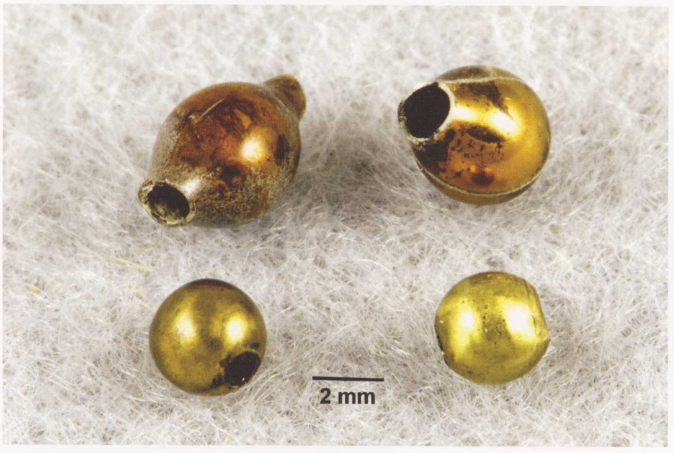
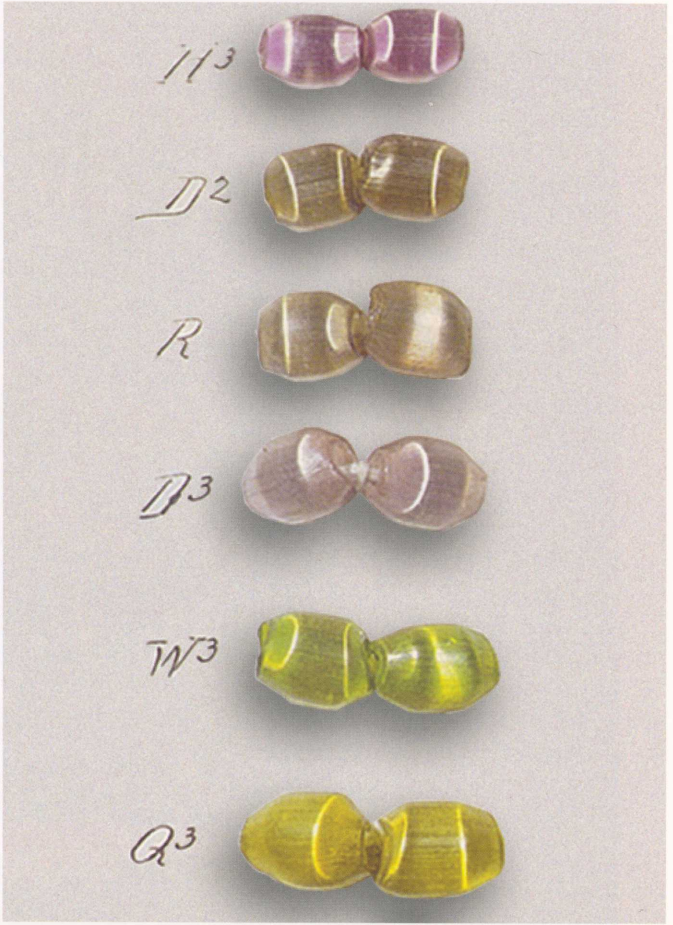


Plate VIIA. *Arabia:* **Top:** Sample of the globular and ovate beads produced by blowing a bubble in a heated glass tube (photo: K. Karklins). **Bottom:** Gilded ovate blown-glass beads (top) and globular brass beads (bottom)(photo: David Hawley).

Plate VIIB. *Arabia:* **Top:** A sample of the blown barrel-shaped constricted-tube beads (photo: David Hawley). **Bottom:** Major hank remnant of Size A circular embroidery beads (photo: K. Karklins).

Plate VIIC. *Arabia:* Tuscarora souvenir multi-lobed pincushion made in the 1860s or 1870s and decorated with clear embroidery beads and satin-white barrel-shaped blown beads. Width: 20 cm (photo: D. Elliott).

Plate VIID. *Arabia:* Detail of a sample card displaying barrel-shaped constricted-tube beads in satin glass from the Mahla Brothers firm in Gablonz sometime between 1878 and 1913. The top bead is 5 mm in diameter (Neuwirth 1994:360).



GLASS BEADS FROM THE BELBEK IV CEMETERY, SOUTHWESTERN CRIMEA

Ekaterina Stolyarova

Situated in the southwestern region of the Crimea, the Belbek IV cemetery was utilized for much of the first three centuries of the Common Era. A comparison of the morphological and technological characteristics of a select sample of the recovered glass beads has provided clues concerning their origins; the majority of the beads seem to have been manufactured in accordance with Syrian glassmaking traditions, a quarter belong to the Egyptian school of glassblowing, while just a little over one per cent were manufactured in Roman workshops. Judging from their burial contexts, it appears that beads in Late Scythian costume were used as buttons, amulets, and pendants, as well as in the preparation of necklaces and embroidery.

INTRODUCTION

The Belbek IV cemetery is located on the outskirts of Sevastopol in the southwestern portion of the Crimean Peninsula, Republic of Ukraine (Fig. 1). Excavated from 1969 to 1991 by a group of archaeologists from the State Historical Museum of Russia in Moscow under the direction of I. Guschina (1974, 1982), the cemetery dates to the period from the second quarter of the 1st century A.D. to the first half of the 3rd century A.D. In all 331 burials were investigated.

Beads were the most common grave goods at the Belbek cemetery. More than two thirds of the burials had beads of various materials in association (Pls. VIIIA-B; IXA). For the purposes of this study, some 2,500 glass beads from 65 burials that comprise approximately one third of the bead-containing complexes were chosen for thorough analysis.[1]

METHODOLOGY

The analysis of the glass beads was conducted using the system for studying excavated glass proposed by J. Shchapova (1989). The gist of the system consists in dividing all the information provided by any glass object into segments. These segments – namely morphology, technology, and material – are, in their turn, divided into sub-systems (Fig. 2). Thus, the morphology of a glass artifact provides a means for recording its shape, dimensions, decoration, color, and diaphaneity. The technological aspect allows the determination of how the bead was manufactured and by what means decoration, coatings, and other components were added.

Form, Decoration, and Color

Rounded beads (cylindrical, spherical, ellipsoidal, egg-shaped, bi-conical, pear-shaped, and conical) prevail among the Belbek beads (Fig. 3, #1-7). In addition, there are flattened (rectangular, flattened round, round, and oval) (Fig. 3, #8-11), faceted (prismatic, ellipsoidal, and cubical) (Fig. 3, #12-14), ribbed (spherical and cylindrical) (Fig. 3, #15-16), and granulated (spherical and cylindrical) (Fig. 3, #17-18) specimens (Table 1).

Round-sectioned cylindrical (39.2%), spherical (33.2%), and flat-rectangular (10.8%) beads are the most abundant forms. According to E.M. Alekseeva (1984:238), flat-rectangular beads were most widespread in the Roman Crimea, especially in the 2nd and 3rd centuries A.D.

Bead dimension categories are based on those proposed by J. Callmer (1977:35). These are based on bead diameter: micro-beads (up to 8 mm), medium-size beads (9-17 mm), macro-beads (18-29 mm), and giant beads (more than 30 mm). All but the last group are represented at Belbek (Table 2). Micro-beads are the most prevalent (90.4%).

Decorated beads comprise just 3.5% of the total. Geometric (Fig. 3, #19-26) and floral (Fig. 3, #27-28) motifs are represented with eyes, stripes, and speckles being the most common decorative elements. Other decoration is rare. It is worth noting that ornamentation is restricted to the rounded beads, principally the spherical and cylindrical ones.

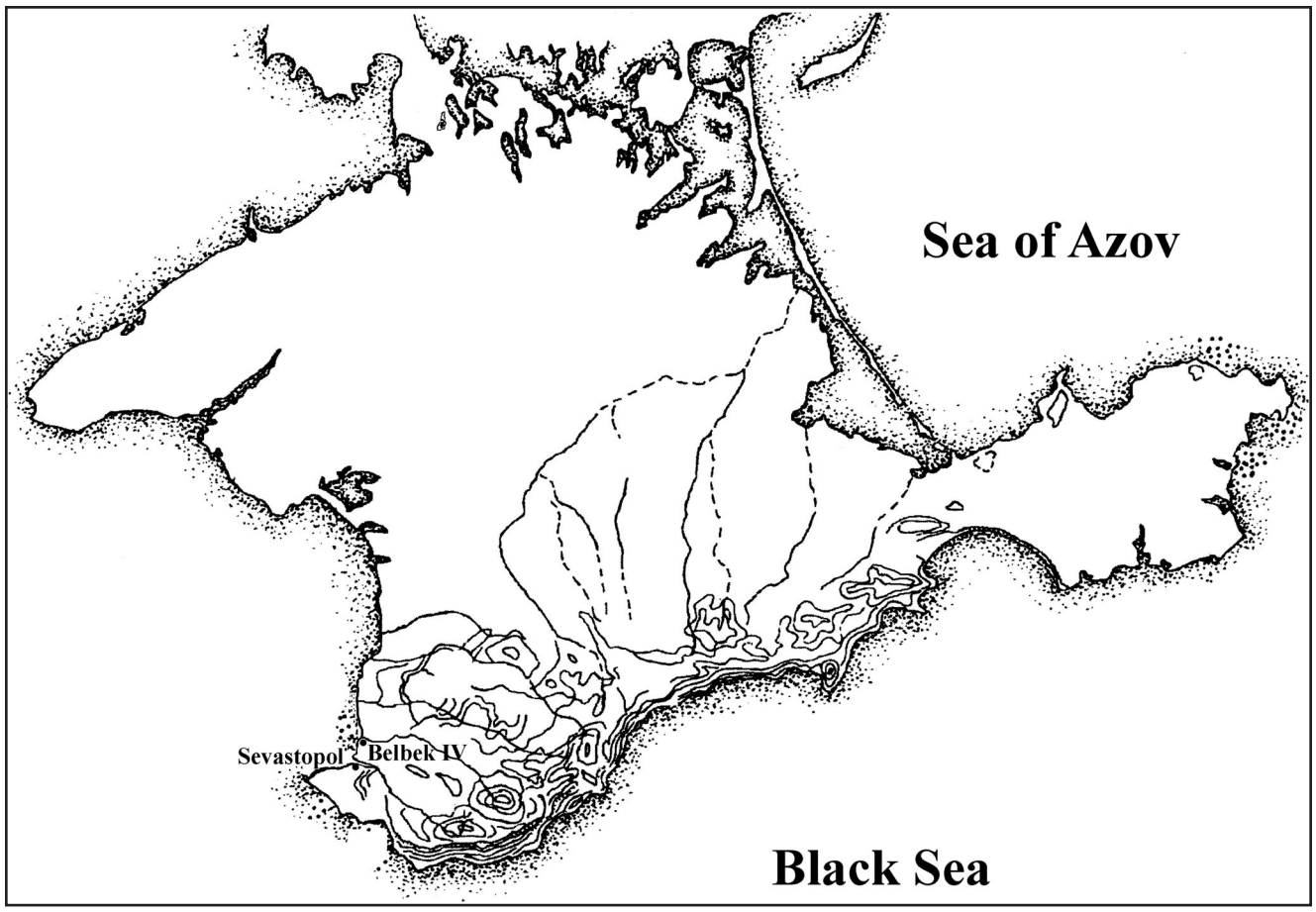


Figure 1. The Crimean Peninsula, Republic of Ukraine, showing the location of the Belbek IV cemetery (after Zubar' 2006:88).

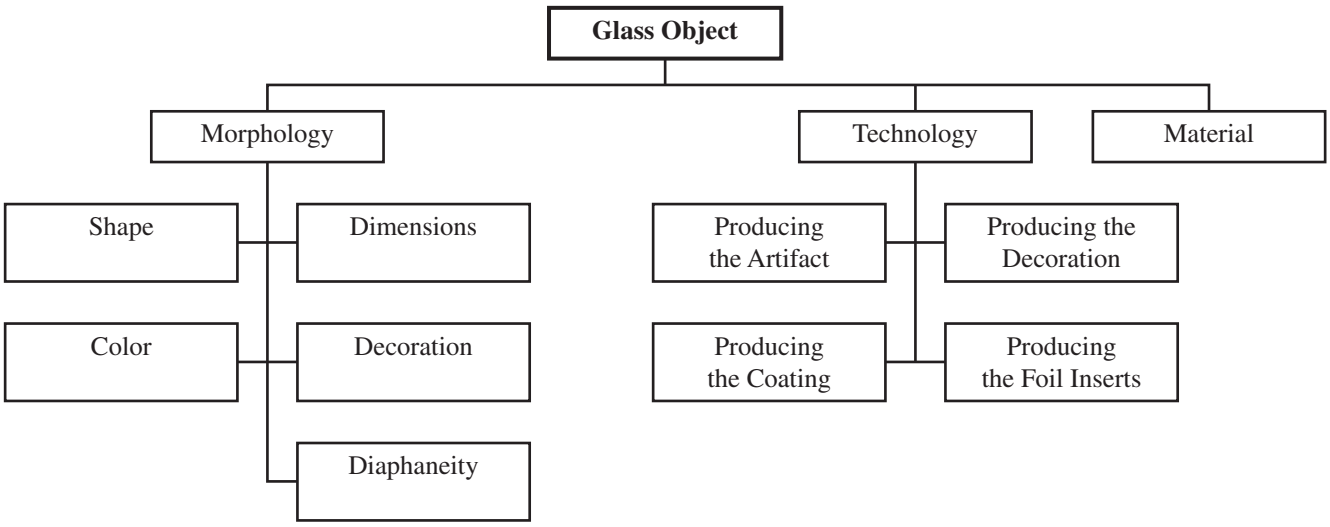


Figure 2. Types of information that a glass object provides.

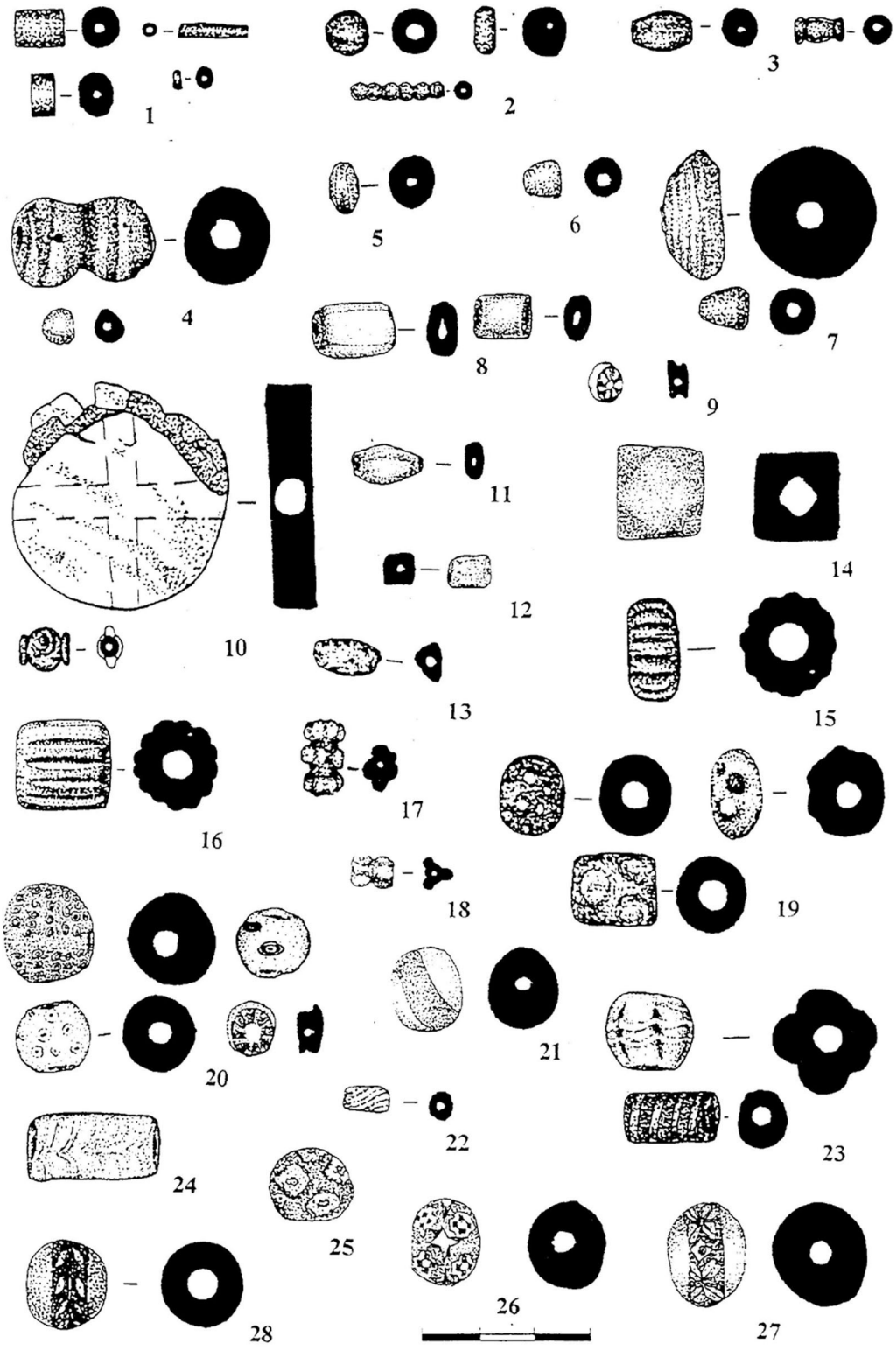


Figure 3. Glass bead shapes and types of decoration encountered at the Belbek IV cemetery: 1-7, rounded (cylindrical, spherical, ellipsoidal, egg-shaped, bi-conical, pear-shaped, and conical) ; 8-11, flattened (rectangular, flattened round, round, and oval); 12-14, faceted (prismatic, ellipsoidal, and cubical); 15-16, ribbed (spherical and cylindrical); 17-18, granulated (spherical and cylindrical); 19-26, geometric motifs; and 27-28, floral motifs (drawing: Anna Trifonova).

Table 1. Glass Bead Shapes, Belbek IV Cemetery.

Group	Shape	Number	%
Rounded	spherical	829	33.20
	cylindrical	979	39.20
	ellipsoidal	140	5.60
	conical	2	0.08
	biconical	14	0.60
	egg-shaped	30	1.20
	pear-shaped	6	0.24
Flat	round	11	0.44
	oval	1	0.04
	rectangular	271	10.80
Faceted	ellipsoidal	21	0.84
	cubical	1	0.04
	prismatic	153	6.12
Ribbed	spherical	18	0.72
	cylindrical	10	0.40
Granulated	spherical	11	0.44
	cylindrical	1	0.04
		2,498	100

Table 2. Glass Bead Dimensions, Belbek IV Cemetery.

Size Group	Measurements	Number	%
Microbeads	up to 8 mm	2,258	90.40
Medium-size beads	9-17 mm	231	9.24
Macrobeads	18-29 mm	7	0.28
Undetermined		2	0.08
Total		2,498	100

A scale created at the Archaeological Department of Moscow State University was used to record bead colors. Seventeen colors were identified with reddish-orange (35.5%), white (21%), and green (15.3%) beads being the most common. Other colors were scarce. It is interesting to note that reddish-orange beads – the most abundant in our sample – also predominated at other North Pontic sites of the same period (Alekseeva 1984:238).

The colors of the decorative elements of millefiori beads (27 specimens) are similar to those of the base glass. Ten colors of glass were used to produce both the beads and their ornamental elements with yellow, white, and reddish-orange being the most common. Applied decoration (61 specimens) is also fairly varied in color, 11 hues being recorded, with yellow, white, and bluish-violet predominating. Other colors are scarce.

Manufacturing Technology

The techniques used to manufacture the beads from the Belbek IV cemetery were determined using the procedures developed by Z.A. L'vova (1979:90-104; 1980:75-85). Seven major techniques were utilized: tube drawing, rod drawing, winding, single wrapping, repeated wrapping, molding, and fusing various components (mosaic or millefiori beads) (Fig. 4; Table 3).

Beads made of **drawn tubing** (Fig. 4, #1) were subject to additional shaping while the glass was soft with the aid of either tongs or a stone mold (Spaer 1993:11, Figs. 2-3), or else the so-called "grid" which is believed to have consisted of a wooden frame strung with parallel wires or blades (Dovgalyuk et al. 1995:8; Francis 1989:28). The use of these implements is evidenced by a slight neck at the edge of the perforation. It is, however, difficult to identify the use of a specific implement. A mold was indispensable for manufacturing granulated and bolster beads. Owing to the use of such implements, an artisan could not only make beads into specified shapes but also accelerate his work by producing series of similar beads. In order to keep the perforation cylindrical in the course of treatment, a metal rod was inserted into it (Spaer 1993:12, Fig. 4). If this was not done, the perforation would became enlarged. Both perforation forms have been recorded among the Belbek beads.

Twisting a plain square tube while drawing it out resulted in a ribbed bead. These were also produced by imparting grooves in the soft glass with a sharp implement, while marvering a hot tube or cold grinding were used to produce various kinds of faceted beads. Series of conjoined beads were divided into single specimens by touching the hot tube at the junction of two beads with a cold implement. The drastic difference in temperature caused a thermal crack and the beads separated.

Tube beads were decorated by means of applying stripes followed by twisting while the glass was hot and before the tubes were cut into bead lengths. Decorative elements such as eyes, however, could have been applied to individual tube segments after a tube was chopped into pieces. Some of the tube beads were subsequently rounded by placing them into a pot containing ashes which was heated and then slowly allowed to cool. As a result, the beads took on a rounded shape, as when conventional heat rounding (without the use of an ash matrix) is used.

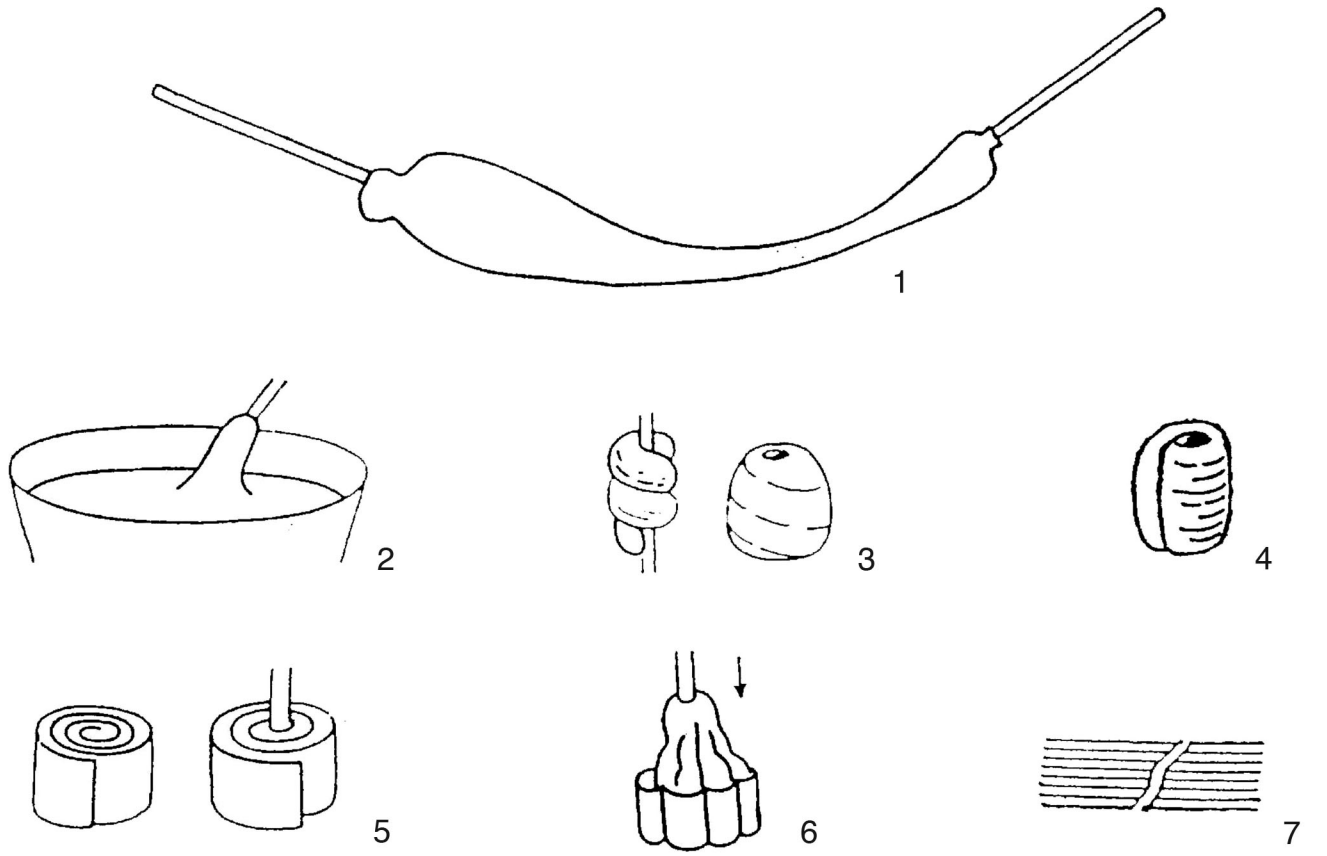


Figure 4. Glass bead manufacturing techniques, Belbek IV cemetery: 1, tube drawing; 2, rod drawing; 3, winding; 4, single wrapping; 5, repeated wrapping; 6, molding; 7, fusing (after L'vova 1979:94).

Table 3. Glass Bead Manufacturing Techniques, Belbek IV Cemetery.

Technique	Number	%
Tube drawing	1,831	73.30
Rod drawing	545	21.80
Repeated wrapping	45	1.80
Winding	43	1.72
Fusing	20	0.80
Single wrapping	7	0.30
Molding	1	0.04
Unidentified	6	0.24
Total	2,498	100

A little over eight percent of the Belbek beads incorporate metal foil. These were manufactured in two different ways (Alekseeva 1978:27). In the first, metal (possibly gold) foil was applied to a tube segment which was then cased with molten glass. The other method involved covering a small tube with foil and then inserting it into a slightly larger tube. The compound tube was then heated to fuse the layers (Spaer 1993:10-12, Figs. 2-3). The latter form predominated (186 specimens compared to only 20 cased beads). Foil beads are generally found to be undecorated (Alekseeva 1978:27), which is the case with the Belbek specimens.

Drawn rods (Fig. 4, #2) were divided into individual pieces with a knife while the glass was still soft or, more rarely, simply broken off after the glass had hardened. The segment was then heated and pierced with a sharp tool in one direction producing a conical hole with sharp edges at the exit point and a concavity at the point of entry. While these features tended to be blurred by further processing – including rolling, marvering on a flat surface, cold polishing, and molding by tongs – traces of piercing were sometimes still visible. The beads were decorated with applied elements.

Beads produced by **winding** a rod or filament of molten glass around a mandrel (Fig. 4, #3) were subject to a

minimum of additional processing. Those manufactured by means of serial winding were not made individually but in a connected series. They were probably separated by breaking them apart. Beads produced by individual winding were occasionally treated with a sharp tool to give them a ribbed surface. Decoration consisted of applied elements.

A longitudinal seam characterizes beads produced by **single wrapping** (Fig. 4, #4). All the beads belonging to this group are composed of square millefiori tessarae. The latter were fused together into strips which, in turn, were also fused together, polychrome and monochrome strips alternating (Fig. 3, #27-28). The strips were then cut into segments and wrapped around a mandrel to form beads. The resultant beads were probably final shaped by marvering.

Some beads were produced by **repeatedly wrapping** a strip of molten glass around a mandrel (Fig. 4, #5). They could be made individually or using serial-production techniques. In the latter case, a tube was produced which was then divided into individual beads using a knife when the glass was viscid or chopping off segments after the tube had cooled. The beads were then usually shaped by cutting grooves with a sharp implement, marvering on a flat surface, and cold polishing. The beads were decorated with applied elements. Occasionally this process was accompanied by twisting to impart a spiral effect. Some beads were rounded by placing them in a heated container with ashes.

Molded beads (Fig. 4, #6) are represented by a single specimen whose perforation was crosswise cold-pierced by drilling.

Multiple seams are the main characteristic of beads manufactured by **fusing** (Fig. 4, #7). They were produced either individually or serially. In the former case, the glass was pierced with a sharp tool in one direction after fusing. Then the beads were shaped by marvering. In serial production, pieces of mosaic tessaerae were cut off, pierced, and formed with the aid of forceps or marvering. Certain beads of this group consist of similar mosaic pieces that were fused together on a mandrel. The rough beads were then shaped and smoothed by marvering. In one case, multicolored strips were used instead of mosaic pieces. The resultant tube was twisted to impart a spiral effect and then segmented either using a knife while the glass was still viscid or by chopping off pieces when cold.

There were two methods for decorating beads. Either decorative elements were applied to a glass core or the bead itself was composed of fused multicolored components. The former method predominates, being twice as common as the latter.

The Belbek IV beads can be categorized as follows based on Shkolnikova (1978:97-106):

- Individually manufactured beads (1.96%); these were produced by individual winding (1.16%), repeated wrapping (0.4%), and fusing (0.36%), as well as mold pressing (0.04%).
- Beads manufactured either individually or in batch production (24.46%); these were made of drawn rods (21.8%), or by either repeated (1.4%) or single (0.3%) wrapping, serial winding (0.56%), or fusing (0.4%).
- Batch-produced beads (73.7%); these were made from various drawn tubes (73.3%) or by fusing (0.04%). Clearly, the majority were batch-produced.

SOURCING THE BEADS

The probable source or sources of the glass beads found in the Belbek IV cemetery was determined based on J. Shchapova's (1983:105) hypothesis concerning the existence of ancient glass-producing centers or "schools." The hypothesis postulates that different centers of glass production used different raw materials, different manufacturing techniques, and produced morphologically dissimilar articles. Thus, to identify the origins of synchronous glass articles recovered from the same site, one has to compare their morphology, technology, and chemical composition.

Such comparisons reveal that the batch-produced beads made of drawn tubes (both those made of solid glass and the laminated foil beads) originated from the Near Eastern (Syrian) school (73.3%). They make up the majority of the recovered beads. Beads manufactured either individually or by a combination of individual and batch-production techniques seem to characterize the Egyptian school. These include beads made of drawn rods and those produced by single and repeated wrapping, fusing, mold pressing, and winding (26.4%). It is worth noting that the millefiori technique in the Roman and Hellenistic periods was typical of Alexandria workshops (Shchapova 1983:113).

To determine the origin of glass articles, one has to identify the type of workshop they came from. The manufacture of beads from either tubes or rods involves a masterful handling of raw materials and of various tools used to increase production. To fuse various glass components (the millefiori technique) or to use the single-wrapping technique, one had to master the art of changing heat conditions and to handle glass of various compositions in its various physical states. Such a skill is characteristic of glassmaking centers specializing in a certain product. Beads

can be made either of molten glass or by heating a semi-finished item; i.e., on a complete or an incomplete cycle.

Thus, the majority of the cemetery beads (just under 99%) were manufactured in specialized bead-producing workshops with a complete or an incomplete production cycle. Such workshops were situated in the areas of traditional glassmaking (i.e., in Egypt and the Near East, notably Syria) and, according to a number of scholars, were connected with international trade (Likhter et al. 1991:244-260).

Winding was something else, however. It is one of the simplest techniques marking the emergence of a new school. One could use it without understanding glass composition or utilizing complex tools. Making wound beads was an auxiliary process to, for example, blowing glassware (Shchapova 1978:99). It seems likely that the manufacture of such small articles was a way of salvaging utilizable waste. During the period that the Belbek IV cemetery was in use, blown glass vessels were already fairly widespread and were being manufactured in workshops of the Roman glassmaking school (Shchapova 1983:119, 123). In the production of blown drinking vessels such as cups or beakers, only a part of the blown sphere is used. The rest is waste which could be used to make small articles such as beads. Indeed, new bead types made mainly of transparent colored and colorless glass that was normally used for manufacturing glassware do emerge in the 1st century A.D. (Alekseeva 1978: Fig. 15). The majority of the wound beads at Belbek are either medium-size or large and of medium quality, betraying an unskilled hand.

Thus, a small number of individually wound beads from Belbek (slightly over 1.0%) are the products of workshops where tableware and window panes were blown with the waste glass being used to manufacture small articles, such as beads. Such workshops are general purpose since they produce a wide range of glass objects. They function on complete-cycle production, from producing the glass to annealing the finished articles. In the period under study, such workshops are characteristic of the Roman glass-making school.

THE CULTURAL ASPECT

It is instructive to consider the place of beads in the material culture of the people buried in the Belbek IV cemetery. This can be discussed regardless of the origin of the ornaments.

Clusters of beads were mostly noted in direct association with skeletons. They were found under the skull, at the neck, on the shoulders, chest, and ribs, at the pelvis or on the thighs, around the wrists of both hands or around the wrist of either the right or left hand, and around the ankles or feet. Less frequently, beads were encountered near the head or feet of the deceased.

Most beads were found on the upper torso. Large beads, which were scarce (one or two items), probably served as buttons or amulets. Medium-size beads found in great numbers could have comprised necklaces. Small uniform beads could have been used to embroider dress fronts.

In those few cases where beads were found around the wrists of both hands, it is likely that they adorned sleeve cuffs. This is especially likely if the beads are small and uniform in shape. Beads around a single wrist, either the right or the left, probably formed bracelets. Bracelet-forming beads are more often found around the right wrist.

It seems likely that monochrome beads found around the ankles or feet were used to embroider footwear, the hem of a dress, or the cuffs of trouser legs. Small beads found along the thighs were probably sewn to trouser legs on both sides.

Beads found under the skull are usually small although some large specimens have been encountered. Occasionally temple-rings and earrings, and small rings are found with them. It may be that the small beads were used to embroider headdresses or served as pendants hanging from a headdress or coiffure.

In rare instances beads were found at the pelvis of the deceased. It seems likely that large beads served as amulets or pendants hanging from a belt. Spherical gold-foil beads occasionally found at the pelvis could also have been used to embroider some dress elements.

Large glass beads were sometimes found beside iron and bronze objects, such as daggers. They usually lay near either the left or the right hand. These beads, mostly polychrome, were likely suspended from the grips of swords, daggers, knives, and, probably, other articles.

Beads have also been found near either the head or the feet of the deceased, either by themselves or in containers such as bowls or dishes. In this case one cannot identify the function of the beads. It is only safe to say that they were part of the grave offerings.

CONCLUSION

The morphological study of the beads from the Belbek IV cemetery reveals that undecorated, round-sectioned cylindrical and spherical beads, as well as flat rectangular specimens, of reddish-orange, white, and green glass up

to 8 mm in diameter are the most abundant forms. From a technological perspective, most of the beads were manufactured from drawn tubing and rods.

The correlation of the morphological and technological traits of the Belbek beads reveals that they were manufactured in accordance with the traditions of three glassmaking schools. The majority (733%) are ascribed to the Near Eastern (Syrian) school, slightly over a quarter of the total number (25.3%) to the Egyptian school, and just over one per cent (1.16%) to the Roman school of glassmaking.

Being found in burial contexts, the beads also reveal much about how they were utilized by the local population. While beads were encountered in various loci from the head to the feet of the deceased, the majority were concentrated in the region of the upper torso. The medium-sized specimens found there probably comprised necklaces while the small-sized ones likely represent embroidered dress fronts. Large beads were scarce and probably served as buttons, pendants, or amulets.

The research potential of the beads from the Belbek IV cemetery has by no means been exhausted. For one thing, the chemical composition of the glass beads needs to be determined. This will hopefully enable researchers to identify more definitely the centers of their manufacture.

ENDNOTES

1. Here we used the random sampling method for the study of antiquities. According to the method, there is no need to study all the recovered items. A researcher only needs to create a random representative sample. A sampling of 30 specimens is thought to be minimal; 100 specimens are considered optimal. A sampling of 277 specimens enabled us to yield knowledge about a population of 1,000 items (Shchapova 1988: 102).

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Plate VIIIA. *Belbek IV:* Glass and agate beads found with Burial 107 (late 1st century - early 2nd century A.D.). Beads were found around the right wrist and on the chest, probably representing bracelets and necklaces, respectively. Others were found at the feet and could have embroidered footwear, dress hems, or trouser cuffs (photos by Ilya Seden'kov).

Plate VIIIB. *Belbek IV:* Glass, faience, and agate beads associated with Burial 201, an infant. Beads were found near the chest and arms and may have embroidered dress fronts or sleeve cuffs. The burial is dated to the late 1st century A.D.

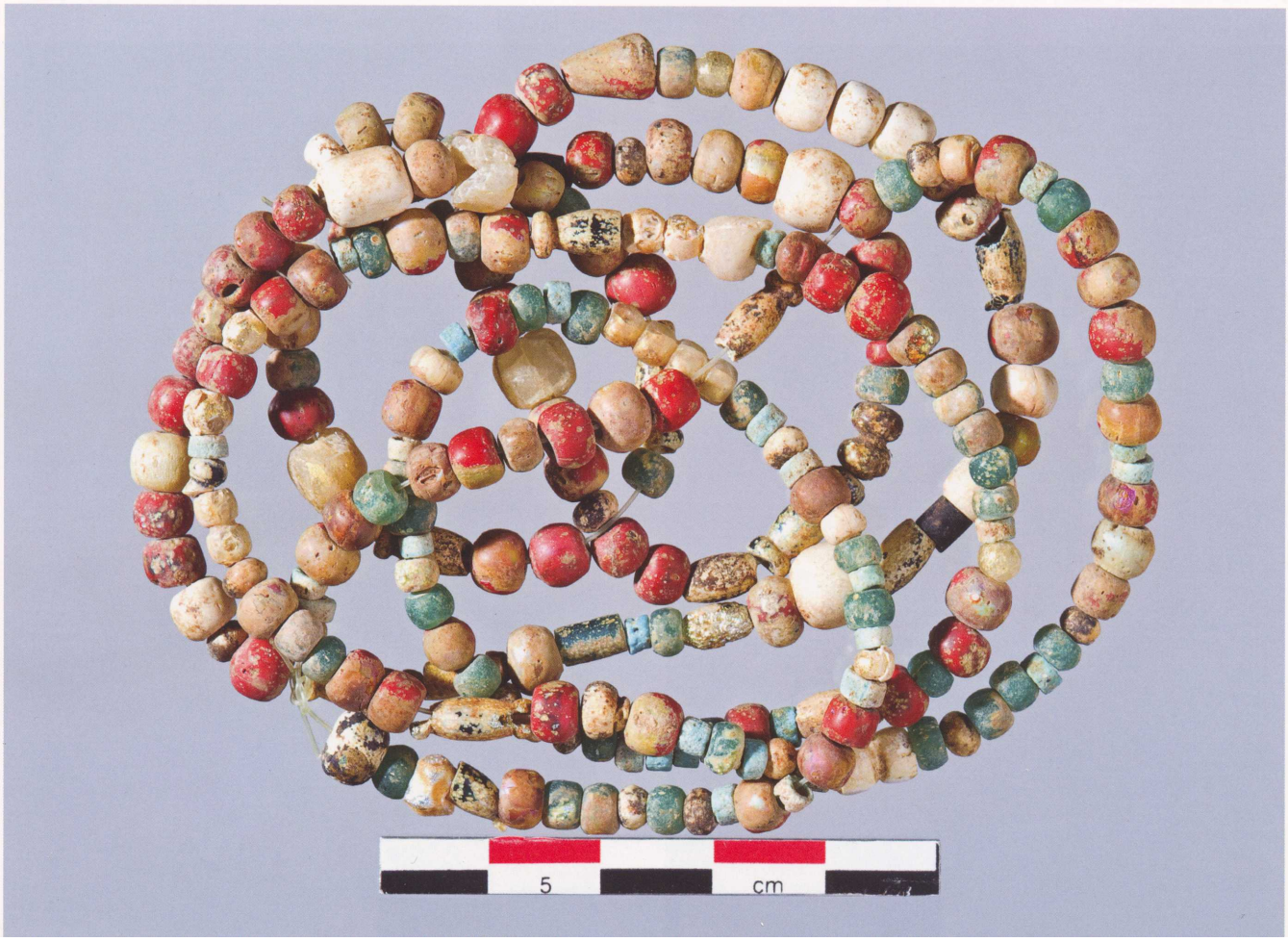

Plate IXA. *Belbek IV:* Glass beads from Burial 295, dated to the late 2nd century - early 3rd century A.D. These were found under the skull together with a small metal ring and may have embroidered a headdress.

RED-ON-WHITE DRAWN OR CORNELIAN BEADS: A 19TH-CENTURY TEMPORAL MARKER FOR THE PLAINS

William T. Billeck

The red-on-white drawn glass bead is an under-used 19th-century temporal marker for cultural objects and archaeological assemblages from Native American and fur trade sites in the Plains region of the United States. This bead variety is referred to as "cornelian" in Plains fur trade records, but is also known by several additional names in other places including cornaline d'Aleppo*,* cornaline*, and* corniola*. By examining bead sample cards, historical references, fur trade ledgers, beaded cultural objects in museums, and beads from archaeological assemblages, it was determined that this bead variety first appears in the latter part of the 1830s in Plains ethnology and archaeological collections. Plains fur trade ledgers first refer to cornelian beads in 1837, and are common therein by the mid-1840s. These multiple lines of evidence provide a chronology for drawn red-on-white beads that is relevant for both the Plains and other regions.*

INTRODUCTION

One of the first questions asked about a glass bead assemblage is: how old are they? Unfortunately, there are few glass bead varieties whose introductions are established precisely enough that their presence can be used to provide a precise date for archaeological assemblages or for cultural objects that incorporate beads. When these varieties are present, they can provide a *terminus post quem*, or the date after which an archaeological assemblage or a beaded object can be placed in time. A common bead that is an underused temporal marker in 19th-century assemblages at Native American and fur trade sites in the Plains of the United States is the red-on-white drawn bead. This bead variety is often referred to as *cornaline d'Aleppo* or as a "white-heart" bead. Immense quantities of glass beads, as well as other trade items, were brought into the Plains in the 19th century to exchange with Native Americans for furs and hides, and among the trade goods were large numbers of red-on-white drawn beads.

Red-on-white drawn beads were made in Venice and probably elsewhere in the 19th century and continue to be made today in several countries. The red glass for these beads was colored with the addition of gold in the early 19th century, but towards the end of the century, the red glass began to be colored with selenium (Allen 2001; Francis 1994:287). Studies of 19th-century glass beads indicate that the location where the beads were made can often be distinguished by glass chemistry. A comparison of the red-glass chemistry from 19th-century red-on-white drawn beads and the rare wound-on-drawn beads from an archaeological site in the northwestern United States (Pl. IXB), reveals that the five tested red-on-white drawn beads have a chemical signature typical of beads made in Venice and that the sampled wound-on-drawn bead is typical of beads made in Bohemia (Burgess and Dussubieux 2007:64-65, 70). The red glass of the red-on-white drawn beads is lead glass that is either potash- or soda-like with lead comprising approximately 9% of the glass which is colored with an average of 247 ppm gold. The red glass for the wound-on-drawn bead is a lead-silica glass that is composed of 49% lead and colored with 122 ppm gold. The amount of arsenic also differs in the two red glasses, comprising 1.4% of the red-on-white drawn beads but is minimal (only 37 ppm) in the wound-on-drawn beads (Laura Burgess 2009: pers. comm.).

There have been a few estimated dates for the first occurrence of red-on-white drawn beads, but these generally lack supporting evidence. Woodward (1965:19) describes them as being "widespread by the latter part of the first half of the 19th century." In Africa, van der Sleen (1980:85) dates their first appearance to the end of the 18th century. Francis (1988:341, 1994:296) estimates that red-on-white beads were made from about 1830, but suggests that they first appear in Alaska in 1884, raising the important point that a bead variety may not be available or desired in all areas and may not become common in an area until years after first being manufactured. Allen (1997:9) dates their first appearance in North American at about 1825 based on archaeological evidence. Ross (2000:162; Table 10) suggests that red-on-white beads are initially present in the Fort Union, North Dakota, bead assemblage during the

1830s. None of the estimates for the first introduction of red-on-white drawn beads provide a detailed evaluation of how the they were determined. The goal here is to review the evidence and establish a usable chronology for red-on-white drawn beads in the Plains region. In the following analysis, red-on-white, red-on-pink, and red-on-yellow drawn beads (Pl. IXB) are all considered together under the term red-on-white drawn beads. While the red-on-pink and red-on-yellow varieties may have distinct temporal spans, there is not sufficient information at this time to examine them separately.

Several lines of evidence will be examined including historical descriptions, bead sample cards, beads on cultural objects in museum collections, beads found at well-dated archaeological sites, and bead descriptions from 19th-century trade ledgers. Consideration of multiple lines of evidence together provides a more comprehensive understanding of red-on-white beads and moderates the limitations of each line of evidence.

HISTORICAL DESCRIPTIONS

Historical descriptions, when available, can provide specific evidence concerning the temporal placement of a particular bead variety. While such evidence provides a date when the bead was available, it is not necessarily the earliest date. Typical historical descriptions are often so general that a specific variety of bead cannot be identified. Because the red-on-white drawn beads are distinctive, they are identifiable in several historical accounts.

A description of the glass-bead industry in an 1841 encyclopedia by Altmütter is the first known mention of the manufacture of red-on-white beads in Venice: "The inside is namely opaque, milk-white, and only the thin exterior layer is a bright red glass" (Neuwirth 1994:206, translation of Altmütter 1841:92). Altmütter also addresses possible reasons for the polychrome manufacture of these beads: "Not only are such tubes cheaper to make, the white opaque foundation also enhances the red color of the overlay" (Neuwirth 1994:150, translation of Altmütter 1841:93). Altmütter establishes that red-on-white beads were being made by 1841 and provides two reasons for their creation: the underlying white layer improved the perceived color of the red glass, and they were cheaper to make, white glass being cheaper than the gold-colored red glass.

In the French-language translation of Dominique Bussolin's description of the Murano bead industry in 1847, the term *cornaline* is used to describe the red color:

> If an opaque white enamel is covered by a ruby-colored enamel, the result is a very bright carnelian [*cornaline*] color. Covering an opaque yellow enamel with that same ruby-colored enamel results in a very pleasant coral shade. In this way, a variety of colors can be produced according to the various qualities of the enamels used (Karklins with Adams 1990:71).

This indicates that *cornaline* was probably used to describe the beads by French speakers soon after the beads were first manufactured. Like Altmütter's account, the underlying color is noted as important for its effect on the color of the overlying red glass, suggesting that the core color was purposefully selected to change the visual properties of the overlying, transparent to translucent, red glass.

BEAD SAMPLE CARDS

On sample cards provided by manufacturers and distributors to advertise their beads during the late 19th and early 20th centuries, red-on-white drawn beads are referred to as *cornaline*, red and yellow *aleppo*, *aleppo*, *corniola perla*, and cornelian. Sample cards destined for French-language markets list red-on-white drawn beads as *cornaline*; e.g., on an 1899 *Societa Veneziana Conterie* card (http://www.picardbeads.com/exhibit8/exhibit/pr87.html, accessed July 10, 2008), on an undated *Carte de Congo* card (Allen 2001), and on a 1924 *Societa Veneziana Conterie* card (Allen 2001; Picard 1988:3).

Sample cards for the Italian-language market identify the beads as *Aleppo* for red-on-white and yellow-on-white beads, such as on an undated Frederic Becher card from Venice (John Picard 2009: pers. comm.). Red-on-white drawn beads are referred to as *corniola perla* on a Nissin Namer sample card (Pls. IXC-XA) collected in 1907 for the Royal Ontario Museum (accession no. 907.31.11) and identified in the museum records as beads used in the Sudan around 1870. *Corniola perla* is also used on an undated Policar & Cannetti card (John Picard 2009: pers. comm.).

Cards for English-speakers include an undated Baker, Baker & Co. sample card from King Williams Town, South Africa, that identifies red-on-white beads as "pound beads" and as "cornelian" (Ezakwantu Gallery 2009). A Randles Bros. & Hudson Ltd. (R.B. & H. Ltd.) sample card from Johannesburg is estimated to date to about 1900, and also lists the beads as "cornelian" (Ezakwantu Gallery 2009). An Edition 1902 card (John Picard 2009: pers. comm.) as well as an Edition 1924 and an Edition 1925 *Societa Veneziana Conterie* sample card (Fig. 1; Pl. XB) identify red-on-white drawn beads as "red *aleppo*" and yellow-on-white drawn beads as "yellow *aleppo*" (Allen 2001; Picard 1988:3).

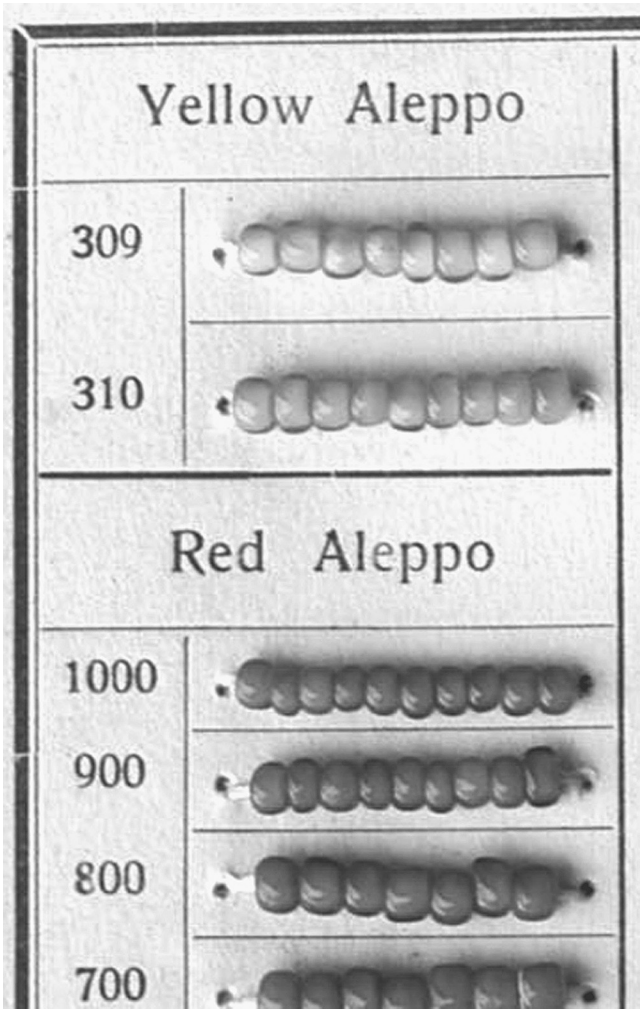

Figure 1. Detail of a *Societa Veneziana Conterie* bead sample card, Edition 1925, that shows "yellow aleppo" and "red aleppo" beads (photo: courtesy of John Picard).

The terminology used is quite interesting. French-language cards refer to the beads as *cornaline*, Italian-language cards use *corniola perla* or *Aleppo*, and English-language cards use cornelian and *aleppo*. It is interesting that *cornaline d'Aleppo*, a name applied to these beads today, combines the French and Italian names for the bead. Allen (1997:10) reports – probably based on an examination of sample cards that have red-on-white drawn beads identified as *cornaline* and as red *aleppo* beads – that this term was applied by Venetians to red-on-white drawn beads and did not originate in France. The term *cornaline d'Aleppo* was not found, however, in the examined sample cards. Today the term is well-known, but its history is poorly understood (Allen 1997, 1998, 2001). The earliest printed reference to *cornaline d'Aleppo* beads is in Haldeman (1878:304, 1879:269) who describes it as a Venetian bead found in a California archaeological assemblage. Haldeman spells the term both as *coralline d'Aleppo* and *cornaline d'Aleppo* and describes the beads as spherical or cylindrical in shape and as occurring in many sizes. His illustration of one of these beads conforms in size and shape to a drawn bead (Haldeman 1879:269). He states that the interior may be white, whitish, yellowish, or pink. Where Haldeman encountered this term and the color variations is an interesting question since these two short articles are the only time he describes glass beads in print. A clue may be Haldeman's statement that the Smithsonian had obtained a collection of 500 varieties of recent Venetian beads (Haldeman 1878:305, 1879:270) which, based on the date of his publications, may have been obtained in the late 1870s. Perhaps Haldeman encountered the term *cornaline d'Aleppo* during an examination of this collection. Unfortunately, no record has been found for the accession of these beads at the Smithsonian and the whereabouts of the collection is unknown.

Allen (1998, 2001) has considered why the term *aleppo* was applied to these beads and postulates that it may be based on a similarity to *aleppo* stones – agates with parallel or concentric colored lines/layers. Allen also mentions that *Aleppo* has been thought to refer to the city of Aleppo in Syria.

Used to designate beads made by several different techniques during various time periods, the term *cornaline d'Aleppo* has acquired such a general meaning that it is presently of little utility. Three groups of beads have been described as *cornaline d'Aleppo* by scholars such as Orchard (1975), Woodward (1965), and van der Sleen (1980): 1) opaque-red-on-transparent-green drawn beads that were made in Amsterdam throughout the 17th century (Karlis Karklins 2009: pers. comm.) and in Venice since at least the beginning of the 17th century through the 19th century; 2) translucent-red-on-opaque-white wound beads that were probably first made in Venice in the early 19th century; and 3) translucent-red-on-opaque-white drawn beads that were probably initially made in Venice and continue to be made today in several countries. The history and reason for why beads of differing manufacture were included under the name *cornaline d'Aleppo* is not revealed in the published literature. Orchard (1975:29) may be the first in print to equate *cornaline d'Aleppo* with red-on-green, red-on-white, and red-on-yellow drawn beads, as well as red-on-white wound beads. Woodward (1965:19-20) also refers to red-on-white, red-on-pink, and red-on-yellow, as well as red-on-green beads as *cornaline d'Aleppo*. Van der Sleen (1980:85) thought that the use of the term *cornaline d'Aleppo* was restricted to the United States and that it referred to red-on-white wound beads. Because of the difference in the history and manufacturing methods of these three bead groups, and since the sample-card evidence indicates that only the red-on-white drawn beads were referred to as *cornaline*

and *Aleppo*, the use of the term *cornaline d'Aleppo* should be restricted to drawn red-on-white, red-on-pink, and red-on-yellow beads, and should not be used for red-on-green drawn or red-on-white wound beads (cf. Allen 1997, 1998).

CULTURAL OBJECTS

One method to assess the introduction of a specific bead variety is to examine cultural objects in museum collections that are well dated by historical records. It should be noted, however, that "well dated" can be a relative term. Museum records reveal when an object was accessioned or formally acquired by the museum, but the records do not always contain information on when the object was first obtained by the collector or donor, how long the object had been in use before being acquired, or when the object was first made. Major museums in the United States were established after red-on-white beads were first manufactured, so collections from the appropriate time period were often obtained by museums years after they were introduced and 19th-century collection records often contain scant information.

Four early collections of Plains objects were examined for the presence/absence of red-on-white drawn beads: the War Department, the Catlin and the Warren collections at the Smithsonian's National Museum of Natural History, and the Jarvis collection at the Brooklyn Museum. The collections at the Smithsonian were examined by the author.

The War Department collection was primarily formed in the 1820s and 1830s with material from the Plains and northeastern United States, and contains 12 beaded objects that were collected before 1842 (Greene et al. 2007). None of these are adorned with red-on-white beads.

Twenty objects from the Plains that were obtained by the artist George Catlin incorporate glass beads. Catlin traveled on the Plains between 1832 and 1836, and, while his trip is described in his book (Catlin 1866) and illustrated in his paintings (Gurney and Heyman 2002), the objects have no associated information about when and where they were obtained. The Catlin objects were donated to the Smithsonian in 1879 and 1881, and the Plains-style objects probably were obtained by Catlin during his 1832 trip to the Northern Plains. Again, no red-on-white beads are present on the objects.

The Nathan Jarvis collection includes Sioux, Chippewa, Winnebago, and Sac objects that he probably obtained while serving as an Army doctor at Fort Snelling in present-day Minnesota from 1833 to 1836. Jarvis later served in the Seminole War in Florida and the Mexican War in what is now the western United States, locations where he may have obtained the Cherokee, Comanche, Caddo, and Seminole objects. All of the objects were donated to the New York Historical Society in 1848, and now form part of the collections of the Brooklyn Museum. The collection has been described (Feder 1964) and eighteen of the beaded objects were probably obtained from Native Americans near Fort Snelling and four beaded objects were likely acquired later. A pair of leggings identified as being of Sioux manufacture is the only object that exhibits red-on-white glass beads. Since the Sioux lived near Fort Snelling and not in areas where Jarvis was later stationed, it is most likely that the leggings were obtained at the fort between 1833 and 1836.

The Warren Collection was accessioned by the Smithsonian in 1866, and was obtained by Lt. Gouverneur K. Warren during military expeditions to the Northern Plains in 1855-1857. The objects and beads in the collection have been individually described by Hanson (1996) and a systematic review of the objects revealed red-on-white beads on 12 of the 42 beaded objects (e.g., Pl. XC).

Comparison of these collections reveals that red-on-white beads were evidently not in the Plains before the early 1830s. One of the 18 Plains objects in the Jarvis collection has red-on-white beads, and its Sioux manufacture indicates that it was likely acquired at Fort Snelling between 1833 and 1836. Based on this one object, red-on-white beads appear to be present but uncommon in the Plains by the mid-1830s. By the time the Warren collection was assembled in the 1850s, red-on-white beads were in common use and are found on 29% of the objects.

Red-on-white drawn beads are present in a collection of Venetian beads at the Technical Museum of Vienna that is thought to date to 1818 (Neuwirth 1994: Fig. 104, 206). Museum records list the beads as "Inventar für Fabrikate an der k. k. technischen Hochschule in Wien vom Jahre 1818 bis 1862" with the added remarks "Geschenke Sr. Majestät des Kaisers Ferdinand I. und Franz Josef I" and "Aus Venedig - 1818" (Waltraud Neuwirth 2009: pers. comm.). This translates as "Inventory for production at the k. k. Technical University in Vienna from the year 1818 to 1862;" "Gifts of their Majesties, Emperors Ferdinand I and Franz Josef I;" and "From Venice - 1818." If these old museum records are reliable, red-on-white beads were made in Venice as early as 1818.

ARCHAEOLOGICAL ASSEMBLAGES

Red-on-white drawn beads appear in the 19th-century but exactly when they make their first appearance requires a detailed examination of a series of archaeological assemblages. These beads are absent from Plains archaeological collections dating to before 1800. While

there are many sites with pre-1800 bead assemblages in the Plains that do not have red-on-white drawn beads, only three sites, Sully (ca. 1650-1700), Larson (ca.1700-1725), and Sturgeon Fort (1776-1780), are included in this comparison to illustrate their absence (Table 1).

Many of the sites that produced red-on-white drawn beads have long occupation periods. For instance, those from the Mandan village of Deapolis in North Dakota were introduced some time during the ca. 1787-1856 occupation. The lengthy life span of the Deapolis site means that any bead present in the assemblage could conceivably have been present as early as 1787 or as late as 1856. Archaeological sites that were occupied for short periods are the most suitable for providing tighter dates for specific bead varieties but unfortunately such archaeological assemblages from the Plains are uncommon. In addition, a short occupation is often associated with a smaller sample size and the likelihood is that only a few of the available bead varieties are represented in the assemblage.

Table 1. Archaeological Bead Assemblages from the Plains and Nearby Areas Organized by Terminal Date of Occupation.

Site	Date of Occupation	Group	Location	Approximate Sample Size of Drawn Beads	Presence of Red-on-White Drawn Beads
Sully*	Ca. 1650-1700	1	SD	5,000	Absent
Larson*	Ca. 1700-1725	1	SD	5,000	Absent
Sturgeon Fort	1776-1780	1	SK	3,000	Absent
Fort George	1792-1800	1	AB	20,000	Absent
Nottingham House	1802-1806	1	AB	3,600	Absent
Fort Manuel	1812-1813, later	1 or 2	SD	100	Present
Engineer's Cantonment*	1819-1820	1	NE	400	Absent
Fort Atkinson*	1820-1827	1	NE	30	Absent
Kipp's Post*	1826-1830	1	ND	5,000	Absent
Leavenworth*	1803-1832	1	SD	100,000	Absent
Windrose	1814-1834	1	IL	24	Absent
Rocky Mountain House	1799-1834	1	AB	10,000	Absent
Fontenelle's Post	1822-1838	1	NE	100	Absent
Davenport Post*	1818-1842	1	IL	33	Absent
Gilbert Post*	1835-1838	2	IA	30	Present
Fort George*	1842-1845	2	SD	5,000	Present
Deapolis*	1787-1856	2	ND	15,000	Present
Fort Pierre Chouteau*	1832-1856	2	SD	8,000	Present
Fort Clark*	1822-1862	2	ND	9,000	Present
Fort Pierre II*	1857-1863	2	SD	5,000	Present
Fort Union	1828-1867	2	ND	100,000	Present
Fort Berthold*	1845-1885	2	ND	5,000	Present
* bead assemblage examined by author					

A conservative date for when drawn red-on-white beads first appear in the Plains can be obtained by examining a series of sites to find the one that has the earliest terminal date (Table 1). The terminal date is the latest one that the site is known to have been occupied and establishes that a bead variety was present by this date. The sites examined fall into two groups based on the presence or absence of red-on-white drawn beads.

The Group 1 sites that lack red-on-white beads are Sully, Larson, Sturgeon Fort (Barka and Barka 1976; Karklins 1981), Fort George (Kidd 1970), Nottingham House (Karklins 1983), Engineer's Cantonment (Carlson et al. 2004), Fort Atkinson (Carlson 1979), Kipp's Post (Woolworth and Wood 1960), Leavenworth (Bass et al. 1972), Windrose (Wagner 2001), Rocky Mountain House (Noble 1973), Fontenelle's Post (Jensen 1998), and Davenport Post (Billeck 2009a). The size of these drawn bead assemblages ranges from 24 to over 100,000 specimens.

The Fort Manuel trading post assemblage has two red-on-white drawn beads that were recovered from a general provenience (Smith and Ludwickson 1981:45) that could be related to the trading post or to a later use of the post area by Native Americans for burial. The presence of this bead variety at Fort Manuel (1812-1813) does not conform to the overall pattern for contemporary assemblages in Group 1 and this would be the earliest reported instance of red-on-white beads. There are several reasons to suspect the association with the post. The absence of red-on-white drawn beads at the nearby Leavenworth site (ca. 1803-1832), is particularly troublesome, since traders at Fort Manuel regularly traded with the nearby Arikara residents at Leavenworth. The Leavenworth site has an assemblage of over 100,000 drawn beads, and if red-on-white drawn beads were available at Fort Manuel, they should also be present at Leavenworth. The few red-on-white beads that are present at Leavenworth are wound. After Fort Manuel was abandoned, a Native American burial was placed there and this probably explains the presence of the red-on-white beads.

The Group 2 assemblages contain red-on-white drawn beads and are represented by the following archaeological sites: Gilbert Trading Post (Peterson 1997), Fort George (Smith 1968), Deapolis (Lehmer et al. 1978), Fort Pierre Chouteau (Billeck 2009b), Fort Clark (Badorek and Ahler 2003; Billeck and Badorek 2003), Fort Pierre II (Burgess 1999; Smith 1960), Fort Union (DeVore 1992, Ross 2000), and Fort Berthold (Smith 1953). Of particular note is the Gilbert Trading Post, an American Fur Company post in Iowa utilized from 1835 to 1838. This site has the earliest terminal date – 1838 – demonstrating that red-on-white drawn beads were present in the Plains region by at least this date.

The archaeological evidence shows that red-on-white drawn beads were first introduced in the Plains by at least 1838, based on a conservative evaluation of the archaeological record. The absence of red-on-white drawn beads in a large sample of beads from sites with terminal dates in the early 1830s indicates that this bead variety was not present in the Plains at this time.

TRADE LEDGERS

Trade ledgers dating from the late 1820s to the early 1850s were examined to determine when red-on-white beads were first introduced into the Plains and when they became common. One of the primary trading concerns in the Plains in the 19th century was the American Fur Company, and these records are now in the Chouteau Collection at the Missouri Historical Society. The available ledgers are of two general types: inventories and invoices. The inventories were typically prepared in June, before the first steamboats arrived with new stock. The inventories do not list all of the items that were available or had been sold at the post, but indicate what remained in stock. The second type of ledger contains invoices for stock received and provides a list of the bead supplies that arrived at a post in a particular shipment. Inventories are not available for every year that a post was in operation and the set of invoices is incomplete.

Copies of original and microfilmed inventories and the transcribed summary of many of the ledgers from Fort Union (DeVore 1992: Appendix a-l) and Fort Clark (Badorek and Ahler 2003: Table 46) were examined. The transcribed inventories were checked against several of the originals, confirming the accuracy of the published transcriptions. Ledgers are available for some years, but not for others. Inventories that provide a listing of what was present at the post at a particular time are available for Fort Berthold (1846 to 1850); Fort Clark (1829, 1831, 1832, 1844-1847, and 1849-1851); Fort Pierre (1832 and 1844-1850); Fort Tecumseh (1827 and 1829-1832); and Fort Union (1831, 1834, and 1844 to 1851). Invoices for the beads that arrived at the posts are available for Fort Berthold (1849 and probably 1850); Fort Clark (1834, 1837, 1839-1841, and 1850); Fort Pierre (1834, 1837-1841, and 1848-1850); Fort Union (1835-1839, 1841, and 1849-1850); and the Rocky Mountain Outfit for 1834, 1836, 1837, 1839, and 1840. The ledgers of the fur trade companies provide general descriptions of the beads that were sold as pound, seed, cut, agate, pigeon egg, snake, common, garnishing, mock garnet, and mock wampum. Unfortunately, the ledgers do not reveal whether the beads are drawn or wound, but do provide descriptions that sometimes allow the identification of the manufacturing types. Beads that are identified as

"pound" beads in the ledgers were sold by weight and these are identified as small drawn beads in this analysis. Support for the identification of "pound" beads as small drawn beads is found on a Sick Co. sample card dating from around 1909 that has very small, small, and medium-sized drawn beads identified as such (van Brakel 2006:73).

The ledger descriptions are often difficult to match up with specific bead varieties found in archaeological assemblages or on cultural objects. No beads are specifically described as red-on-white beads and the term *cornaline d'Aleppo* does not appear in the examined ledgers. The term cornelian, which is used to refer to red-on-white drawn beads on English-language sample cards of the late 19th or early 20th century, is used in the ledgers to refer to the color of beads that were sold by weight and are referred to in the ledgers as cornelian-colored beads or as cornelian-colored pound beads. In the examined fur trade ledgers, cornelian does not appear in the 18 ledgers that have bead entries made between 1827 and 1836. The term appears in only the 1837 ledger of the 16 ledgers that date between 1837 and 1841, but appears in 23 of 36 ledgers that date between 1844 and 1851. The ledgers suggest that while cornelian beads were uncommon in the late 1830s, they were common by the late 1840s, at which time hundreds of pounds of these beads were being sent to the Northern Plains, including one invoice for 857 pounds of cornelian beads for Fort Pierre (Table 2). The earliest usage of the term cornelian is in the ledger for the 1837 Rocky Mountain Outfit.

Cornelian beads were relatively expensive compared to other colors of pound beads. For instance, in the 1846 Fort Union inventory, cornelian pound beads were sold for $0.6867/lb. and for $0.95/lb. The reason for the price difference is not recorded, but may be related to the size of the beads. Pound beads of other colors sold for much less: blue pound beads - $0.565/lb., white pound beads - $0.30/lb., yellow pound - $0.25/lb., and black pound beads - $0.25/lb. In other inventories, cornelian beads sold for between $0.60/lb. and $1.00/lb. (Table 2), substantially higher than the other pound beads.

The examination of mid-19th-century trade ledgers indicates that red-on-white beads were referred to as cornelian beads in the United States as early as 1837, and are common by the late 1840s.

COMPARISONS OF PLAINS TRADE LEDGERS TO PLAINS ARCHAEOLOGICAL ASSEMBLAGES

Another way to look at the importance of red-on-white beads is to examine their occurrence in the trade ledgers and at archaeological sites relative to other small beads. Ledgers and archaeological collections are available for the prominent Plains trading posts of Fort Clark, Fort Pierre Chouteau, and Fort Union. The available trade invoices and inventories were summarized for weight by color for all beads identified as pound or seed beads. Several ledgers only described beads by weight, color, and price and the ledger entries that conformed in price and weight to pound beads were included in the summary.

There are nine inventories and six invoices that date between 1829 and 1851 for the Fort Clark (1822-1862) post (Table 3), eight inventories and eight invoices that date between 1832 and 1850 for the Fort Pierre Chouteau (1832-1856) post (Table 4), and nine inventories and ten invoices that date between 1831 and 1851 for the Fort Union (1828-1867) post (Table 5). What can be learned from the trade ledgers is the general importance of the different types of beads, but this is best done in comparison with archaeological assemblages. If it is assumed that the beads recovered from archaeological investigations at a post are a good indicator of the beads available at the post, the archaeological assemblage can be used to evaluate how well the ledgers represent the bead trade. Comparison of the trade ledgers with the archaeological assemblages reveals that the inventories and invoices from a particular post do not precisely match each other. For instance, at Fort Union there is a marked under representation of white beads in the inventories. White beads comprise only 8.6% of the bead inventories but 49.1% of the invoices of beads shipped to the post. Clearly white beads were very popular at Fort Union and were hard to keep in stock. If only the inventories were examined, a distorted interpretation of the importance of different bead colors would result. While inventories may poorly represent the amounts of beads sold at the post, the invoices are generally much better as they list the beads shipped to the posts. Not all of the invoices have been located, however, and the descriptions of the beads in the invoices may not be adequate to identify uncommon bead colors, leading to biases in the invoices. The invoices listing the beads shipped to the Fort Clark post under-represent the uncommon bead colors in comparison to the inventories (Table 3). The inventories of unsold stock show approximately 80% white and blue beads of small size while about 20% of the beads are the less common colors – black, yellow, red, and cornelian (Table 3). By comparison, less than 1% of the beads listed in the invoices are black, yellow, red, and cornelian, while 99% are white and blue.

Comparing the amounts listed in the invoices with the number of beads recovered from archaeological excavations reveals that the percentage of the colors varies, sometimes substantially. For instance, blue and white beads comprise 90% of the invoices for Fort Union while the excavated

Table 2. Cornelian Beads Listed in the Chouteau Paper Trade Ledgers for the Rocky Mountain Outfit, Fort Clark, Fort Pierre, Fort Union, and Fort Berthold.

Year	Weight (lbs)	Description	Price Per Pound	Post
1837	11.5	Fine	1.00	Invoice Rocky Mountain Outfit
1844	98	None	.69	Inventory Fort Clark
1844	235	Pound	.78	Inventory Fort Pierre
1845	124	None	.68	Inventory Fort Clark
1845	306.25	Pound	.69	Inventory Fort Pierre
1846	23	Pound	.69	Inventory Fort Clark
1846	200	Pound	.69	Inventory Fort Pierre
1846	30	None	.69	Inventory Fort Union (not noted why beads vary in cost)
1846	185	None	.95	
1848	52	None	.68	Inventory Fort Pierre
1848	857	Pound	.65	Invoice Fort Pierre
1849	14	Pound	.65	Inventory Fort Clark
1849	50	Pound	.65	Invoice Fort Clark
1849	523	None	.65	Inventory Fort Pierre
1849	280	Pound	.60	Invoice Fort Pierre
1849	207	Pound	.60	Invoice Fort Union
1849	16	None	.65	Inventory Fort Berthold
1849	43	None	.65	Invoice Fort Berthold
1850	15	None	.60	Invoice Fort Clark
1850	201	None	.60	Inventory Fort Pierre
1850	99	None	.60	Invoice Fort Pierre, forwarded to Fort John
1850	429.5	Pound	.65	Inventory Fort Union
1850	40	None	.60	Inventory Fort Berthold
1850?	42	None	.60	Invoice Fort Berthold
1851	72	Pound	.60	Inventory Fort Clark

assemblage contains 62% blue and white beads. The invoices at Fort Clark have 0.2% yellow and black beads and the excavated assemblage has 10.9%. At Fort Pierre Chouteau, the invoices are the most similar to the archaeological assemblage. The differences in the percentages of bead colors between the inventories and invoices and the archaeological assemblages indicate that the ledgers are not a precise indicator of the importance of the colors of small beads at the posts, but provide evidence for the relative importance of beads. Combining the information from the ledgers and the archaeological assemblages reveals that blue and white beads predominate while the other colors generally make up less than 10% of the total.

Turning to the red-on-white beads in particular, the Fort Clark, Fort Pierre Chouteau, and Fort Union inventories show 1.7%, 12.7%, and 8.2% cornelian-colored beads,

Table 3. Comparison of Small Drawn Bead Colors in the Fort Clark Trade Ledgers and the Archaeological Assemblage.

Ledgers					Archaeological Assemblage*		
Color	Inventory		Invoice		Color	n	%
	lbs.	%	lbs.	%			
Blue	2,017	40.6	2,105	53.8	Blue	3,329	37.4
White	1,670	33.6	1,784	45.6	White	4,025	45.2
Black	404	8.1	5	0.1	Black	447	5.0
Yellow	468	9.4	5	0.1	Yellow	526	5.9
Red	74	1.5			Red or Pink	169	1.9
Cornelian	331	1.7	15	0.4	Red-on-White	388	4.4
					Other	113	1.3
Total	4,964	99.9	3,914	100.0		8,897	100.1

*Archaeological counts from Billeck and Badorek (2003).

Table 4. Comparison of Small Drawn Bead Colors in the Fort Pierre Chouteau Trade Ledgers and the Archaeological Assemblage.

Ledgers					Archaeological Assemblage*		
Color	Inventory		Invoice		Color	n	%
	lbs.	%	lbs.	%			
Blue	5,628	54.5	11,061	39.4	Blue	2,798	33.4
White	1,970	19.1	14,363	51.2	White	4,030	48.3
Black	439	4.3	964	3.4	Black	113	1.4
Yellow	561	5.4	419	1.5	Yellow	103	1.2
Red	410	4.0			Red or Pink	705	8.4
Cornelian	1,317	12.7	1,236	4.4	Red-on-White	320	3.8
					Other	297	3.6
Total	10,325	100.0	28,043	99.9		8,366	100.1

*Archaeological counts from Billeck (2009).

respectively, while the invoices surprisingly have less at 0.4%, 4.4%, and 1.5%. Cornelian beads were more expensive than the other colors and perhaps the difference between the inventories and invoices may be because they sold less quickly and therefore were more likely to remain in stock. The inventories and invoices suggest that red-on-white beads were most common at Fort Pierre Chouteau, followed by Fort Union, and least common at Fort Clark. This is not supported by the archaeological assemblages, however, where Fort Union has the most red-on-white beads (6.3%), followed by Fort Clark (4.4%) and Fort Pierre Chouteau (3.8%). This order of archaeological assemblages corresponds with the abandonment sequence of the posts in 1867, 1862, and 1856, respectively, providing further evidence that red-on-white beads become increasingly common through time.

Table 5. Comparison of Small Drawn Bead Colors in the Fort Union Trade Inventories and the Archaeological Assemblage.

Ledgers					Archaeological Assemblage*		
Color	**Inventory**		**Invoice**		**Color**	**n**	**%**
	lbs.	**%**	**lbs.**	**%**			
Blue	5,857	74.4	5,492	38.6	Blue	39,574	26.6
White	687	8.7	6,763	47.5	White	52,470	35.3
Black	196	2.5	1,002	7.0	Black	17,815	12.0
Yellow	202.5	2.6	305	2.1	Yellow	9,524	6.4
Red	281	3.6	462	3.2	Red or Pink	8,213	5.5
Cornelian	644	8.2	207	1.5	Red-on-White	9,386	6.3
					Other	11,537	7.8
Total	7,867.5	100.0	14,231	99.9		148,519	99.9

*Archaeological counts from Ross (2000:28-34).

CONCLUSION

Red-on-white drawn beads are frequently found in bead assemblages and on beaded objects from the Plains region and are a valuable temporal marker for the 19th century. Several lines of evidence – historical records, ethnographic beaded objects, and archaeological bead assemblages – were used to determine when red-on-white drawn beads first appear and when they become common in the Plains. An examination of historical records regarding bead manufacture reveals that red-on-white beads were being made by 1841. Red-on-white beads on cultural objects are not present in the War Department (ca. 1820s and 1830s) and Catlin (ca. 1832-1836) collections, are present on one object in the Jarvis collection (ca. 1833-1836 and later), and are often present on objects in the Warren (ca. 1855-1857) collection. On cultural objects, red-on-white beads are not present before the early 1830s. There is also tantalizing evidence that the beads may have been made in Venice as early as 1818, but additional research is needed to verify this date.

A review of trade ledgers reveals that the term cornelian can be equated with red-on-white drawn beads. The earliest occurrence of the term in the examined ledgers is 1837, and these beads are commonly listed in ledgers dating to the late 1840s. As for nomenclature, slightly different terms are used to describe red-on-white drawn beads in different languages: cornelian in English, *cornaline* in French, and *corniola* and *aleppo* in Italian. It is not until the late 1870s that the term *cornaline d'Aleppo* is first encountered in the examined historical records, and additional historical research is needed to precisely date the introduction of these terms.

The lines of evidence indicate that red-on-white drawn beads were in use in the Plains by the mid-1830s, but are uncommon at this time. By the mid-1840s they are often listed in the trade ledgers and are commonly used on objects collected in the 1850s. Red-on-white drawn beads are a distinctive, fairly common, well-dated bead type in the Plains that provides a good index for more precisely assessing a minimum age for cultural objects and archaeological assemblages from the region.

ACKNOWLEDGEMENTS

Information on bead sample cards in the collections of other museums was a great aid in completing this article. John Picard provided information on bead cards and an image of the 1925 bead sample card. Waltraud Neuwirth shared accession records for beads at the Technical Museum of Vienna. The Royal Ontario Museum provided images of the Nissin Namer bead sample card and Trudy Nicks summarized the information on the accession history of the card. Jamey Allen generously shared an updated version of his previously published article on Cornaline d'Aleppo beads. Laura Burgess commented on several drafts of this article. Don Hurlbert photographed the beads.

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Plate IXB. *Red-on-White:* **Left:** Tsl. red-on-yellow, red-on-pink, and red-on-white drawn beads (Fort George, SD). **Right:** Tsl. red-on-white wound-on-drawn bead and an op. red-on-green drawn bead (Sullivans Island, WA)(photo: Don Hurlbert).

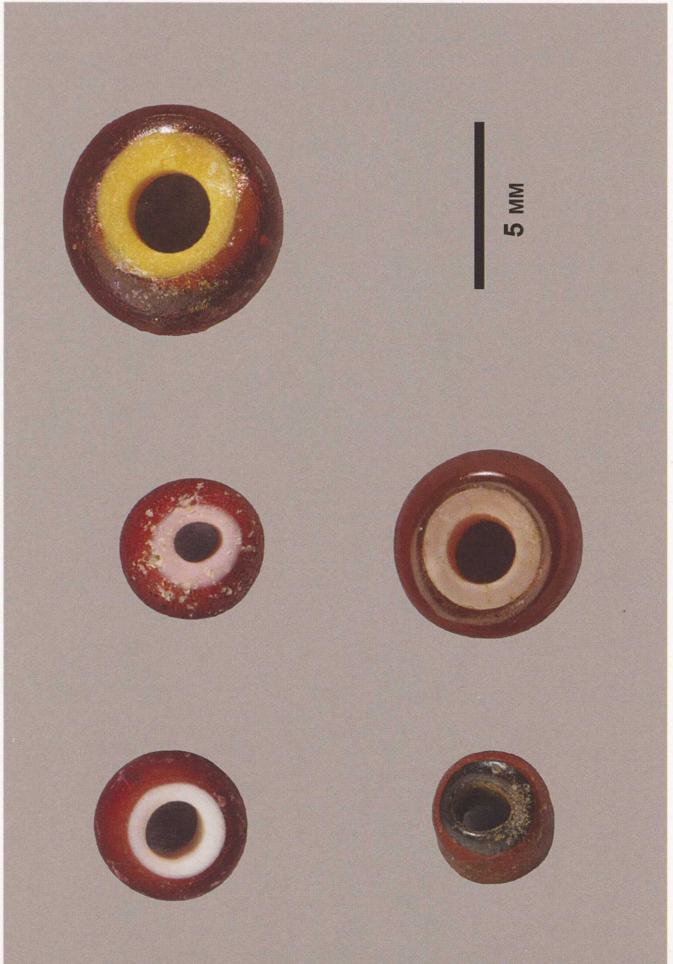

Plate IXC. *Red-on-White:* Detail of the Nissin Namer bead sample card in Pl. XA showing red-on-white drawn beads identified as *corniola perla*; ROM Accession 907.31.11 (Photo Credit: With permission of the Royal Ontario Museum © ROM).

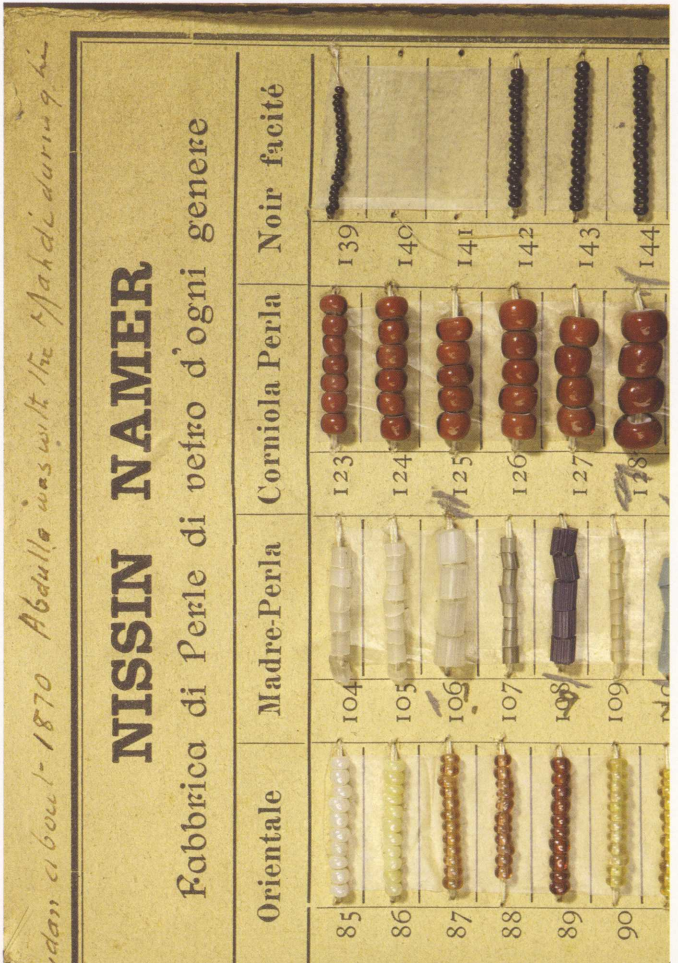

Plate XA. *Red-on-White:* Nissin Namer bead sample card from the Sudan, ca. 1870; ROM Accession 907.31.11 (Photo Credit: With permission of the Royal Ontario Museum © ROM).

Plate XB. *Red-on-White:* English-language version of a *Società Veneziana Conterie* bead sample card, Edition 1925, with red and yellow *aleppo* beads (photo: John Picard).

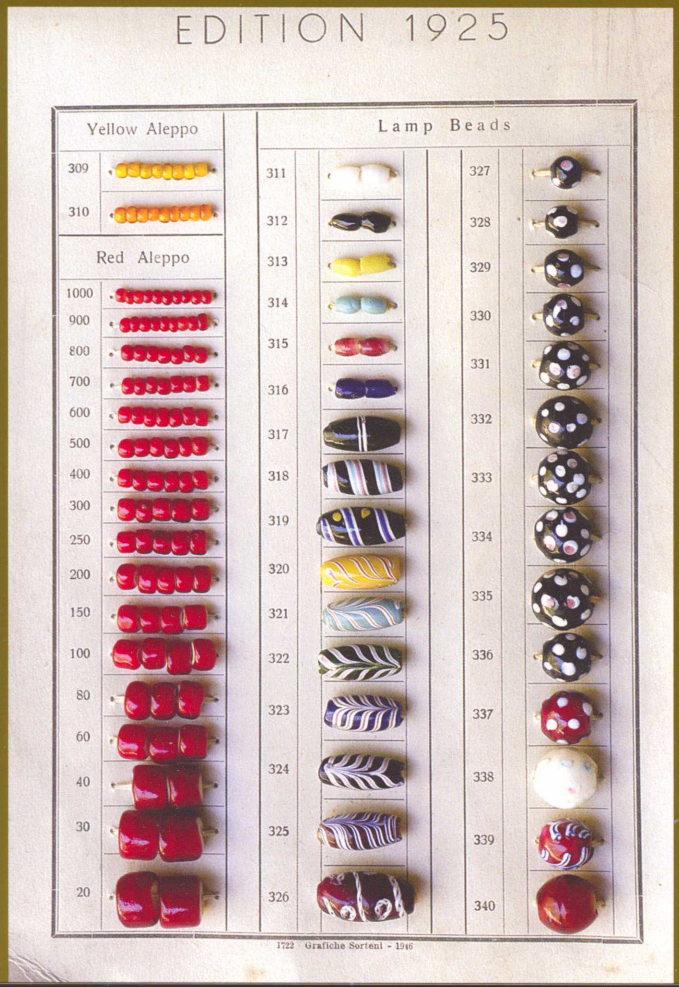

Plate XC. *Red-on-White:* Beaded hunting pouch, probably Sioux, with white, blue, black, and red-on-white drawn beads, ca. 1856 (Warren Collection, Smithsonian catalog E1935).

THE VENETIAN BEAD STORY[1]

Peter Francis, Jr.

With the possible exception of the Egyptian and Syrian beadmakers of Roman times, no glass bead producers have had as much influence on their contemporaries as those of Venice. Venetian beads have been sent all over the world and have for the last several centuries dominated the trade and tastes in the commodity. These beautiful products of Venice come in an amazing diversity of styles. It has been estimated that well over 100,000 different Venetian bead varieties have been produced and each year the numbers grow, for Venetian artisans are constantly turning out new kinds of beads for their customers. This article summarizes the history of the Venetian bead industry and also discusses its diverse products.

PART I: HISTORY

One of the world's most exquisite cities, Venice consists of 117 islands in the Lagoon of Venice, sheltered from the Adriatic Sea by the Lido, a long sand spit. Her wealth has always come from the sea.

Several theories of the origin of glassmaking at Venice exist, but none are proven. In the 7th and 8th centuries, small furnaces on Torcello Island made tableware and tiles for the cathedral (Gasparetto 1967; Tabaczyska 1968). Tradition says that in A.D. 811, people of the Lido fled the Huns to Rivo Alto (Rialto), the "high bank," thus founding Venice. Radiocarbon dates from materials beneath San Lorenzo are, however, from the late 6th and early 7th centuries and those from beneath San Marco are from the 7th or 8th century (Ammerman et al. 1995). In 823, St. Mark's bones were brought from Alexandria and Venice began to eclipse Torcello.

Documents from A.D. 982, 1082, and 1090 refer to *philolarii* or bottle makers attached to Benedictine monasteries; they also made mosaic tiles to decorate San Marco cathedral (Gasparetto 1960:37). In 1072, alum was imported from Alexandria to make glass; this was forbidden in 1330, as it resulted in an inferior product (Perrot 1958:11). In 1224, 29 members of the *Ars Fiolaria*, the glassmaker's guild, were fined for various rule infractions (Nesbitt 1879:652), the first mention of the guild.

In those days of state control of industry, many laws were passed governing glassmaking. An edict in 1275 barred the export of sand, potash, or broken glass and restricted Germans from taking more glass than they could carry on their backs or ten Venetian-lire worth. An edict of 1286 by the Grand Council set down minimum working conditions and ordered the furnaces shut when the weather was hot. In the next year, wood for fuel was put under the direction of the senior judges to ensure its availability (Perrot 1958:10-11).

On 8 November 1291, the Senate decreed that glassmaking must move from Rialto to the island complex of Murano (ancient Amurianas or Amurianum). The official reason was to shield the wooden buildings of Venice from fire, but it also helped to control the industry and prevent glassmakers from leaving. The law was not always obeyed; two similar laws were passed in the next 30 years and there was still a glassmaker in Rialto in the late 14th century (Hazlitt 1915:705).

Murano was a draw. By 1350, at least 60 glassmakers from the Dalmatian Coast and Italy went there, many apparently from the Diaspora (Kurinsky 1991:382-383). Venice favored glassmakers. An immigrant could become a citizen in 25 years (Kurinsky 1991:382-383). A 1376 law allowed the heirs of a glassmaker's daughter and a nobleman to inherit his title and in 1490 the guild was placed under the Council of Ten, enhancing its lobbying power (Perrot 1958:21). Glassmakers could even buy a title, as the Morellis did in 1686 for 100,000 ducats (Gasparetto 1958:189).

Venice attempted to prevent an exodus of glassmakers, for a while under penalty of death. This did not stop many from leaving, however, and the penalty was applied only twice (Kidd 1979:22). Many European powers encouraged glassmakers and beadmakers, foremost among them France (Scoville 1950:82-83).

As early as 1486, Venetians set up a bead factory in Bohemia (Jackson 1927). In the 16th century, Venetian glassmakers went to France (Morazzoni 1953:41), England (Thorpe 1935:120; Winbolt 1933:511), and Holland (Baart 1988:67). In the next century, workers were smuggled out to Amsterdam and Zuan Antonio Miotti managed a bead factory in Middelburg, Holland (Baart 1988:67-69; Karklins 1974:54-55; van der Sleen 1967:108; Zecchin 1971:78). Italian beadmakers were even sent to Jamestown, Virginia (Harrington n.d.:9; Kidd 1979:50, 78).

The trickle became a flood in the mid 18th century, largely due to Dominico Vistosi, said to have been associated with beadmakers in Florence, Bologna, Naples, Rome, Loreto, Torino, Mantova, and Pisa (all in Italy), Innsbruck and Graz, Marseilles, Amsterdam, and Portugal. The failure of the Austrian adventures brought a sigh of relief in Venice. A book was produced to bring beadmaking to Spain (Morazzoni 1953:41-48).

Beadmaking Guilds in Venice

Venice had long drilled pearls (Morison 1963:273-274) and made beads of bone, ivory, wood (Morazzoni 1953:9), and rock crystal (Alcouffe 1984:274). Martino de Canale first noted glass beads worn by a glassmaker (who probably made them) at the installation of Lorenzo Tiepolo as Doge in 1268 (Gasparetto 1958:182). In 1296, the first firm reference to Venetian glass beads indicated their use in embroidery (Morazzoni 1953:20). Their first official mention was in 1308, when the State Inquisition organized the beadmakers into the guild *Arte de'Margariteri* (Morazzoni 1953:8-9).

This new guild threatened the stone beadmakers, the *Arte Minuta* branch of the *Cristalleri* guild, organized in 1284 (Alcouffe 1984:274). Over the next two centuries, the stone cutters fought the glassmakers. As early as 1301, they lost their monopoly on lens making (Perocco 1984:30). Their rules (*marigola*) and laws of the Senate and the Inquisition sought to ban false gem making (Gasparetto 1958:184; Morazzoni 1953:22).

It was a losing battle. On 17 February 1510, the *Capitolo dell'Arte*, the governing board of all guilds, announced their support of glass beadmakers and stopped the export of canes to Bohemia for further working. The *Margariteri* and the *Paternostri* (organized in 1486) nominally remained part of the *Cristalleri* until 1604, but so firm was this decision that Gasparetto (1958:185-186) wrote, "rock crystal was dead and glass beads born."

The ordinance and the *Paternosteri* rules speak of a recent innovation. The law says, "Newly discovered twenty years ago... an invention made by our glassmakers of Murano of pure canes of common *cristallo* and colors of diverse sorts...." The rules read, "*paternosteri de rosetta*" (chevrons), "*oldoni*," and "canes, and other sorts of work newly discovered" (Gasparetto 1958:184; Morazzoni 1953:21).

What was discovered between 1480 and 1490? Morazzoni thought it was Bernardo de Pin's polishing machine, but this marvel was a figment of an earlier historian's imagination (Zecchin 1955). It was not clear *cristallo* nor colored glass; both had been around much longer.

The invention must have been tube drawing. Tubes had been drawn around the Mediterranean for centuries, but they seem to have been short. A long thin tube (cane) could be cut into segments which would then be processed into beads. When Venetians taught Bohemians to make beads in 1486, they used furnace-winding, not tube drawing (Jackson 1927:Al13).

To draw a glass tube, a master prepares a hollow glass gather by blowing into or manipulating it. By 1869, a device (*borsetta*) was inserted into the glass and opened up inside, creating the cavity (Zanetti 1869:38). The master held the glass on his pipe and a boy with a rod (*pontil*, punty) with a piece of glass at the end joined this to the gather and ran away from it. Seed bead tubes were as long as 100 m (yards),[2] made in galleries built for the purpose. A man with a leather fan cooled the tube, which rested on crossbeams on the floor. The tube was cut into meter lengths and sent elsewhere to be processed.

If any one person was likely responsible for the invention of drawing it would be Angelo Barovier (1405-1460), who invented clear *cristallo*, milky *lattimo*, an agate glass, and possibly chevrons (Jargstorf 1995:46; Mentasti 1980:xlvi).

A distinction between beadmakers and their beads was the finishing process. Before the introduction of a tumbling drum in the early19th century, beads were finished either *a ferrazza* (in a pan) or *a speo* (on a spit). There is disagreement on which was first and who first used them. By 1600, the pan method was used by the *Margaritari* for seed beads and the *a speo* method by the *Paternostri* for larger beads, though the sizes could and did overlap (Gasparetto 1958:186; Jargstorf 1995:52-53; Karklins 1993a).

A third beadmaking method, lampwinding, developed more slowly. The *Arte de 'Perleri e de' Supialume* (*supialume* refers to blowing into a lamp to increase the heat of the fire) was made a guild in 1528. It did not share the status of the other two guilds until 1647, when they had a school (begun in 1615), the rules, and a patron saint (S. Antonio) in common, but kept separate banks and councils

(Gasparetto 1958:188; Morazzoni 1953:25-26). *Paternostri* feared competition from *Supialume* who, indeed, eventually supplanted them.

Lamp-winding grew slowly. Wound beads don't appear in the trade until about 1700 and aren't important until about 1750. By 1731, 800 pounds (364 kg) of oil were used daily (Kidd 1979:67). Andrea and Pietro Bertolini improved the process soon thereafter (Morazzoni 1953: 37-38). Dominico Bussolin patented a gas lamp in 1843 and credited Giovan Battista Franchini for persuading his colleagues that it was better than tallow, yet as late as 1869, two leading beadmakers, Salviati and Giovanni, still advertised beads made "by candle and by gas" (Gasparetto 1958:195; Hollister 1983:203; Zanetti 1869:170).

Venetian Glass

Special glasses are the hallmark of Venetian production. Venice was famed for its tableware and other glass products, as well as beads. Some of the glass improvements were used immediately for beads, while others took a long time for beadmakers to adopt.

We have already noted that Angelo Barovier (d. 1460) was the leading glassmaker of his day. His *cristallo*, an excellent, if slightly gray, clear glass, was made with purified alkalies, special ingredients, and decolorized with manganese. It was later combined with his *latticino* to make the famous gooseberry bead (Francis 1994:5). He may not have invented chevrons, but he was the first to make molded canes for mosaic or millefiori work. Though described as early as the late 15th century, the word *millefiori* (thousand flowers) was only introduced in 1827 (Hollister 1983:202).

Glassmaking and beadmaking everywhere was advanced by a Florentine priest with a love for chemistry, Antonio Neri (1576-1614). Though he did not work in Venice, his book *L 'arte vetraria*, published shortly before his death, became the standard textbook on glass for centuries. Not right away, however. It languished in obscurity, being reprinted only in 1661. The next year Christopher Merrett (also Meritt; 1614-1695) published an English translation that was an instant best seller. It was translated into Latin in 1668, and went through three printings and three editions. In 1679, Johann Kunckel, the director of the glassworks in Potsdam, added material and translated it into German, which went through four editions. It was reprinted in Venice in the original Italian in 1663 and 1678. Altogether, there were dozens of editions in a half dozen languages (including Spanish and French) down to 1826, with many books excepting from it, often giving no credit to Neri (Mentaste 1980:lix-lxv; Turner 1963).

A spectacular Venetian glass is aventurine, probably so named because it was risky (*avventura*) to make. Tiny copper flakes suspended in glass make it shimmer like gold, giving it the synonym "goldstone." It was invented by Vicenso Miotti (1644-1729) who was given exclusive rights to it in 1677. He passed it to his son, Daniel, in a "Book of Secrets" in 1669. Pietro and Giovanni Andrea Bertolini made an inferior version in 1731. By 1807, Lorenzo Bigaglia had made it and it was improved upon in 1859 by Giuseppe Zecchin, working for the heirs of his firm.

Antonio Saviati made it soon thereafter. In the meantime, the Miotti family had closed shop in 1791, and a widow revealed the formula to Beneditto Barbaria in 1811 (Morazzoni 1953:36-37, 56-58; Zecchin 1971:78, 82). In addition to Venetians, other nationalities took out patents and it has been made in several countries, but for the last century, the Dalla Venezia family of Venice has been the principal supplier (Revi 1967:110-112).

Gold ruby (translucent red) glass is a favorite, rich color. The Venetian Giovanni Darduin (1595-1654) may have first used it (Mentasti 1980:lix), but the German Andreas Cassius (ca. 1640-1673) first described a colloid suspension of gold in stannic (tin) acid to color glass ("Purple of Cassius") in *De Auro* in 1685. Kunckel developed it commercially as a thin coat (casing) and the Bohemians mastered it around 1715. Later improvements were by Venetians, especially Giuseppe Zecchin around 1859 (Weyl 1959:380-381).

The 19th century, especially the second and third quarters, saw many new and improved glasses, some to combat the rising Bohemian (Czech) beadmakers. Giobatti Franchini made a coral glass in 1826 and a pink nacre (mother-of-pearl) in 1827. Giovanni Giacomuzzi was celebrated for his golden nacre in 1867; 5,000 lbs. (2,272 kg) of it adorned a Trevesto theater. He also created silver, red, green, blue, and carnelian shades. Lorenzo Radi imitated agate, chalcedony, and lapis lazuli (Gasparetto 1958:194; Morazzoni 1953:54-59).

Innovations in Beadmaking

Glass beadmaking begins with glass. For drawn beads, the production of the tube is the next step. These operations require several specialized skills: furnace making, preparing the ingredients, making the glass, and drawing the tubes. A division of labor was already at work. After the tubes were drawn, more steps were necessary, performed by different people, sometimes in main factories and sometimes at home.

There are several descriptions of these processes, but only two are by observers connected to the industry. The

first is by Dominico (Dominique) Bussolin, the promoter of gas for lamp-winding: *The Celebrated Glassworks of Venice and Murano* (Karklins with Adams 1990). The other is by Abbot Vincenzo Zanetti (1824-1883), a historian who wrote 30 books on Venetian glass and glassmakers and founded the Museum of Glass on Murano in 1861. I use his "Little Guide to Murano" of 1869 (pp. 44-52). Both writers list discrete steps in the beadmaking process; Bussolen six and Zanetti seven.

Molds were introduced in the 1860s by Lorenzo Graziati, J. Bassano, and Giuseppe Zecchin for canes with hexagonal, channeled, lobed, and other sections (Carroll 1917:20; Neuwirth 1994:108-109).[3]

The following steps are performed to form a drawn glass tube into beads:

1. Sorting tube diameters, done by women (*cernitrici*; sorters) by hand.

2. Cutting the tubes, done by a man (*tagliatori*) sitting on a chair holding a small bench (*zocco*) between the legs, with about 3 in. (7.5 cm) of blade mounted in it. Behind the blade is a regulator (*scontro*) against which the ends of the tubes are placed as they lie on the blade. The worker takes a handful of tubes, lays them on the blade, and pushes them toward the *scontro*. With a blade of the same length in his other hand, he chops the ends of the tubes into segments.

In 1822, Captain Longo invented a machine to automate cutting by mounting the chopping blades onto a cylinder. Two men ran it. It was not precise enough and in Bussolin's day was not much used. Carlo Romiti improved it in 1867, and by Zanetti's day it was apparently common (Gasparetto 1958:198, n. 48; Morazzoni 1953:53-54).

3. Rounding the segments by men called *tubanti*. As previously mentioned, this was done by several means. In the pan method, beads were packed in a refractory powder, put on a pan heated underneath, and stirred with a paddle. The drum was introduced in 1817 by Luigi Pusinich and improved in 1864 by Antonio Frigio (Gasparetto 1958:198; Morazzoni 1953:53). The beads were also packed in powder, and the rotating drum replaced the stirring paddle.

In the one documented *a speo* operation (Karklins 1993a), beads were put on six tines arranged in a circle mounted on a handle. Each held three large beads. The spit was placed in the fire and rotated until the beads were rounded. Often beads melted together or were misshapen; these were still sold.

Zanetti puts another step of eliminating broken beads before this step; Bussolin incorporates it into step 2. It is done by the *schizzadori*, who use a screen to separate broken pieces. Zanetti said the process was simple and executed with "half weariness."

4. Separating beads by size done by the *governadori*, who use a series of screens to sort the beads. Then a handful of beads are put on a flat plate that is inclined and gently shaken so rounded beads are separated from misshapen ones.

In 1867, Giuseppe Zecchin and Augusto Ceresa built a mechanical sorter consisting of sieves with progressively smaller holes mounted above each other and rocked back and forth (Gasparetto 1958:198).

5. Polishing the beads, done by the *lustradore*. The beads are put into a sack and shaken very hard to remove dust and to buff them. Bussolin said two sacks were used, one with sand and the other with bran. Zanetti noted only one with fermented bran and noted that this was an "operation opportune for a machine."

In 1838, Isacco Bassano built an eight-horsepower machine to give beads a high polish (Morazzoni 1953:59). Matte finishing was first done with hydrofluoric acid, then the French developed a grinding process involving emery, sawdust, or other materials; it was especially popular in America (Carroll 1917:11-12).

6. Stringing the beads, done by women called *infilatrici*. Neither Bussolin nor Zanetti describe this step, but Irene Ninni did in 1893 in her little book *L 'Impiraressa* (Ninni 1991). In short, the beads are placed in a scoop (*sessola*) that measures the length of the strands and the stringers hold a "fan" of 40-60 long (ca. 18 cm or 1 in.) needles threaded with flax which they rake through the beads, picking them up and stringing them *en mass*.

Up to 20% of the beads were not properly perforated and the women rejected them, dubbing them with several names. In 1894, Cav. Salvatore Arbib invented the *tamburo*, a machine that picked up beads by their holes by means of short wires set in a revolving cylinder, leaving beads with occluded holes behind. It was built by Meyer and Sons of Birmingham, England. In the same year, Arbib and Meyer produced a machine that strung beads on wire to sell to French beadmakers for the production of beaded flowers (Carroll 1917:11-12). Some beads were sold by bulk and not strung.

An Indian Connection?

We don't know how far back these processes were used in Venice, but they have an eerie similarity to the way beads are made today at Papanaidupet, India (e.g., Francis 1991a).

Indian crafts are very conservative and the archaeological evidence suggests that most of the steps used for beadmaking today were used over 2,000 years ago.

The Venetians did not learn tube drawing from the Indians. Their methods are totally unlike (though the Danner machine, invented in the United States, works on the same principle as Indian tube drawing).

Indians sit on the ground to cut tubes on a flanged blade in the earth. Venetians prefer to sit on a chair and the *zocco* and *scontro* could be modifications. Rounding, sorting, polishing (the Indians use rice husks), and stringing (longer and fewer needles; the beads in a winnowing basket) are all very similar.

There are many recorded cases of independent invention and perhaps these methods are as efficient as possible. On the other hand, when Venice was developing her seed bead industry, India was far wealthier and more technologically advanced than Europe. Papanaidupet does not hide its work from curious outsiders and a European, an Italian, even a Venetian, could have visited what was then a place notable for a large guest house for pilgrims visiting the important temple at nearby Tirupati. We may never know, but I believe this hypothesis deserves testing.

The Fortunes of the Industry

Scholars have begun combing the archives of Venice (e.g., Bonannini 1999). When they publish their findings, we may have more data about the size of the industry. In the meantime, I shall rely on data gathered for *The Glass Trade Beads of Europe* (Francis 1988). It is spotty, but does reveal some trends. Only two figures are available for the 17th century. We are on slightly better grounds for the following centuries, but the data are hardly complete and not strictly comparable.

Table 1 compares the number of masters, furnaces, and workers in the bead industry as reported for various years.

Clearly, the growth of the industry did not follow a straight line. The decline between 1736 and 1744 and resurgence in the next decade, as well as the decline from 1867 to 1869, were recorded in the same two contemporary documents. The figure for furnaces for 1766 represents furnace owners.

Yet, the numbers are instructive. Furnaces ranged from 15 to 52, with an average of 29 and a median of 26. After the initial rush, the number of masters fluctuated around 100. The early figures do not account for the many *Supialume* members.

Table 1. Comparative Size of the Venetian Glass Bead Industry (Selected Years).

Year	Masters	Furnaces	Workers
1606	251 – 14H		
1674	11H		
1736		30	
1744		19	
1754		46	
1755		52	
1761	108	30	
1762	200	15	
1764		22	
1766	100	26	
1790s			600-1,000 L
1867		ca. 40	
1869		20	15000
1883			15000
1889			1,000 TD
1890			6000
1898		22	
1900			ca. 9,000
1917			ca. 3,000
1955			500 L

Legend: H = Head master; L = Lamp-workers; TD = Tube drawers.

Sources: Carroll (1917:18); Gasparetto (1958:201-202); *Harper's* (1889:262); Morazzoni (1953:29-33); Nesbitt (1879:652); Pasquato (1953:77); *Pottery Gazette* (1890); *Scientific American* (1883, 1900); Zanetti (1869:32).

The number of workers is harder to determine, and they weren't even counted for several centuries. These are probably the least accurate figures, but a decline between 1869 and 1917 is evident. 1900 and 1917 were calculated from the number of "men" and "families," respectively.

Historical events can explain some of the variations, especially steep drops. These include the 1718 Peace of Passarowitz when Venice lost much of its empire, Napoleon's 1797 Peace of Campoformino when she lost the rest, and the rise of Czech beads in the 1860s.

Another way to judge the size of the industry is by its output. The figures presented in Table 2 come from various sources. Where there is a range of years, the output is an annual average.

Table 2. Production (Export) of Venetian Glass Beads in Quintals (100 kg = 220 lbs.).

Years	Quintals
1764	10,400
1860-1905	23,500
1867	33,182
1868	36,621
1861-1871	33,182
1870	<20,000
1879-1883	25,000
1880	27,273
1885	<20,000
1890	<20,000
1938	7,680
1949	9,159
1954	7,619

Sources: *Encyclopaedia Britannica* (1875:460); Italian Institute for Foreign Trade (n.d.:161); Kidd (1979:67-68); Morazzoni (1953:63); *Scientific American* (1883).

Again, historical events hurt the industry: the growth of Bohemian beadmaking in the 1860s, a drop in demand for beaded dresses (*Scientific American* 1883), and World War II. Table 3 confirms the effects of the Second World War and shows how trading patterns changed during the first half of the 20th century.

The figures for 1938 and 1954 are remarkably close; the bulge in 1949 might represent pent-up post-war demand. The export patterns are quite different, however. India, by far the largest importer in 1938, saw more than an 85% drop by 1954, probably because of the rise of her (and Pakistan's) own beadmaking industries. Libya, Somalia, and especially Eritrea dropped considerably as they were no longer Italian colonies. The USA had the greatest increase, its imports growing 18-fold in 16 years. While the U.K., Belgium, Australia, the Congo, and Canada all bought more beads, Canada's imports increased 122-fold. South Africa and Portuguese South Africa (Angola and Mozambique) remained steady customers.

Despite a drop around 1866, the year the railroad reached Jablonec, the heart of Czech beadmaking, Venice recovered and the competition was actually good for her.

The mid to late 19th century saw new beadmaking firms, more inventions, and new glasses. At least some of these improvements were due to Bohemian competitive pressure.

One leader in this renaissance was Antonio Salviati (1816-1890), lawyer turned glass entrepreneur. Lorenzo Radi, his partner, also had his own company. The Giacomuzzis, especially Giovani, were famed for their glasses (Zanetti 2002). Giovan Battista was honored for improved lamp-work. He and his father Jacobo were known for fine mosaic work, ca. 1845-1865 (DeCarlo 1987:46). Jacobo died in an asylum in 1863, said to have been driven mad by the exactness of his craft (Carroll 1917:16).

Despite the revival, the next century proved to be hard. It was anticipated by the merger of 17 beadmakers in June 1898 into the Società Veneziana per la Industria della Conterie. Its name was twice altered, but it was always "the Conterie" for short. It dominated Venetian beads and was the only seed bead maker. Czech and Japanese competition forced its closure in 1992 (Karklins 1993b).

Early in the century hope abounded and the industry expanded internationally. Venetian beadmakers set up around Lyon to make beads for France and her colonies. During WWI, the Conterie offices were moved to Pisa and beads were shipped from Oporto, Portugal. A significant acquisition in 1920 was a large German and Bohemian concern, A. Sachse & Co. (Pasquato 1953:78-90). Around the 1920s the Conterie bought tube-drawing machines from the Libby Glass Co. of Toledo, Ohio, improving their production of seed beads.

Nevertheless, the Great Depression, being on the losing side in WWII, the rising popularity of plastic beads, intense competition from other beadmakers, and the attention newly independent African and Asian nations now directed toward problems of construction all took their toll. Venetian beads are not dead, but the Mother of Modern Beads is having an increasingly hard time making a living as a beadmaker.

PART II: VENETIAN BEADS

Venice was the leading glass beadmaker of Europe for five centuries and an understanding of modern beads begins with her products. We can assign dates for most of her important bead types, at least tentatively (Table 4). The data for a chronology comes from several sources, each with its own limitations. These sources are:

1. Historical references to beadmaking or the trade. To rely on statements about the origin of beads we must consider their credibility. When Abbot Zanetti, for example, talks about changes he witnessed we can believe him, but others may or may not have been so well informed.

2. Bead sample cards have the advantage of presenting the beads for study. Unfortunately, few are dated. Some were made by or for dealers and have beads from different sources.

Table 3. Export of Venetian Beads, 1938-1954, in Hundreds of Kilograms.

Importer	1938	1949	1954	Rank 1938	Rank 1954
India	2,821	829	413	1	5
Pakistan	with India	127	4		16
India/Pakistan Total	2,821	956	417	1	5
South Africa	1,186	2,251	1,648	2	2
Angola/Mozambique	1,053	509	973	3	4
France	1,005	550	253	4	7
Eritrea	638	39	12	5	15
British West Africa	301	1,641	1,137	6	3
Egypt	172	538	207	7	9
British East Africa	133	1,277	312	8	6
Turkey	103	340	193	9	10
United States	93	197	1,668	10	1
Somalia	52	6	1	11	17
United Kingdom	46	183	247	12	8
Libya	34	--	17	13	13
Belgium	25	32	135	14	12
Belgian Congo	11	548	155	15	11
Australia	6	83	122	16	13
Canada	1	9	122	17	13
TOTALS	7,680	9,159	7,619		

Source: Italian Institute for Foreign Trade (n.d.:16).

Others have beads to show what could be made if a demand for their revival arose. The Center for Bead Research's own large collection (though few are Venetian) and research into other collections has proven invaluable.

3. Archaeological evidence is helpful, especially from American sites and increasingly elsewhere. Again, caution is necessary. A bead from a dated locale may have been used then but at other times as well. Heirlooms may be lost long after production stopped. Small objects such as beads migrate upwards or downwards in soil, throwing off dates. Surface finds are often misleading, sometimes wildly so. The date of a bead from a single site is far less secure than many from several sites.

The evidence here is divided into centuries, an arbitrary but useful distinction. A bead is discussed in detail when first encountered and its range of dates noted. If it continues unaltered, no more notice of it will be taken. Plain, monochrome beads are the most common at all times and these are rarely distinguished here. Also keep in mind that during the 17th century, Holland was a major beadmaker and her output was similar to that of Venice.

The 16th Century: Start with the Best Beads

Although the first Venetian beads were furnace-wound, few, if any, were traded abroad. By the time Columbus met "Indians" and Vasco de Gama encountered real Indians, Venetian beadmakers were building an early industrial system to turn out large quantities of beads to meet the growing demand of the widened world Europe was discovering. The earliest of these beads, at least in the American trade, were *Paternostri* products and many were quite complex.

The priority of drawn trade beads over wound ones is seen in the Seneca sequence of western New York, where wound beads hardly appear until 1687-1710 (Wray 1983:45) and along the Susquehanna River in Pennsylvania at the end of the 1690-1750 period (Kent 1983:81). The same pattern appears in West Africa (Francis 1993:8). At Kilwa, Tanzania, in East Africa, wound beads were "extremely rare" until the 18th century (Chittick 1974:480), and earlier ones there may be European.

The most famous Venetian bead is the chevron (*rosetta* in Italian) (Kidd type IIIm) whose production started around

Table 4. Time Line for the Venetian Glass Bead Industry and its Products.

Venetian History	Venetian Beads
7th century – Torcello glass	
1296 – First recorded glass beads	
d. 1460 – Barovier; *cristallo*, *latticino*	
1480 – "Newly discovered"	1480 – 7-layered Chevrons – 1610
1486 – *Margaretari* and *Paternostri* founded	
1510 – Glass beads "born"	1520 – Nueva Cadiz – 1610
1528 – *Supialume* founded	1550 – Gooseberry – 1900
	1560 – Early blues – 1750
1576-1614 – Antonio Neri	*A speo method becomes very popular*
	1570 – Flush eyes – 1635
	1575 – Drawn with 3 sets of multiple stripes – 1620
	4 sets of stripes = 17th C.; wound with stripes = 19th C.
	1600 – 4/5-layered chevrons, green, *a speo*, striped, flattened
	1600 – Green hearts – 1836
1647 – *Supialume* on par with the other two guilds	1600 – Blue-white-blue and white-clear-white – 1690
	1600 – "Old Whites": clear over white – 1890
1677 – Miotti, aventurine	*17th century dominated by drawn monochromes*
1685 – *De Auro* gold ruby	*Seed beads, including charlottes, important trade items*
1718 – Venice loses much of her empire	1725 – Squiggle decoration – 1899+
	Lampworking grows in importance
1797 – Venice loses rest of empire	1750 – Barleycorns – 1840
1820s-1860s– Seed bead finishing mechanized	1820 – Goldstone decoration – present
	1830 – Wound white/yellow hearts – 1870?
	1839 – White hearts – present
1843 – Bussolin patents gas lamp for lampwinding	1840 – Microbeads – 1900
1845-1865 – Battista mosaics	*Differences in trading patterns:* *America – spiral designs, spots* *Africa – "eyes," yellow bases* *West Africa, Borneo – imitations*
1860s – Gablonz (Jablonec) at zenith	1860 – "New glass," combing – 1900
1860s – Molds introduced	1860 – Maccas, 2/3-cuts, iridizing/lustering
1910s – WWI	1900 – Bundled millefiories – 1920
1917 – Conterie founded	1920 – Molded millefiories – present
1920s – Drawing seed beads mechanized	1920 – "Bumpy yellows" – 1940
	1930 – Swirled glass – 1940
	1930 – Tight spirals –1940
1945 – Italy defeated in WW II	*Many lamp types until WW II*
1992 – Conterie closed	1992 – End of seed-bead making

1480. The earliest chevrons were the most complex, with seven layers of glass (usually from the inside out: bottle-green/white/blue/white/red/white/blue) and faceted ends to reveal the corrugated pattern. The molded "stars" of chevron beads have 9-18 points, with 12 the most common. Their terminal date has recently been adjusted forward, as several have been found at Jamestown from the 1607-1610 period (Francis 1996).

Seven-layered chevrons are widespread. They are found in Ghana (Francis 1993:8) and elsewhere in Africa and in Indonesia (Adhyatman and Arafin 1993:93-94). For Spanish contact sites *see* Smith and Good (1982) and Smith (1983); for Mexico, *see* Francis (1987). For other sites in the U.S. consult the papers in Hayes (1983).

Often accompanying chevrons is the Nueva Cadiz bead, named for the site where it was discovered on Cubagua Island, Venezuela. These have three layers: usually a thick dark blue core, a thin white middle layer, and a blue exterior. They are square in section. Some are twisted (Kidd type IIIc'); non-twisted ones are called "Plain" (Kidd IIIc). There is a smaller, shorter variety with a dark blue exterior, never twisted. A few other colors, including 17th-century red varieties, are also known.[4]

There has been debate about their origin, but I believe Venice is most likely, considering their distribution. The terminal date was once thought to be about 1575, but they are found into the 17th century. Old chevrons and Nueva Cadiz beads are often found together and they were once thought to be markers of Spanish exploration, but this can no longer be assumed.

The initial report on Nueva Cadiz beads was by Fairbanks (1968), based on John Goggin's (n.d.) unpublished manuscript. For comparative material from Spanish sites, *see* Smith and Good (1982) and Smith (1983). For eastern North America, *see* Wray (1983) and Kenyon and Kenyon (1983).

The notion that Nueva Cadiz beads were Spanish was Goggin's (n.d.:7-9), who argued that Spain rarely imported goods, but a study of imports to America between 1534 and 1586 shows otherwise (Torre Revello 1943). Their presence where the Spanish had no contact (*see* below) also argues against it. Only a single example – out of a total of 70,000 beads – was encountered at the 17th-century Spanish mission site on St. Catherines Island, Georgia (Blair et al. 2009:66).

Chevrons and Nueva Cadiz beads often appear together in the Americas and the Philippines (Francis 1989a:15). They are, however, also found where the Spanish had no contact; e.g., Egypt (Francis 1995:10), Jamestown (Francis 1996), and Madagascar (Thierry 1961:117-118; Vernier and Millot 1971:157, Figs. 160-162). Venice monopolized Euro-Egyptian trade and Spain was the enemy at Jamestown. In Madagascar, the beads were in a Muslim cemetery and probably came via Egypt, or the Portuguese could have brought them.

An early terminal date for Nueva Cadiz was argued by Fairbanks (1968), Deagan (1987:163), and Smith et al. (1994:41), but their appearance at Jamestown (Francis 1996) and Ontario sites (Kenyon and Kenyon 1983) rules that out.

In mid-century, another fancy bead appeared that grew very important in world trade. The "gooseberry bead" (Kidd variety IIb18) was not named by collectors, but is recorded as early as 1704 (Barbot 1732:404). It resembles the fruit, and the histories of the bead and the fruit eerily parallel each other. It was the premiere bead in the slave trade (Francis 1994).

Gooseberries are made from two renowned Venetian glasses: clear *cristallo* and milky white *lattimo*. Angelo Barovier (1405-1560) invented these glasses, and it is possible (but not confirmed) that his heirs made the beads. The body is clear and the lines are *enclosed within* the body, not laid on the surface.[5] Later examples used lead glass. The *cristallo* was clarified with manganese that solarizes and turns violet, leading some to classify them as another variety. The number of lines varies from 8 to 18, with 12, 14, and 15 being the most common. There are both round and ellipsoidal examples. They continued into the early 20th century.

A full discussion of gooseberries is provided in Francis (1994) supplanted by (Blair et al. 2009:69-70). In America, they are in the Northeast in the 16th century, but thereafter in the South and along the lower Mississippi (Brain 1979:106, 124). They are at Ayawaso, Ghana, with a terminal date of 1680 (Yaw Bredwa-Mensah 1990: pers. comm.) and Kilwa, Tanzania, in the 16th and 17th centuries (Chittick 1974:401). The last recorded date is on a Conterie sample card of 1909 (Harter 1981:12, 1992:10). Smith (1983:150) suggests that ellipsoidal ones are early and round ones popular after 1650. Round ones are, however, known at several early 16th-century sites.

A distinctive bead is called "flush eye" (Kidd type IVg) by American archaeologists. It is rounded or elongated, finished *a speo* and decorated with three or four mosaic chips. They had a short life span in the last quarter of the 16th and first quarter of the 17th centuries. They are found in the Seneca sequence, 1570-1635 (Wray 1983:42); at Susquehanna sites, 1575-1600 (Kent 1983:81); at St. Catherines, Georgia (Blair et al. 2009:68-69); and at Ladoku, Ghana, with no precise date.

At many American sites, the most common bead is a light blue monochrome bead finished *a speo*, with striations along its surface (Kidd IIa40). At least five different names have been attached to this bead, but they are usually called "early blues" in the northeast and "Ichtucknee blue" in the southeast. There is also a black variety. They are found in Africa, but don't seem to have made it into Asia. They date from 1560 to 1750. Those of the 15th century are darker than 16th-century ones and had less calcium, tending to disintegrate.

They are found on Seneca sites, 1560-1710 (Wray 1983:42-43); in Virginia, 1683-1720 (Miller et al. 1983:137); Ontario (Kenyon and Kenyon 1982:60); the Southeast (Smith 1983:150); and at the 18th-century Guebert site (Good 1972:117). It is by far the most common bead at 17th-century St. Catherines (Blair et al. 2009:75-80)[6] and found at Ladoku, Ghana, with no precise date. A chemical study was undertaken by Hancock, Chafe, and Kenyon (1994).

The 17th Century: The *Paternostri* Still in Charge

Many bead types from the previous century continue into the 17th, but there is a tendency for them to be less fancy. This is particularly noticeable with the chevrons. They have fewer layers (often four or five) and the ends are ground round or finished *a speo*. New color combinations appear, green often replacing blue. Some have four layers of clear, red, and white with red, blue, and/or green stripes on the white, the whole covered with clear glass (some are Dutch products). A flattened white-striped chevron finished *a speo* appears.

Striped chevrons with clear outer layers are known from: West Africa, 1640-1700 (Lamb and York 1972:111); Ayawaso, Ghana, terminal date 1690; Seneca sites, 1590-1615 (Wray 1983:43); Oneida sites (Pratt 1961:8-9); Ft. Orange, New York (Huey 1983:96); and Burr's Hill, Rhode Island, 17th Century (Gibson 1980:126). Green chevrons: Susquehanna sites, 1575-1600, 1690-1759 (Kent 1983:81); and Ft. Jesus, East Africa, early 17th-19th centuries (Kirkman 1974:145). Flattened: 1610-1635 (Wray 1983:44). Five layers: 1595-1635 (Wray 1983:43). Four layers: Cameron site, NY, 1570-1595 (Bennett 1983:52); Virginia, 1638-1660 (Miller et al. 1983:135); and Burr's Hill, 17th century (Gibson 1980:126).

Multiple glass layers were popular. The solid-red bead favored in the Northeast (sometimes with a clear coat and sometimes striped) was replaced by one with a green (or other color) core (Kidd IIIa1-5). Blue-white-blue was popular (IVa19). White beads were actually either white-clear-white or clear-over-white (I call them "old whites"). Seed beads with green or blue glass between two clear layers were present at St. Catherines (Blair et al. 2009:245).

Brain's compilation of the red-on-green beads (green hearts) extends from 1600 to 1836 (1979:106). In Africa they appear as late as 1870 (Schofield 1945:20). Blue-white-blue beads: Susquehanna sites, 1575-1630 (Kent 1983:60); Spanish sites, 1565-1630 (Smith 1983:155); Ft. Orange, 1585-1624 (Huey 1983:102-104); and Ayawaso, Ghana, terminal date 1690. White-clear-white: New York, 1595-1635 (Bennett 1983:52); and Virginia, 1660-1680 (Miller et al. 1983:133). Clear-over-white: Seneca sites, 1590-1635 (Wray 1983); Trudeau site, Louisiana, 1600-1890, but rare after 1870 (Brain 1979:105-106); and common in East Africa until 1830, where archaeologists call them "crackled white" because the surface often exhibits cracks (David Killick 1989: pers. comm.).

Longitudinal stripes are widespread. Common combinations are a dark reddish-brown body with three sets of three thin white stripes ("root beer" beads; IIb74) and a blue body with three sets of white/red/white stripes (IIbb27). A white bead with three groups of three thin, often spiraled, stripes (IIb'2) appears, but is more popular in the following century.

These patterns evolved through time. They began with three sets of stripes on a drawn bead, turning to four sets of stripes on a drawn bead, and then lamp-wound beads with varying numbers of stripes.

Root beer beads: Seneca sites, 1590-1615 (Wray 1983:42). White with blue stripes: Oneida sites, 1595-1614 (Pratt 1961:7). Blue with three stripes: Susquehanna sites, 1575-1600 (Kent 1983:80); Ft. Orange, 1624-1676 (Huey 1983: 88). Blue with four stripes: Dawu, Ghana, 1600-1840 (Shaw 1961:72); these were also cut thin and reheated in West Africa. Blue-on-white: Ontario, early 17th century (Kenyon and Kenyon 1983:66), but Brain (1979:105) lists them from 1699-1833.

Finally, the 17th century saw the introduction of seed beads in large numbers in the American trade. They had been in production a century or so before they came to be popular as trade items. Most were monochrome, though multiple layers were also common. "Charlottes" (faceted against a wheel) also appeared.

Early seed beads are present in eastern New York (Bennett 1983:53; Pratt 1961:6), but are rare in the Seneca territory before 1710 (Wray 1983:47). They are rare in Peru and Belize before the 17th century (Smith et al. 1994:39). They are common in the early Alaska trade, 1740-1800

(Francis 1989b; 1994:287). In the Great Plains, they appear to have been introduced in 1843 (Wildschut and Ewers 1959:49) or 1840 (Hail 1983:51). Charlottes are in a burial at Tipu, Belize (Smith et al. 1994:Pl. IVA), dated 1540-1630, but probably post 1575. They are also at 17th-century St. Catherines (Blair et al. 2009).

The 18th Century: Changes Come

A significant change occurred in the 18th century, though it began slowly. Wound beads replaced large drawn ones. Drawn beads remained numerically dominant, but most new bead types were wound.

A good example of this is the mid-century (1731-1764) "Tunica Treasure" of the Trudeau site in Louisiana. It consists of artifacts dug up by an amateur, then studied by Jeffrey Brain (1979). We are fortunate to have Brain's work on this material, but unhappily can never place the material in proper context to learn how the Tunica used the beads and other recovered goods.

Of 181,200 beads, 97.5% were drawn. No less than 61% were "old whites" or similar whites. With opaque turquoise blue, they make up 77.9% of the beads. While plain drawn beads still predominated numerically (52 varieties), there were already 49 wound ones.

This is the case in most parts of America, but not universally so. Deagan (1987:178) examined beads from three 18th-century Spanish contact sites in the Southeast, where 80.6% were wound beads.

This is also the time when distinguishable wound Dutch beads appear. At least it is widely believed that mulberry and twisted cubes are Dutch. Some others may be as well; e.g., large oblates, ellipsoids, and "pigeon eggs." Black beads with white wavy lines that meet at their apices may also be Dutch.

The drawn beads are not much different from those of the last century: monochromes, old whites, green hearts, and beads with three, often twisted, stripes. A new drawn type, at least in Spanish areas, is the bugle seed bead (Deagan 1987:179-180; Watt and Merony 1937:55).

Most wound beads are also plain, with shades of blue and white being popular. Large round, barrel, and ellipsoidal (pigeon egg) beads are in demand. Of the plain wound beads, the most popular are "barleycorns." The name is not from its shape. Its outline is similar to the grain, but it lacks the characteristic long side groove. Rather, its name derives from an old unit of measurement: three barleycorns made an inch (2.54 cm). Their average length is ca. 8 mm, so three usually do make an inch. Barleycorns are usually white or black; an appealing green-blue shade is rarer. The white ones at least are of lead glass. They range from about 1700 to 1836 and are the most common wound beads on many sites: Trudeau (Brain 1979:109, WID1); Guebert (Good 1972: 111, #39); and Ft. Union (DeVore 1992:35, T4VA). The Ft. Union trading post operated between 1829 and 1867, so the beads may have lasted a little later than 1836. On the other hand, white and colored barleycorns are on American Fur Co. trading lists in 1834 and 1836, but not in 1837 nor 1840 (nor in a list for 1835) (Spector 1976:19). Lead was detected by Davison and Harris (1974:210, #101). A white example donated to the Center for Bead Research by Marvin Smith has a specific gravity of 3.12, also indicating lead.

Decorated wound beads are rare in the 18th century. Some have simple stripes. A single light blue ellipsoid with a spiraling yellow stripe and another spiraling multi-colored twisted cane (color not reported) from Tampa, Florida, is recorded from this time (Piper and Piper 1982:218).

The first distinctive lamp-wound decoration (though still rare) is the "squiggle," made by combing through a series of parallel lines. Several combinations of colors and bead shapes (round, ellipsoidal, and drop-shaped) appear in the 18th century. Squiggle decoration – the term was coined by Kelly and Johnson (1979); *see also* Francis (1980) – was used into the 20th century.

The earliest report (1725, if that is correct) of squiggle decoration is from the Tallapoosa Valley (Burke 1936). There are three different types at the Trudeau site, dated 1731-1764 (Brain 1979:113, WIIIB1-3). There are two types at Guevavi, Arizona, pre-1773. In the Wichita site sequence, one is dated "post-1780" (Harris and Harris 1967: #124). Another is on an 1899 Venetian sample card (Francis 1980).

The 19th Century: Change Comes

The 19th century is significant for our story. Science begins to blossom and new glasses and beadmaking techniques are introduced. Venice got its first real competition from Bohemia. Our sources of information also begin to shift from an almost exclusive emphasis on archaeological data to adding a new form of evidence: bead sample cards.

Perhaps the oldest sample cards are those of the Levin company, London, founded in 1830, which donated some cards to the British Museum in 1863 (Karklins 1982, 2004). The Slade sample book, in the same museum, was accessioned in 1896, but acquired earlier from a dealer in India (Francis 1984; Karklins 1982; Slade 1896:163).

The Dan Frost Cards are from the Stephan A. Frost & Son Co. of New York, trading from 1848 to 1904 (Johnson 1977; Liu 1983). The J.F. Sick & Company cards (Sick-L) at the University of Ghana, Legon, are mostly from the 1930s (Francis 1993:8-9). These sets belonged to dealers on four continents and include beads from various places.

Cards in the Museum of Glass in Murano represent output by Venetian producers. There are at least nine sets of these and in some cases the beads can be matched with those from other makers. The Bead Museum in Prescott, Arizona, has a sample book and several folders of the Giacomuzzi brothers, dated between 1852 and 1870 (Francis 1988b; Karklins 2002). A card by Weberbeck in the Museum of Glass and Jewelry in Jablonec dates between 1871 and 1898. Two Frances Greil cards in the Peabody Museum, Harvard, date to ca. 1870-1898. The J.F. Sick & Co. cards in the Royal Tropical Museum in Amsterdam (Sick-A), which are all Venetian, are from 1910 to 1948+ (van Brakel 2007). A catalogue from Allan's Bead Store in Boston (Allen n.d.; Liu 1975) dates between 1920 and 1930 (Francis 1988c).

Bead styles did not change immediately with the turn of the century. American Fur Company trading lists between 1834 and 1840 show only monochromes (including barleycorns) except for two entries of unspecified "Fancy" and one of "Blue & White" beads (Spector 1976:19).

Two glass types that had been manufactured in Europe for a long time finally made their way into Venetian beads. The first recorded bead with a goldstone (aventurine) decoration appeared between 1820 and 1836, though the glass was invented 150 years earlier. Ruby glass made with gold had been around just as long, but few beads were made from it and the earliest ones may not be Venetian. The Venetians introduced it in spectacular style in the form of white hearts starting about 1830. At first there were wound and drawn ones with ivory cores and wound ones with yellow cores. Yellow cores disappeared, though I have no firm date as to when. Around 1860, the ivory white turned to a pure white (as with white beads). By the 1890s, selenium was used in place of gold; both seem to be used today. Drawn white hearts were also made in Bohemia and France and wound ones in India.

The earliest bead with goldstone known to me is from the Wichita site sequence (Harris and Harris 1967: #163). It becomes common on post-1860 sample cards. An early ruby-glass bead is one of the squiggle beads from Guevavi (Robinson 1976:164). Deagan (1979:179) mentions a few other red beads without being specific.

Three wound and 17 drawn white hearts were found at the Guebert site, along with 100 green hearts (Good 1972:123). Though basically a 17th-century site, it was still occupied (by one old man) in 1833 (Good 1972:62). White hearts postdate 1820 at the Wichita sites (Harris and Harris 1967:153) and at Ft. Laramie, Wyoming, 1834-1875 (Murray 1964:31). They are said to have come into the African trade about 1830 (Schofield 1945:19). Wound white hearts are on the Giacomuzzi cards, 1852-1870. The dates for ivory and white cores and selenium are in Sprague (1985:94).

I earlier assumed that there was a sharp change in styles from the early to the late 19th century (e.g., Francis 1988a:26-28). That assessment needs modification. Many beads classified as "early" were not only made before the changes of the 1860s, but also long thereafter. I now stress the differences in beads produced for different markets.

In the trade with Native Americans, beads from 1830 to 1870 are mostly monochromes and white (or yellow) hearts, with a liberal sprinkling of Czech beads and some blown German ones. Fancy types include those with a stripe (or two jointly twisted colors) spiraling around them. Dots or eyes are popular, often in conjunction with wavy lines. The squiggle persists. "Maccas" – black, drawn hexagonal tubes – appear in 1860 (Francis 1997:10-12).

Seed beads are refined, though many of the innovations are Bohemian. Very tiny "microbeads" are present from ca. 1840 to the end of the century, based on Harris and Harris (1967) and an 1899 Conterie card in the Scarpa collection, Venice. Two-cuts, Ceylon pearls, iridized, lustered, and lined beads debut toward the end of the 19th century (Francis 1997:10).

For accounts of these beads, *see* the archaeological reports on Ft. Laramie, 1849-1869 (Murray 1964); the Wichita sites, 1820-1850 (Harris and Harris 1967); Washoe Co., Nevada, 1820-1890 (Witthoft 1972); Old Sacramento, 1849-1900 (Motz and Schultz 1980); Ft. Vancouver, 1829-1860 (Ross 1990); and Ft. Union, 1829-1865 (De Vore 1992; Ross 2000).

The beads traded into Africa are quite different. While some of those mentioned above went to Africa (especially the universal black round bead with white dots, often with blue or pink centers), the most important types are quite distinctive. The dominate color is a dull yellow or ochre and the beads are in the form of standard and short bicones and cylinders, often decorated with multiple stripes and eye-like designs. Green, brick red, and black are also common colors. The yellow, no doubt, is a substitute for gold and a standout against dark skin. This is the group that I previously called "early 19th century." They are, however, very much present (with an occasional green heart) in the Sick-A collection, dating to 1910-1948+ (van Brakel 2007). J.F. Sick & Co. traded into Africa.

The Levin, Greil, and older cards in the Murano Museum of Glass exhibit these beads. For West Africa, ca. 1750-1850, *see* Lamb and York (1972:110-112); for East Africa ca. 1857-1895, *see* Karklins (1992). An important collection from an apparent bead dealer's house at El Mina, Ghana, is at the University of Ghana in Legon. The village was torched by the British in 1873, and the beads are a "snapshot" of what was being traded then (DeCorse 1989; Francis 1993:8). In addition to the Sick-A cards, a Conterie card at the University of Florida, Gainesville, has similar beads. Its colophon is 1948 and I earlier cited it as an example of using old stock (1988a:8), but now think differently.

Other parts of the world favored other beads. In Indonesia, especially among the bead lovers of Borneo, some beads are very similar to those in the African trade, while others are not (Adhyatman and Arafin 1993). The picture is complicated not only by the presence of many Chinese beads but also because modern dealers in Southeast Asia import beads from Africa. In Iran, about the only Venetian beads are those of the late 19th century (personal observation).

While it has been recognized that Bohemia made many beads to imitate beads valued in various places, the role of Venice in this business has gone unappreciated. While they did not do it as often, they also imitated other beads, including the West African *Bodom* and *Akuso* (*see* Francis [1993:12; Pl. 4B] for imitations) and the *Luket Sekala* and *Kelem Bela* of Borneo (Munan-Oettli 1988). The imitation of *Luket Sekala* was documented early in this century (Furness 1902:118). The imitation *Kelem Bela* is on a Greil card.

To this repertoire, new types of beads were added in the 1860s. They resulted from the changes in the industry and were spearheaded by the leaders of those changes, as previously. The glass was purer, shinier, and more brilliant. Black and other dark colors were common. Designs included rosettes and other floral motifs and raised colored dots. Combing, perhaps because of the success of the squiggle, was very popular, leading to decorations that collectors call feathers and ogees, arabesques and wedding-cakes. Goldstone decoration was widely used, the varieties almost endless. In addition to Iran, these beads were favored by women in Europe, America, Egypt, and other places. Some made it into West Africa, but they are relatively scarce there.

These beads are found in the Slade, Giacomuzzi, later Murano Museum of Glass, and Dan Frost books and cards (Liu 1983).

The 20th Century: Slow Decline

The 20th century was not kind to Venetian beadmaking due to various factors discussed previously. The weakness resulted in debased styles and a loss of the vibrancy of the 19th century. Only one new bead was a real success: the millefiori.[7] No one knows when the first modern ones were made, but it was probably in the late 19th century, perhaps by small-scale beadmakers. The vast majority are 20th-century products. Those made before WW I incorporated mosaics constructed by bundling and fusing canes that resolve into tiny dots under a lens when drawn out. Later canes were nearly all molded. The distinction between the two was presented in my review (Francis 1991b:91) of Picard and Picard (1991). They later reported that bundled canes were made by cottage industries and molded ones by the larger factories (Picard and Picard 1993).

Technically, Venice could have made millefiori beads as soon as the *Supialume* appeared; cane molding is essentially the same as that used for chevron production or the decorative elements applied to flush eye beads, etc. Perhaps they didn't because of the domination of large manufacturers.

The only excavated millefiori is from Dawu, Ghana, and dates to the late 19th or early 20th century (Shaw 1961:73). They are not on the Levin, Slade, or early Murano Museum of Glass books or cards. Their absence in the Giacomuzzi book and the Greil cards could simply mean that these companies did not make them. They are on the Dan Frost, Sick-A, and Sick-L cards, and in the Allen catalogue. For later examples, *see* Harris (1984).

The other beads weren't much to brag about. The complex lamp beads had virtually disappeared; no more floral sprays, squiggles, or other fancy elements that marked the late 19th century. The lamp beads that were made were done with less skill and were not as attractive. Eye beads, combed feather designs, spiral stripes, and some of the types for the African trade continued at least until WW II. After that, even the millefiori lost much of its charm, made with only a few mosaic chips.

There were a few new types. One was round with raised dots in several color combinations, the most common being the "bumpy yellow." Another was covered with a spiral thread of twisted red, white, and blue. A third was made from swirled glass forming both the body and decorations in several color schemes, most conspicuously red and yellow. These new types appear on the Dan Frost, Sick-A, and Sick-L cards, two Conterie cards in the Scarpa collection dated 1925, in the Allen catalogue, Harris (1984), and in the collections of the Center for Bead Research with known dates of purchase.

CONCLUSION

The decline in the quality and vibrancy of Venetian beads is understandable given the history of Italy and Venetian beadmaking. Indeed, the spectrum of Venetian beads mirrors that history. The 16th century was one of great excitement as an emerging industry served Europe which was discovering the rest of the world. Much of the enthusiasm was gone by the 17th century, as gifting changed to trading and beads became a commodity. The 18th century saw the rise of the *Supialume* and decline of the *Paternostri*. The late 19th century saw a rebirth spurred by science and competition. War, the Depression, and decolonization marked the 20th century. At the start of the 21st century, Italy is again rich and powerful, but no one can pay the wages required to make fine beads once again.

I have often called attention to how beads reflect the world in which they are wrought. Here is yet another example from the pages of the history of one of the world's outstanding beadmakers.

ENDNOTES

1. Editor's note: This article first appeared in two parts in the Center for Bead Research's journal, *The Margaretologist*, Vol. 11, No. 2 (1998) and Vol. 12, No. 1 (1999). It is based on Peter's two earlier publications on the subject, *The Story of Venetian Beads* (1979) and *The Glass Trade Beads of Europe* (1988) with new research incorporated where appropriate. The text remains essentially unaltered except for light to moderate editing to remove typos and clarify some statements. Several recent publications that have relevance to a specific topic being discussed have been cited in text and added to the References Cited section by the editor to bring the text more up to date. The article is being reprinted here as it remains one of the best summaries of the Venetian bead industry and its products, and *The Margaretologist* is, unfortunately, a very difficult publication to access by most interested parties. Permission to publish this article was kindly provided by The Bead Museum in Prescott, Arizona, which now holds the copyright to the publications of Peter Francis, Jr.

2. Editor's note: It is highly unlikely that the tubes were ever longer than about 45 m (150 ft.)(Carroll 2004:30).

3. Carroll asserts the primacy of Graziati in 1860 and said that the tubes were subjected to "enough pressure to give them facets." Neuwirth pictures Austrian patents for molds by the other two, dated 1864 and 1867, respectively.

4. These must not be confused with similar l9th-century beads. Early ones have diameters (corner-to-corner) of ca. 7 mm, the later ones of 13+ mm.

5. A well-respected researcher, looking at weathered specimens, mistook the stripes for enclosed bubbles. Several other writers blindly accepted this, though he has since corrected his error.

6. Editor's note: Since writing this, Francis has proposed that these distinctive beads, which he refers to as "bubble-glass beads" due the presence of numerous tiny bubbles, were actually produced in France (Blair et al. 2009:75-80). Whether this is, in fact, the case remains to be seen.

7. Many are more properly called mosaic beads. They are also known as Goulimine beads, after the town in Morocco where American dealers bought them in the 1960s and 70s before they discovered they were coming from West Africa.

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Peter Francis, Jr.

BOOK REVIEWS

The Beads of St. Catherines Island.

Elliot H. Blair, Lorann S.A. Pendleton, and Peter Francis, Jr. *American Museum of Natural History Anthropological Papers*, Number 89. Anthropology Division, American Museum of Natural History, Central Park West at 79th Street, New York, NY 10024-5192. 2009. 312 pp., 17 B&W figs., 15 color figs., 12 color plates. ISSN 0065-9452. $40.00 (paper cover).

This volume has been long-awaited by researchers working in the southeastern United States, particularly those investigating late 16th- and 17th-century Spanish Franciscan missions among various indigenous groups. In itself, this volume (fifth in a series concerning the archaeology of St. Catherines Island, Georgia) is a helpful blend of historical bead research (the late Peter Francis, Jr.) and archaeological treatment (Elliot H. Blair, Lorann S.A. Pendleton, David Hurst Thomas, and Eric Powell). A contribution by Thomas (Chapter 3) sets the bead study within the larger context of long-term archaeological investigations on St. Catherines Island. It specifically focuses on the site identified as Mission Santa Catalina de Guale, a mission to a Muskhogean indigenous group, the Guales, native to the Georgia coast. St. Catherines Island is located in the middle Georgia coast, within the area called the Georgia Bight, an area stretching from southern South Carolina to northeast Florida.

Native peoples along the coasts were the first to have episodic, then sustained contact with Europeans. Between the late 15th century and the late 16th century, it is possible that undocumented contacts between Spanish and French explorers, traders, and slave raiders occurred. After 1565 and the establishment of St. Augustine, Jesuit missioners operated along the lower Atlantic coast. Thus the origin of trade or gift items such as beads cannot be ascribed solely to Spanish activities. The missions of *La Florida* were the earliest Franciscan missions in North America. Although other missions systems are better known, such as those of California and Texas, the Franciscan mission effort began in 1573 and ended after two hundred years of escalating international conflict. Indigenous groups brought into this system experienced extreme cultural pressures, waves of epidemics and population decline, and a position of diminished power in controlling their own affairs. Over one hundred installations related to mission activities are known from documentary accounts, but archaeological sites that can be confidently identified as specific missions are relatively few.

Mission Santa Catalina de Guale was established perhaps as early as 1587, more confidently by 1595. It was destroyed in 1597, in the Guale Rebellion, re-established in 1604, and abandoned after 1680. The bead assemblage – nearly 70,000 specimens – is drawn largely from excavations within the footprints of two successive mission churches. In the missions of Spanish Florida, burial of members of the congregations was made beneath the church floors. On St. Catherines Island, where two churches are present, it is possible to discriminate earlier burials from later burials in some cases. Thus, this study may offer some indication of temporal placement for particular bead types. In 1972, Mary Elizabeth Good noted, "Instead of the beads dating the site, quite often the site dates the beads, especially when confirming historical documentation is available" (Good 1972:93). In this case, this relatively well-documented mission site provides an opportunity to characterize early to middle Mission-period bead assemblages.

It is clear that bead assemblages from late 16th-century mission sites differ from those of the early to mid-16th-century entradas. The expeditions of Allyón (1526), Narváez (1528), De Soto (1539-1543), and contacts with French explorers and colonists (after 1562) brought a variety of glass beads into circulation in the lower Southeast during the 16th century. Most typical of the earliest contacts are the seven-layered chevron beads and various types and sizes of Nueva Cadiz beads. The St. Catherines assemblage contains a single small Nueva Cadiz bead and three halved five-layer chevron beads.

The Beads of St. Catherines Island is a remarkable monograph, combining as it does archaeological data and historical and cultural research. It is divided into four parts, each with a number of chapters addressing various topics. A "Personal Preface" by Pendleton and Blair provides an explicit description of the bead assemblage, the archaeological contexts, analysis methodology, problems encountered, and how those problems were resolved. Part I (Beads in Society) sets the stage for what follows by presenting an introduction to bead research (Chapter 1, Pendleton and

Francis). Chapter 2 (Francis) introduces the reader to the significance of beads in Spanish-colonial activities.

Part II (The St. Catherines Island Bead Assemblage) presents the archaeological collections. Bead types and varieties recovered from the site are described in Chapter 4 (Blair, Pendleton, and Powell) and each type is illustrated in twelve appended color plates. The authors consider drawn beads, the majority of the collection, as well as wound, molded, segmented, and blown glass beads. They also include non-glass beads: amber, metal, stone, jet, and crystal. This section is particularly helpful to archaeological researchers trying to identify bead types and organize bead data. The authors use the simple/compound/complex approach in describing 123 different types of glass beads. They provide standardized color ranges and also include Kidd and Kidd descriptors.

Part III (Bead Manufacture and Origins) is largely the work of Peter Francis and is the culmination of research and writing over many years. This section includes historical information detailing the organization, methodology, and techniques of bead manufacture. These chapters are at once a primer on bead manufacture, finishing techniques, and national origin amassed over a lifetime of travel and inquiry. Individual chapters consider Venice (Chapters 6 and 7), the Netherlands and France (Chapter 8), China (Chapter 9), Spain (Chapter 10), and Bohemia (Chapter 11). Many of these chapters are drawn from Francis' publications that have appeared in limited circulation from his Center for Bead Research. Brought together and updated, these chapters help the reader understand the regulations, politics, and distribution of bead production. It seems clear from these chapters that the bead assemblages found in Mission-period sites were drawn from many more national sources than originally suspected.

Part IV (Conclusions) returns to the archaeological assemblage. Blair traces the indigenous development of bead manufacture in pre-Mission-period times (ca. 3000 B.C. to A.D. 1580) and then considers the Old World beads introduced during the Mission period. In this presentation, the specific contexts and their bead assemblages are developed. Blair discusses the temporally diagnostic beads – a group of seven bead types that appear to have dependable date ranges. He also considers the role of beads at Mission Santa Catalina de Guale from the perspective of economic, religious, and personal usage. He comments on the possibility of delimiting status from the presence of beads, the number, variety, and complexity of beads, and the location within the church of burials with beads. Concluding this part of the monograph, Peter Francis assesses the significance of the bead assemblage from St. Catherines Island in historical context.

For those of us who work with archaeological collections in the southeastern United States, the type/variety system has been a deeply ingrained tool for making sense of lithics and ceramics. Glass beads, however, have not proved readily adaptable to such a typological system. John M. Goggin, whose unpublished manuscript has guided many of us, made an early attempt to create a bead typology. My experience with Peter Francis, however, indicated that he was skeptical of archaeologists' grasp of bead terminology, origins, and technological complexity. He thought us naïve and unschooled in the lengthier research of bead scholarship. He was not particularly happy about our attempts at typology. Archaeologists will find that Francis had strong feelings about various names in common usage by archaeologists and that he has proposed other names, more consistent with bead scholarship or priority of usage. For example, Cornaline d'Aleppo (green heart), Seven Oaks Gilded Molded (Gilded Incised), Florida Cut Crystal (Cut Crystal), Ichetucknee Plain (Early Blue), and for simple medium-to-small drawn beads containing numerous, apparently intentional, bubbles (bubble-glass beads).

Several assumptions that archaeologists have maintained over the years have been explored, e.g., that Venice was the major source of beads in Spanish Florida and that these beads represent "rosary beads." Francis' research has indicated that France may be the source of many of the early drawn glass beads such as the Early Blue type and those that would be categorized as "bubble glass." He also suggests that the origin of cut-crystal, jet, and gilded-incised beads is most likely Spain. Although he had originally thought India to be the source of cut-crystal beads, he subsequently concluded that the poor quality of the crystal indicated a source other than India. The later five-layered chevrons most likely were made in the Netherlands. Although many of the 16th-century compound beads such as the seven-layered chevrons and Nueva Cadiz types are likely of Venetian origin, Francis believes that as beads became a critical component of exploration, trade, and colonization, other European countries became centers of bead production, eclipsing Venice's domination.

The careful excavation of beads in situ, as reported by Blair and Pendleton, indicates that there is little direct evidence of rosaries. Gilded-incised beads, often assumed to be rosary beads because of their greater value, were not found in arrangements that suggested a rosary. In fact, most of the beads recovered appeared to be items of personal adornment located around the neck, wrists, and ankles. Even seed beads may not be assumed to be for adorning clothing since most of them were found in relationship to human remains that suggested necklaces and bracelets.

The Beads of St. Catherines Island represents an ambitious undertaking. Given the sheer number of beads

in the assemblage, it has required considerable time to identify, measure, classify, and quantify the beads from various site contexts all the while maintaining provenience control. As Blair and Pendleton reveal in their preface, there were successes and there were changes in approach. This monograph succeeds because of the thorough consideration of the many archaeological and historical facets presented by such an assemblage of artifacts: context, origin, economic value, social usage, and personal meaning. I believe it will be much valued in the future as a resource and as a standard for presenting archaeological bead data.

The volume may be purchased in paper form or it can be downloaded as a free pdf file from the library website of the American Museum of Natural History at http://digitallibrary.amnh.org/dspace/handle/2246/5956.

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Editor's note: It should be pointed out that AMNH bead types 27-32 (pp. 39-40, 241-244) are not Kidd type If (tubular beads modified by grinding) but IIf (rounded beads modified by grinding).

Zulu Beadwork: Talk with Beads.

Hlengiwe Dube. Africa Direct, Inc., 2300 Krameria Street, Denver, CO 80207. 2009. 112 pp., 114 color figs. ISBN 978-0-9816267-0-3. $35.00 (paper cover).

The reputation of Hlengiwe Dube as an active collector of contemporary and early KwaZulu-Natal beadwork is well established in South Africa. This is her first book, published abroad as the result of losing a decade-long struggle to interest local publishers in the subject of beadwork, the primary means of aesthetic expression of southern African women. Publications on beadwork of the region are relatively sparse, and those that include indigenous knowledge systems and authentic voices are rare. The role of the American publisher, Africa Direct, must be acknowledged in validating the art of Zulu beadwork.

The significance of this small publication is that it is a unique narrative and an authentic voice of a contemporary observer, who skillfully negotiates both the traditionalist and the modern realms of KwaZulu-Natal culture. The meaning and symbolic use of materials, color, style, and form in beaded adornment has long been a subject of fascination for outsiders – from the earliest colonial records of 17th-century travellers at the Cape to later visitors to Port Natal (Durban).

Today, this fascination has been seized upon by the tourist industry resulting in the mass production and sale of "beaded love letters" with accompanying explanations of their meaning.

In reality, the majority of southern Africa's diverse population would not openly part with intensely private meanings of their beaded items of adornment, worn possibly as "love tokens" or to effect the prescribed treatment of a diviner or appease ancestral spirits. It is in this area that Hlengiwe's book is strongest, for the light it throws on the stylistic variations of beadwork design across space and through time in the locus of a Zulu-speaking community. Dube extends the legacy of her maternal grandmother, MaDlamini Tatata Dube, who was well known as a valuable source of knowledge to the founders of the African Art Centre in Durban. She was called upon in the 1970s, when Hlengi was a little girl, to provide both examples of her own work and background information on pieces she collected. Hlengi acted as an interpreter for her *Gogo* (grandmother) who could speak only isiZulu, and consequently her own vocation was born.

The meaning conveyed in northern Nguni beaded adornment continues to be complex and can be imagined as a visual language. Personal messages are expressed metaphorically through the use of color and design that change frequently with the whims of fashion, but remain within certain stylistic cannons that identify work from specific regions in KwaZulu-Natal, such as Msinga or Eshowe. This is the central concern of Dube's book and she expands on this theme in twelve chapters and it is further emphasized by the subtitle she has chosen, *Talk with Beads*.

Given the significance of *Zulu Beadwork: Talk with Beads*, and the fact that there is a paucity of information from

primary sources on the subject matter, it is disappointing that the publisher, Africa Direct, was unable to budget for professional photography or rigorous editing. Little inaccuracies (such as using the now obsolete *Northern Transvaal* instead of *Limpopo Province* on p. 20 or the spelling of *intsimbi* [not insimbi] on p. 53) and the disregard for any coherence in the captions and attributions of the illustrations diminish the success of the publication. It is hoped that future editions will have corrected these errors, thus giving *Zulu Beadwork: Talk with Beads* the respectful attention it deserves.

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Straits Chinese Beadwork and Embroidery: A Collector's Guide.

Ho Wing Meng. Times Books International, Times Centre, 1 New Industrial Road, Singapore 536196. 2003. 176 pp., 88 color figs., 9 B&W figs., glossary, index. ISBN: 981-232-480-1. $38.50 (hard cover).

Straits Chinese Beadwork and Embroidery: A Collector's Guide was first published in 1987, and reprinted in its hard-cover format in 2003 and 2006. In 2008 it was published in a paperback version by Marshall Cavendish (ISBN: 9789812616647). As neither the 2006 nor 2008 editions could be procured, this review is based on the 2003 printing.

This volume is one of a set of four books on Straits Chinese works of art – porcelain, silverware, furniture, and needlework. Its author, Ho Wing Meng, was a professor of philosophy at the National University of Singapore. The publication of Ho's series in the mid 1980s coincided with a rise in the popularity of Straits Chinese material culture as collectibles. Although it was prefigured by Ho's (1976) *Straits Chinese Silver* and a catalogue of an exhibition on porcelain at the University of Malaya by William Willetts and Lim Suan Poh (1981), the series forms one of the earliest sustained efforts to document and contextualize a body of artifacts associated particularly with the Straits Chinese.

"Straits Chinese" is a potentially confusing term which deserves clarification, especially as current emphasis on the connections between acculturated Chinese communities in Malaysia and Singapore, southern Thailand, and Indonesia has now rendered the term "Peranakan Chinese" a commonplace, although not uncontested, appellation. Historically, the term "Straits Chinese" is derived from "Straits-born Chinese" and refers to Chinese born in the Straits Settlements – primarily the port cities of Penang, Melaka, and Singapore – which had been founded or taken under British jurisdiction between the late 18th and early 19th centuries. Strictly speaking, not all locally born Chinese were part of the "Peranakan Chinese" (or "Baba and Nyonya") communities for whom Chinese and Malay practices were incorporated into daily and ceremonial life. Ho's (1983) use of the term "Straits Chinese" relates to the Peranakan Chinese, for he reminds readers of the "Sino-Malay" elements of their "hybrid culture."

Although some Nyonya needleworkers may have carried out both beading and embroidery, Ho's two-part division of his book into beadwork and embroidery gives recognition to the distinctions between each of these practices and the materials they employ. He organizes the content in each part according to wider contexts of beadwork and embroidery elsewhere in the world, as well as origins, materials, techniques, and typology according to function.

Examples illustrated in the book were drawn primarily from four important private collections: Mrs. Grace Saw, whose family was involved in the provision of wedding equipment and whose collection was formed largely in Penang; Mr. Peter Wee, owner of Katong Antique House in Singapore and grandson of a prominent Straits-Chinese family with roots in Singapore and Melaka; Mr. Don Harper, a longtime resident and collector in Indonesia; and Mrs. Ho Wing Meng. A number of pieces from the Harper collection were subsequently acquired by the then National Museum of Singapore and have been published in Eng-Lee Seok Chee's (1989) catalogue.

In his opening, Ho stresses that beadwork and embroidery are works of Straits Chinese women themselves and therefore typify their unique aesthetic (pp. 13-17). In the first part, a review of the value of beads and beadwork as items of prestige in the ancient world precedes his presentation of Straits Chinese beadwork and its association with wedding tradition in Chapter 3. Ho reiterates the "hybrid" nature of Straits Chinese culture, arguing that their beadwork conforms to a distinct aesthetic. After examining the characteristics of beadwork, he concludes that Straits Chinese beadwork "owes its form and functions to old Hindu-Malay customs and practices, its decorative designs to ancient Chinese

motifs... and its techniques and craftsmanship to Malay and other cultures of ancient vintage" (p. 36). Unfortunately, this oversimplifies the sources of inspiration for beadwork which can be misleading given his unequivocal style of writing.

A brief discussion of the manufacture of drawn glass beads and sewing equipment in Chapter 4 is followed by an explanation of beadwork techniques in the following chapter. These are divided into stringing, stitching (by which he means the attachment of beads to a base fabric with thread), and threading or bead-netting. Ho does not go into the variety of stitches or techniques and his illustration of netting on p. 56 is puzzling as it does not show the precise path of threads through beads. It is also rather different from the more detailed explanation provided by Valerie Hector (1995), an experienced beader herself, of the multiple-thread technique for one example of Straits Chinese netting which she examined. Some of the patterns Ho shows do not appear to correspond either to Malay or Straits Chinese examples I have seen. Furthermore, a number of examples of bead embroidery (Figs. 1, 4, 17, 34, 39) are erroneously described as threaded panels.

Ho develops a categorization for beadwork by function: personal ornaments such as belts and slippers, and decorative ornaments such as panels and hangings. This is not only a useful typology of the forms, but also shows the variety of objects which were beaded and facilitates comparison with similarly embroidered articles in the second part of the book. While Ho does not focus on regional styles, he observes that Penang beadwork is dominated by motifs of rose-like peonies and most of the larger netted beadwork has a Penang provenance. He also includes a separate chapter on Indonesia that usefully highlights some of the similarities and differences between Peranakan Chinese beadwork from Indonesia and the Straits Settlements. For example, the *tempat surat* or holder for wedding documents (pp. 80-83) is not common in the Straits Settlements and suggests regional variants in Peranakan Chinese culture. A number of the items (e.g., Figs. 41 and 43) attributed to Java are, however, from Sumatra (*see* Eng-Lee 1989:71 and Ee et al. 2008:220-221). Most of the beadwork from the Harper collection was acquired from Sumatra (Don Harper 2006: pers. comm.).

The embroidery section of the book is broad in scope and encompasses metallic-thread and silk-thread hand embroidery as well as machine-made embroidery. In contrast to Ho's focus on the local nature of beadwork, Straits Chinese embroidery includes work not thought to have been made by them. Ho places Straits Chinese embroidery firmly within a Chinese needlework tradition based on techniques and materials and notes that this presents a difficulty in distinguishing between embroidery imported from China and locally made examples. He supposes that the latter were dominated by smaller examples although he also asserts, based on style, that some smaller pieces were not Nyonya handwork but does not explain this further. Whereas Ho's caveats on origin need to be heeded, he tends to dismiss the Nyonya's own embroidery as "at best, an amateur pastime" (p. 98) that produced items less sophisticated than Chinese output, rather than to investigate the works closely. This renders the second part of the book less satisfactory.

A variety of basic silk-thread stitches (including knot, chain, satin, and voided satin stitches) are reviewed in Chapter 9. Surprisingly, Ho does not place his discussion of the techniques of raised silk-thread and metallic-thread embroidery and the use of cardboard cutouts here, relegating the description instead to two paragraphs in Chapter 10 under the sub-section "Items of Malay or Indonesian Origin" (p. 120; *see also* the unfinished panels illustrated in Figs. 19 and 51). Oddly, in the last part of this sub-section, his comparison of Straits Chinese and Malay embroidery states confidently that the Straits Chinese motifs and "techniques of stitchery" were derived from traditional Chinese sources based on a comparison with the limited repertoire of stitches in Malay needlework (p. 128). Yet Straits Chinese raised metallic-thread embroidery and the application of cardboard cutouts can be compared with techniques of Malay raised metallic-thread needlework (*tekat timbul*).

Embroideries are categorized first by size (which the author relates to origin) *or* dependence on local forms, *and then* by function in Chapter 10. This makes the flow of his discussion awkward, which moves from smaller personal to room ornaments, then back to smaller personal accessories of local forms and soft furnishings, only to be interrupted by information on *kebaya* or short blouse embroideries, before moving on to large altar hangings, wedding costumes, and rank badges. Ho deserves credit for including *kebaya* embroideries within the scope of Straits Chinese embroidery. Yet, with its history closely tied to the development of Indo-European "fashions" in the Netherlands Indies, this topic would probably have been better served by a separate chapter that could have included a more thorough discussion of the types of laces and embroideries, particularly machine embroidery.

Chapter 11 presents some generic information on needles, threads, dyes, and silk and Chapter 12 briefly discusses Chinese sericulture. A final but unnumbered chapter highlights the difficulties of dating works and the care with which one must approach dealer-supplied information. The glossary consists entirely of definitions of various gemstones which seems an odd focus as such materials have a tenuous relationship to Straits Chinese beadwork and embroidery. A glossary of Straits Chinese terms would have been much more relevant.

Ho admits he has "interwoven... statements of fact, fiction and conjectures… to arouse [the reader's] interest and imagination" (p. ix). Although endnotes are provided, the lack of notes concerning oral sources makes it difficult to follow up on some of his assertions. Furthermore, his largely "factual" tone of presenting information is not conducive to distinguishing between informed speculations, genuine errors, and deliberate fictive creations. It is difficult, for instance, to understand the extent to which Straits Chinese beadworkers themselves may have regarded the facets of *manek potong* or "cut glass beads" as "accidental effects of polishing" (p. 45) since subsequent research on beadmaking highlights the deliberate production of beads with these characteristics. Attribution of a panel of metallic-thread embroidery (Fig. 77) to "old Malay workmanship" is unexplained and deserves clarification. There are also a number of minor errors. For example, the lotuses in Fig. 59 are described as peonies and the beaded collar in Fig. 33, described as a collar for the flower girl, is of a form generally worn by boys (*see* the boy's dress in Fig. 82).

With the benefit of more recent research and subsequent publications, it is all too easy to be critical of Ho's work and we must acknowledge that Ho's discussions reflect, in part, the state of knowledge in the 1970s and early 1980s. In attempting to document and categorize information on Straits Chinese beadwork and embroidery, Ho's book provided a framework for enthusiasts wishing to further their knowledge and develop their collecting agendas. It served a generation of museum curators and researchers. Importantly, Ho's book also brought to the fore the manifold forms and significance of beadwork and embroidery for Straits Chinese culture and society at a time when hardly any literature on the subject was available. As the several reprintings suggest, the book has become essential reading for anyone interested in Straits Chinese needlework and it can only be hoped that future versions will address some of the shortcomings. Much more than just a collector's guide, it stands as a major contribution to the study of Straits Chinese beadwork and embroidery. Even in its present form, some 20 years after it was first released, Ho's work (and his conjectures) can still suggest avenues for further research.

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Chinese Sewing Baskets.

Betty-Lou Mukerji. AuthorHouse, Bloomington, IN. 2007. 202 pp., 71 color figs. Order from Betty-Lou Mukerji, c/o Wolf Run Ranch & Studio, 375 Wolf Valley Drive, Umpqua, OR 97486. ISBN: 978-1-4389-1523-4. $49.98 (soft cover).

Combining nostalgia and exhaustive research, collector Betty-Lou Mukerji has produced a volume that will be indispensable to all with an interest in Chinese baskets and the "Peking" glass beads and bangles that adorn them. Her love for these 20th-century artifacts, fast becoming antiques, is apparent throughout the book.

Her investigation into the baskets' origin refutes the often-encountered myth that they were shipped from China already ornamented and filled with exotic wares or delicacies. In fact, they arrived in bundles at United States (and other countries') ports and were de-bugged, stained, and decorated in the local Chinatowns, usually by children. The glass beads and bangles, coins, and tassels could be bought separately in some of the shops, and the design

of the trimming could at times be done to the purchaser's order. Ms. Mukerji suggests that such a visit to a shop and the choice of ornament could be a rite of passage for a young girl in the early 20th century.

Following are clearly and beautifully illustrated chapters on the varied basket forms and their care, preservation, and repair. Some owners chose to modify and decorate their baskets by painting, lining, or applying their own trinkets, and many of the results are illustrated. There are also unusual applications such as gesso and barbola.

The beads, bangles, coins, and tassels are each given their own chapters, with useful information on Chinese glassmaking and a chart showing the dates of the coins. These ornaments are fragile, and Mukerji makes some suggestions for repair, reuse, and reattachment.

The author is to be congratulated for her care, enthusiasm, and research. She has produced a charming and valuable reference volume that will be appreciated by all who collect or admire these baskets and "Peking" glass. The photographer, too, deserves plaudits for his beautiful work. I must regretfully add, however, that the book would have benefited from the work of an editor or simply a careful proofreader.

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Middle Eastern and Venetian Glass Beads: Eighth to Twentieth Centuries.

Augusto Panini. Rizzoli International Publications, Inc., 300 Park Avenue South, New York, NY 10010. 2007. 311 pp., 712 color figs., glossary, index, synoptic tables. ISBN: 978-88-6130-164-1. $100.00 (hard cover).

This lavishly illustrated volume showcases selected specimens from the author's extensive collection of glass beads acquired in West Africa, principally Mali, during the 1980s and early 1990s. There are over 700 superb color images which provide macro views of individual beads and full-page images of strands of related beads. These will be invaluable to those wishing to know what bead types have been found in a part of Africa where relatively little archaeological excavation has been undertaken. Unfortunately, as the bulk of the beads were acquired in markets, just about nothing is known about their exact find spots or archaeological contexts.

For the purposes of this book, the beads have been sorted into two groups based on their likely place of origin: the Eastern Mediterranean and Middle East, and Venice. The volume is about evenly split between these two categories which are not only cultural and geographical, but temporal as well as the beads in the former group comprise the early part of the date range provided in the book's title while the Venetian beads are primarily from the late 19th and 20th centuries. The beads discussed in each category are grouped according to the form of their decoration and are then further subdivided on the basis of how they were manufactured and the specific nature of their decoration.

In the Eastern Mediterranean and Middle Eastern section, the major classes are Eye Beads, Beads with Striped Decorations, Beads with Wavy Linear Decorations, Beads with Feather Decorations, and "Mirror" Beads. The latter are what are generally termed "folded" beads. The author discusses the manner in which the beads were made, their distribution, provides dates where possible, and acknowledges that not all the beads in the section were necessarily produced in the Eastern Mediterranean or Middle East.

A "Finds" section follows. Although it lacks any introductory text, it is clear that the items in the first 14 photographs are small assemblages of beads and other small finds either surface collected or dug up at various places in Mali. While the general location of the finds is sometimes provided in the captions, it is not known if the beads are all from one site or from a wider geographical area, thus lessening their research potential.

Turning to the Venetian section, we find the beads grouped in much the same way as in the previous one: Eye Beads, Beads with Striped Decorations, Beads with Wavy Linear Decorations, Beads with Wavy Spiral Decorations, Beads with Feather Decorations, Beads with Reticulate Decorations, Beads with Curled Decorations, and Beads with Flower Decorations. The majority of the beads are lamp-wound; only one subgroup of the beads with striped decorations is of drawn manufacture. As in the previous section, information is provided concerning how the beads were produced, their stylistic variability, and their dating.

There follows a "Documents" section which, again, is without any prefatory text but is revealed to illustrate 41

bead sample cards, showing primarily fancy lamp-worked (wound) beads produced by the Società Veneziana per l'Industria delle Conterie of Murano. Another eight cards are from the collections of the Museum of Glass on Murano. While dates are not present on the bulk of the cards, the Società was formed in 1898 so the cards ascribed to it have to be later than that.

While the volume is visually stunning, there are problems with some of the text. This book was originally published in Italian and then translated for the English version. This has made some statements a bit confusing. For example, in the Introduction (p. 11), the production of "*mosaic* cane beads" is described as follows: ...[they are] made by fusing together cross sections of several polychrome canes set one next to the other, with subsequent folding back onto itself of the resulting glass tile." While the first part is understandable, the last part leaves one guessing.

The paragraph that follows is equally confusing: "*drawn cane* beads are... made with glass of different colours stratified in crucibles with a growing number of layers – in circular, star-shaped or flower moulds – or successive dips, drawing the hot glass cane until the desired cross section is reached, saving the central hole and finally cutting it into cross sections and rounding the corners." Again, a rather garbled description of a well-known process. Such problematic wording is also encountered elsewhere and could have been eliminated by a knowledgeable proofreader.

There are also a few questionable statements and odd inclusions in some of the categories. I do not intend to list them all but will point out a couple of examples in the short section that deals with Circular Cross Section Drawn-cane Beads. The opening sentence (p. 175) states that "this type of bead is often called Nueva Cadiz...." This is certainly not the case as Nueva Cadiz beads are characterized by a square cross section as the author actually goes on to say in the next sentence! Furthermore, the example that is pictured (#180) does not exhibit any stripes, making the reader wonder why it is included in a subsection of the category, Drawn-cane Beads with Longitudinal Linear Stripes? These are decidedly minor points but such oversights should have been caught before the book was published.

Another problem area in my view is the limited Bibliography which is comprised primarily of secondary sources. One would have hoped that at least some archaeological reports that deal with West African beads, scarce as they are, would have been consulted. Citing the same old popular sources does little to further our knowledge of the beads of West Africa.

Despite its flaws, *Middle Eastern and Venetian Glass Beads* is a welcome addition to the growing literature on West African beads. While it may not be as useful to researchers as the author had hoped, it will certainly appeal to the bead afficianado.

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