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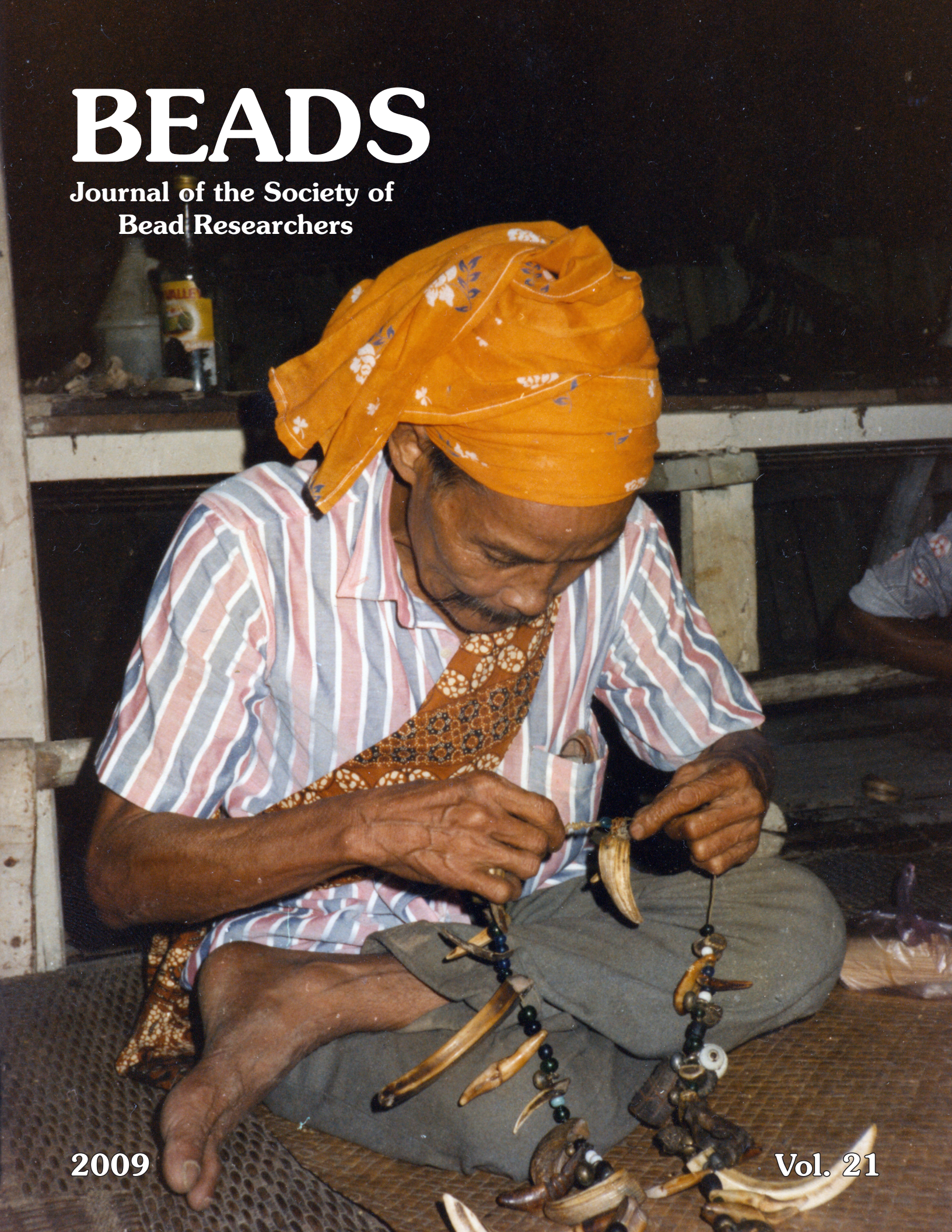

BEADS

Journal of the Society of Bead Researchers

2009 Vol. 21

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KARLIS KARKLINS, *editor*

CONTENTS

BOOK REVIEWS

TWENTY YEARS OF *THE BEAD FORUM: NEWSLETTER OF THE SOCIETY OF BEAD RESEARCHERS* (1982-2002)

Compiled by Karlis Karklins

The Bead Forum: Newsletter of the Society of Bead Researchers was initiated in 1982 by Peter Francis, Jr., to facilitate communication between bead researchers. Over the years it has provided news about the society, announcements of relevant exhibitions, conferences, and recent publications, requests for information, memorials, and short articles and news items on various aspects of bead research. The two latter contain much useful information that is, unfortunately, not readily available to many researchers who do not own the set or have forgotten what is in the earlier issues. Furthermore, few libraries and museums have full sets in their collections. To resolve this situation, a broad selection of the articles and other items that appeared in the first forty issues are reprinted in this volume of *Beads* where they will be readily available in a more permanent format. While some of the material is dated, it is nevertheless interesting from a historical research perspective. Obsolete contact information has been deleted from some items and updated information has been added to others.

The articles are arranged by author (the author's name is appended to the title) with each author's articles in chronological sequence. The original date, issue number, and page numbers of each article appear after the author's name. A subject index is provided at the back of this issue.

1. PUMTEK–AN INTRODUCTORY REPORT UPON AN UNUSUAL CLASS OF DECORATED STONE BEADS, by Jamey D. Allen (1986, 9:6-13)

The so-called "etched," "bleached," or "decorated" stone beads of antiquity and more recent times are intriguing on many levels. Not only are they esthetically pleasing, with a diversity of forms and intricate patterns (Fig. 1), but they also have a sophisticated manufacturing sequence which was devised in very early times, but is not yet entirely understood even today. Interest is also stimulated by the consideration of their occurrence through a long period of time, and by distinctive sub-types that exist over a wide physical area of southern Asia. These sub-types are remarkably different from one another, yet are obviously related by their decorative developments and their technology. Decorated agate beads have received much attention in the archaeological and popular literature (Beck 1933; Dikshit 1949; Ebbinghouse and Winsten 1982; Francis 1980; Liu 1980), in an effort to describe and classify their development and technology. However, considerable misunderstanding and/or disagreement exists among researchers (Allen 1982, 1983; Ebbinghouse 1982, 1983; Ebbinghouse and Winsten 1982; Francis 1982), pointing to a very real need for information and hard research. As is usual with beads, there are more questions (and speculations) than answers.

The purpose of this short paper is not to further this discussion, but rather to introduce a class of decorated stone beads which heretofore has been almost wholly unknown within the circle of modern bead research. These beads (Pl. IA top), collectively called *pumtek* (pronounced "poom-check") became available on the bead market, out of India, about two or three years ago. They derive from several tribal groups living in the frontier area of northeast India and western Burma, and, until quite recent times, were apparently an important part of native costume, and rank or personal prestige. Pumtek beads were first seen only a few at a time, as components within necklaces of other sorts of beads; and this suggested that–like "etched" agates–they were possibly rather scarce and highly valued. However, in a short time, it became possible to acquire whole strands of pumtek beads. These structured necklaces commonly had ca. 60 to 100 beads, arranged in (we may assume) traditionally or locally favored conventionalized sequences–such that in a group of as many as 200 strands, the arrangements were more alike than different (personal observation). This changed the outlook on pumtek beads considerably. It became obvious that they were not rare or unusual–at least to the groups possessing them prior to mass-collection by enterprising bead merchants. Most recently, the supply of pumtek beads seems to be waning. Currently, strands of pumteks now contain filler beads (mostly what appears to be common

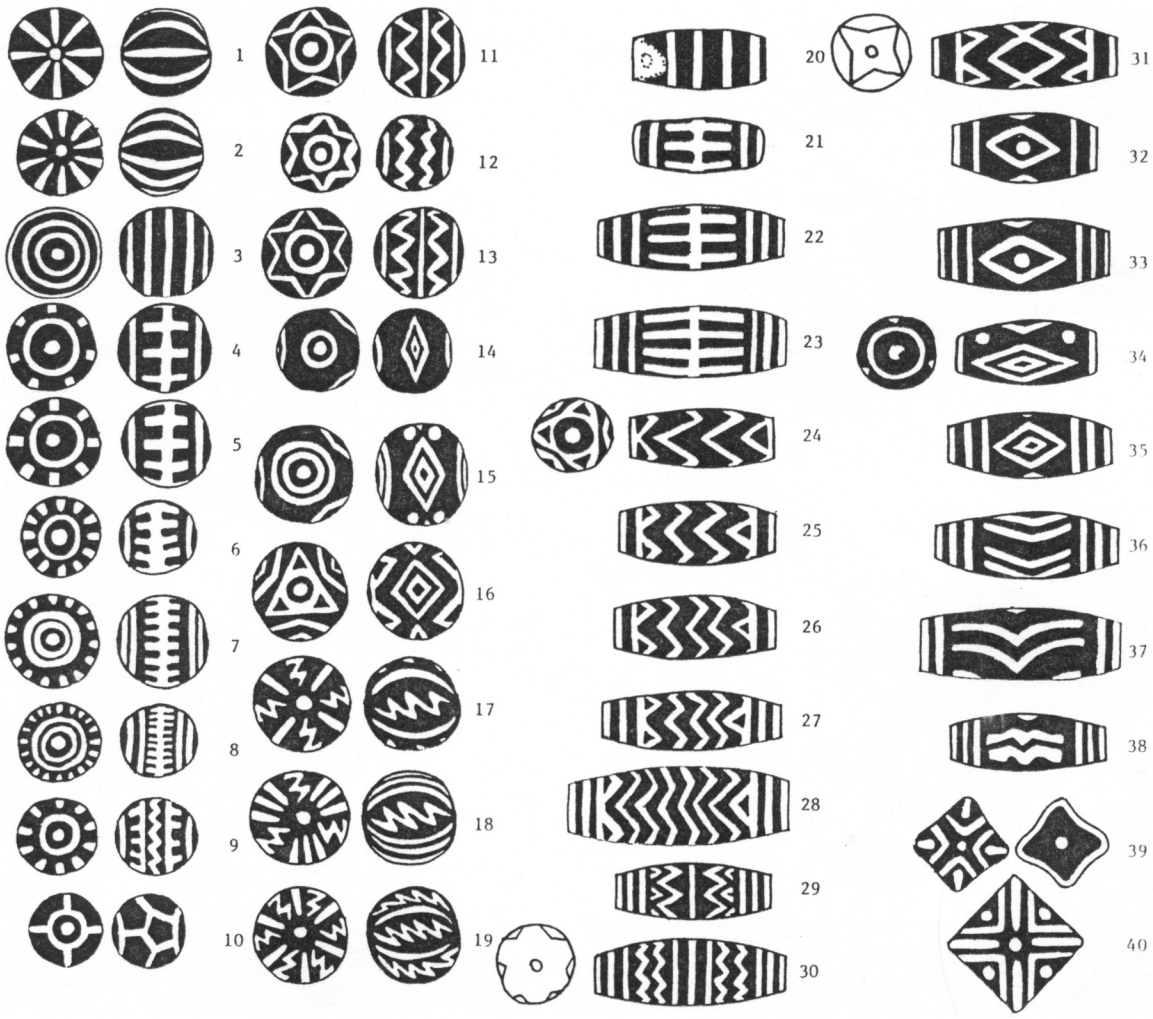

Figure 1. Forty varieties of pumtek beads from Mizoram, India (drawing: Jamey Allen).

palm or bamboo wood), and prices are rising even for these. It is likely that this class of beads has seen mass-collection from original users, and dispersion to foreign bead collectors in a remarkably short period of time. It behooves serious bead researchers to garner and report whatever information can be collected, while and if it is still possible.

The sudden appearance of pumtek beads has created the need for a line of questioning regarding their relationship to other decorated stone beads. They share many features in common with "etched" agate beads (or, they appear to); yet there are distinctive differences as well. The most striking difference is that pumteks are not chalcedony or agate (like "etched" beads). They are made from non-precious opalized wood (quite common in many parts of the world, and certainly available in northeast India [Kennoyer 1985: pers. comm.]). It has been suggested that the wood derived from palm trees (Carlsson 1984: pers. comm.), but there is not universal agreement that all pumtek beads are of fossil palm wood. The material is light brown in color, usually with a "dotted-looking" sort of grain in cross section, or a "line grain" longitudinally (Pl. IA bottom). The grain may be masked by the decorations, or may show through somewhat. Pumtek beads have been submitted to treatments that provide a line decoration on a dark background. The line patterns range from a strong opaque white, to more creamy and yellowish or brownish (and sometimes less distinct) colors. The dark background ranges from brown to black, and is sometimes more pale or blotchy in less well-made specimens. Pumtek beads have been favorably compared to Tibetan dZi beads, due to some resemblance in terms of shape and decoration motifs–as well as the place of these beads in the personal belief systems of the persons who owned and used them. However, the popular conception of pumteks as "a sort of dZi bead" is probably incorrect, or misleading at best. It has been easy to assume that pumtek beads have been "etched" like other agate beads, due to

the similarity of their appearance; but this is perhaps a hasty conclusion. (It is a "can of worms" to use terms like "etched" and "bleached," since many researchers disagree about the meaning and usefulness of these terms, and I will use my preferred term "decorated" in most instances.) We cannot rule out the possibility of other methods having been used to create pumtek beads; and I hesitate to classify them as "etched" until their technology is better understood. It has been brought to my attention (Ebbinghouse 1985: pers. comm.) that opal is a material that will not withstand the sort of firing that is usual with decorated agate beads. This certainly implies that pumtek beads result from a different process than typical "etching." The dark coloration may result from "caramelization" (Allen 1982); but, since a heating process is usually required (unless acids are used), it is not possible to determine.

I have had the opportunity to examine several hundred strands of pumtek beads, most on their original strings, in correct arrangement. I became so interested in them that I acquired several strands myself, and have continued to collect data on form and decoration. I have had much correspondence with David Ebbinghouse, who is also working with these beads, and will present a full report for publication in the near future. In the meantime, I offer the above information as an introduction to pumtek beads, and would like to present a selection of the pattern variations I have recorded thus far. The illustration (Fig. 1) I have supplied is culled from my correspondence with Ebbinghouse, and may often represent less common variations, rather than typical beads (as I do not wish to overlap or infringe upon Ebbinghouse's publication priority). However, my drawing presents a fairly good rundown of basic design motifs and permutations, and ought to give the reader a good general view of the appearance of pumtek beads. For instance, the most common design on spheroidal or oblate beads is that of longitudinal lines. There are usually 6 or occasionally 12 lines on a bead. My examples here (Nos. 1 and 2), are less common beads that display 8 and 10 lines, respectively. The spheroidal beads (Nos. 1 to 19) are shown in cross-section (on the left) and in horizontal axis (on the right). The cross-section has been omitted from most of the long barrel-shaped beads (Nos. 20 to 38), except to show the number of design element repetitions in some instances. The "diamond-tabular" shape (Nos. 39 and 40) is the least common variety of pumtek bead, but a few of these occur in many structured necklaces (example 39 is shown front and back–not with a cross-section). As these drawings were produced free hand, over a period of time, they are not all to the same scale. However, in a general sort of way, their size relationship is evident. The smallest spheroidal bead (No. 10) is 11 mm in diameter, while the largest (No. 15) is 18 mm in diameter. The smallest tapered barrel bead (No. 20) is 7 mm in diameter, and 15 mm long. The largest (No. 28) is 10 mm in diameter, and 30 mm long. The smallest diamond-tabular bead (No. 39) is 20 mm long, while larger ones range up to ca. 30 mm in length. These are the general size ranges.

As a rule, pumtek beads are fairly well made. The external shape has good form and proportion. They are usually well drilled (from both ends, meeting in the center), and do not have a great tendency for an internal constriction that makes stringing difficult (with some exceptions). The technique of their decoration is fairly variable, ranging from quite good to somewhat poor (good is reckoned as having strong white lines on a uniformly dark background, while poor means that lines are indistinct or discolored and/or backgrounds are pale and blotchy). Some strands of beads are extremely dark in appearance–probably due to being hung within the home, near an open fire. The soot deposit that accumulates is practically impossible to remove.

It is tempting to speculate regarding the inspiration, origin, and age of pumtek beads. However, very little of a tangible nature is known for sure. Certainly, they have been mentioned in the writings of previous ethnographers (Head 1917; Lehman 1963; Parry 1932), so it is possible to know some of the tribal groups that have possessed them, names of individual types, favored arrangements (pictured in photographs and drawings), and some folkloric beliefs.

Some pumtek patterns are identical to beads which Beck (1933:Pl. LXXI) determined to be "Middle Period" etched agate beads (dating from ca. 300 B.C. to A.D. 200), and several more are quite similar. This may suggest that pumteks were inspired by Middle Period etched agates– though they need not be as early in production. However, at least one of my correspondents believes them to be "ancient"–possibly reclaimed from earlier graves by current peoples in India and/or Burma. Let us hope that future research brings more information to light.

Acknowledgements

I am extremely grateful to Törbjorn and Judy Carlsson for the opportunity to examine and record the pumtek beads they have imported from India in the past three years, and for certain information they have passed on to me. I also thank David Ebbinghouse and Jonathan Mark Kennoyer for much enlightening discussion and feedback.

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2. THE NORDIC GLASS BEAD SEMINAR: A REVIEW, by Jamey D. Allen (1993, 23:4-10)

The Nordic Glass Bead Seminar was a three-day event held just outside the town of Lejre, west of Copenhagen, Denmark, from October 16th to 18th, 1992. The event was sponsored by The Historical-Archaeological Experimental Centre–a private institution with the goal of conducting practical experiments to explore, reconstruct, and explain the crafts, buildings, and physical conditions of the past. The centre is located on a large tract of beautiful, unspoiled land, and features a reconstructed Iron Age village, complete with domestic and farm-use buildings, agricultural fields, and workshops for weaving and pottery, as well as an iron forge. In addition, the grounds feature a cultic dance labyrinth, a sacrificial bog, and megalithic tomb (all constructed in areas of great beauty, with thought given to the nature of such Stone Age monuments).

In all, 18 papers or presentations were given, and some 36 participants attended–many of whom were from the European archaeological community. This reviewer was the only American in attendance, and was quite grateful that all papers were given in English. In most respects, the Seminar was conducted as an archaeological conference, and seemed very similar to the various bead conferences that have been held in America during the past ten years. However, this was the first opportunity that European researchers have ever had to gather together for the purpose of sharing information about bead studies.

The theme of the seminar was to consider the occurrence of glass beads that were prevalent during the Viking Era in Scandinavia (from ca. A.D. 700 to 1100), although papers were given that concerned earlier and later beads, and beads from outside Scandinavia proper. Some of the highlights will be mentioned below.

The seminar was opened by Morten Meldgaard, director of the centre, who introduced Ulf Nasman, a Danish archaeologist from Arhus University. Dr. Nasman gave an introductory talk related to the general topic of why it is helpful and necessary to study beads–but with the concern that possibly it might not be a good idea to accomplish this apart from traditional archaeology. He expressed the opinion that he was not entirely in favor of conferences that segregated beads from other artifacts in archaeological assemblages, though he welcomed the opportunity to perform such an experiment, and was pleased to be in the company of his interested peers.

Dr. Johan Callmer, the author of *Trade Beads and Bead Trade in Scandinavia, ca. 800 - 1100 A.D.*, was introduced as the moderator of the first-day program, and first presenter. He spoke on the subject of the inundation of oriental beads into Scandinavia in the 8th century. Dr. Callmer is regarded as the father of Scandinavian bead studies (particularly because of his well-researched and thorough dissertation, named above), and led the session with authority and with the respect of those in attendance. In his talk, he discussed the proposition that beads provide data for five points of archaeological interest: 1) beads are chronologically significant and crucial; 2) they are technological indicators, and indicate both technological diffusion and cultural preference; 3) they provide socio-economic considerations; 4) within grave finds they are a “display of wealth,” and had magical functions; and 5) they indicate exchange and trade

patterns between Europe and the Orient. He also discussed the problems resulting from lack of information regarding Middle Eastern beads and their technology. He proceeded to show slides of examples of various glass beads recovered from Scandinavian graves, including millefiori and gold-foil specimens. He characterized the trade in glass beads as proving that "cheap products" were concurrent with more important "luxury" goods, such as silks, precious metals, and pharmaceuticals. This reviewer engaged him in a lively discussion regarding the veracity of proposing that glass beads should be considered separate from other "luxury goods."

Mr. Per O. Thomsen of the Svendborg Museum discussed the possibility of local Danish glassworking as early as A.D. 200, showing specimens of both simple monochromatic and complex polychrome beads, the latter looking much like imports from the Middle East to this reviewer. He reported on sites in Denmark where various craft workshops have been excavated, and suggested that common remains of bronze and iron scraps (for remelting and reuse) and silver sheets may have provided products to be used for trade with the Roman Empire. The circumstances of recovered glass fragments and scraps may suggest the reuse of glass for beadmaking. Though it is difficult to conclude that glassmaking may have been so early in Denmark, crucible fragments with intact glass have been recovered and indicate glassmaking in the 7th century.

The seminar was scheduled to feature several speakers from former Soviet Bloc countries. Unfortunately, circumstances prevented many of them from attending at the last moment, to the disappointment of those present. However, Dr. Evalds Mugurevics of the Institute of Latvian History did attend, and presented a paper on Latvian glass beads from the 13th century–many recovered from areas around Riga. He presented slides of beads, discussing them in order of color frequency–the most common being yellow, followed by blue. He remarked that colors and compositions changed over time, and that red glass had been made with copper as a colorant. Professor Mugurevics proposed that soda-glass beads were imported, while potash-glass beads were probably of domestic manufacture.

Dr. Veronica Tatten-Brown of the British Museum spoke on small glass objects and pendants of the Roman Period in the museum–a collection which will be published in the near future. She reported that although the BM housed considerable collections of ancient glass beads, they were not organized or classified, and would not be included in plans for publishing. Nevertheless, a few pendants and beads were included and discussed. Among them were pieces that had been pressed in two-part molds, giving them relief designs such as a seated goddess, a child, a bunch of grapes, a dove, and an eagle.

Lars G. Hendricson of Stockholm, Sweden, spoke on the reuse of glass fragments from vessels in beadmaking. He showed examples of turned rims from bowls (which are already "perforated" from manufacture), and a segment from the claw of a claw beaker–all of which could function as beads. Although the reuse of broken glass products as beads is not exactly common, several persons present remarked that they too knew of similar instances where this reuse had occurred.

The second session began the following morning with Mr. Torben Sode who spoke on Islamic glass beads and their use as amulets and for protection against the evil eye. He noted specifically use by women and children, who are thought to be particularly vulnerable to negative influences, as well as on livestock. He reported that in several areas (i.e., Spain, Italy, and parts of Africa) glass itself is considered amuletic. Certain colors were associated with helping cure specific illnesses, or served specific functions. In addition, he mentioned that even vehicles such as taxis and trucks were protected by beads.

Mr. Kjeld Hansen gave a very interesting presentation on the use of imported beads by the native people of Greenland, screening photographs of people in regional costumes from different areas. He noted that East Greenland folk prefer color combinations featuring red, white, and blue, while West Greenland folk like to use all colors available to them. All these people were/are very proficient at making complicated beadwork constructions (often collars), traditionally strung on sinew and (now) nylon thread.

Dr. Julian Henderson of Sheffield University, an expert on ancient glassmaking, discussed the scientific investigation of glass, generally, and how to distinguish between primary glassmaking and secondary glassworking. He also talked about the interpretation of analyses to indicate relative age or period. Dr. Henderson showed slides of an archaeological dig at Frattesine in northern Italy, of quite early context (ca. l0th to 8th centuries B.C.), where glass crucibles have been recovered, as well as translucent greenish-blue wound-ring beads (often left connected as segment beads) and striped and eye beads. He made the rather controversial proposal that certain ancient British beads dating from between the 5th and 2nd centuries B.C., with precise spiral-line decorations in opaque yellow glass, had been made by a molding process. He believes he has found a bead within such a mold, intact.

Dr. Barbara Sasse-Kunst, assisted by Dr. Claudia Theune-Vogt, both of Germany, presented a paper concerning their scheme for classifying Merovingian Period glass

beads of the 6th to 8th centuries. These particular Frankish beads (recently the topic of two short articles in *Ornament* magazine) form a fairly distinct group within Medieval European beads–widely known in Germany and France, but appearing in other countries as well. The classification scheme is too complicated to discuss in any detail here, but provides another view of how bead researchers might approach creating a "universal classification system" for all glass beads.

Per Ethelberg, a doctoral candidate associated with the Sydsjaellands Museum in Denmark, discussed a cemetery at Skovgarde that was excavated in 1988. Eighteen graves were investigated from the Roman period between A.D. 180 and 250. The 1,313 recovered beads included intricate millefiori specimens with checker and Greek-wave patterns. It was apparent that beads were worn by women as hair decoration attached to pins. Necklaces were symmetrically composed from bronze and glass beads. Other pectoral arrangements were not necklaces, exactly, but rather strands that hung from bronze shoulder fibulae (or possibly attached to clothing under the fibulae). These were mainly composed of larger, complicated, spheroidal millefiori beads. Amber beads and pendants were also recovered.

The final session of the seminar dealt with practical technology, and began with a presentation by Professor Önder Kücükerman, from Mimar Cinan University in Istanbul, Turkey. He spoke on the subject of beadmaking in Anatolia, in ancient and, primarily, modern times. Professor Kücükerman learned about glass and beadmaking through a 25-year association with Venetian glassmakers. Much of the information he reported is published in his recent book, *Glass Beads: Anatolian Glass Bead Making*, a Turkish publication dealing with the modern beadmaking industry. The author attempted to connect ancient glass beads with those currently made, not by direct and continuous manufacture, but rather by the spirit of the continuing desire to possess these traditionally favored objects. Among the interesting facts he reported was the belief that there are beaches in Turkey where the sand can be collected and used as-is for glassmaking. The reason blue is the most common color is because it is the cheapest to make (albeit also quite popular). Red and yellow are expensive colors, and white is difficult to make. Often, colored glass bottles and jars are used to provide colors. He also showed the traditional kit used by beadmakers, consisting of 14 tools. Melon beads are formed by rolling a plastic bead across a corrugated surface (as also practiced elsewhere). The most interesting part of the presentation concerned his description of the furnace where beads are made (carefully described in his book). The furnace is fueled only with pine-tree roots since other fuels do not burn hot enough. A temperature of 900 degrees can be reached in as few as 40 minutes. Amazingly, the furnace is not vented and remains cool to the touch around its circumference! The inner top of the furnace is domed, which acts as a reflector of the heat, focusing it at the working apertures where the beads are made. At these ports, the temperature is 900 degrees, making glassworking possible. Professor Kücükerman reported that glass beadmaking is somewhat in decline due to the growing popularity of plastic beads. He hopes his book will encourage interest in Turkish beads, and proposed that future conferences might take place in Turkey.

Torben Sode presented a second paper pertaining to the contemporary manufacture of glass beads in India. His premise was that through investigations of modern but fairly primitive small industries it may be possible to come to a better understanding of the nature of ancient Scandinavian glassmaking. His discussion strongly mirrored the prolific writings of Peter Francis, Jr., who has often discussed Indian glass-beadmaking industries in the pages of *Ornament* so little more will be said here.

Partners in studio glassworking, Pete Hunner and Mai-Britt Jönsson, discussed the ancient manufacture of gold-glass beads, and demonstrated one of the possible methods by which such were made (Fig. 1). Participants found all this quite interesting, engendering much discussion.

In the absence of Rosmarie Lierke, Tine Aschenbrenner presented a paper asking the question, "Should we believe in experiment?" She suggests that researchers may not always be on the correct track when they suggest certain techniques for particular glass products. She mentioned specifically bowls that are thought to have been cast, which she has been able to duplicate in about 25 seconds on a spinning wheel. She also objected to suggestions of bead molding (as per Henderson, above) when no mold materials exist that allow easy separation of the product and maintain fineness of detail. She proceeded to present an alternate method of manufacture that would allow for precision of detail, and would be technically more simple and undemanding than molding. Ms Aschenbrenner presented her own thoughts regarding approaches to glass beadmaking, reporting on several experiments she conducted to see if it were possible to work glass apart from a furnace with a crucible of molten glass–working with small quantities that are melted and used in-process. Such practices would negate the archaeological expectation of finding actual crucibles at glassworking sites.

This reviewer was quite surprised to discover that the European bead researchers present were almost entirely unfamiliar with the substantial progress made in bead studies

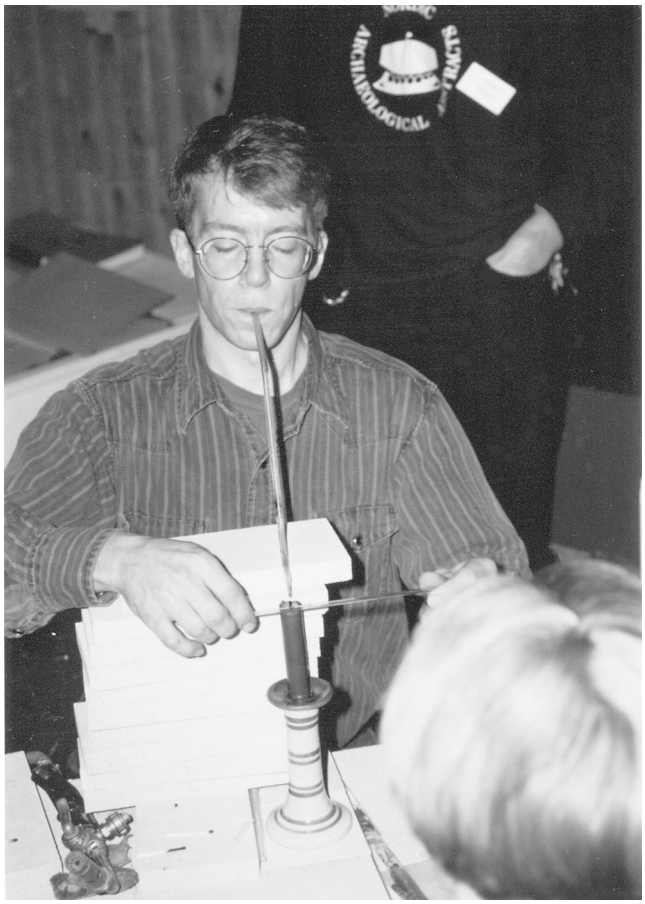

Figure 1. Pete Hunner demonstrating beadmaking using a glass blowpipe and candle (photo: J.D. Allen).

in Canada and America. They were not aware of publications like our journal *Beads* or *Ornament* magazine, nor that organizations such as the Society of Bead Researchers and the various other bead societies existed. They did not know that as many as five separate conferences had been conducted here in the past ten years. Thus, it would certainly be accurate to characterize European bead research, and researchers, as being some twenty years behind the times! This reviewer, having attended all previous American conferences, experienced many moments of frustration, listening to discussions of issues that should be considered dead or already dealt with (to at least some degree). There was much sense of *deja vu*, as participants conversed over the worth and validity of studying beads, and shared opinions about the best and most practical approaches. These, and others, were issues discussed in much the same tone and terms as long ago as 1982, during the Glass Trade Bead Conference held at Rochester, New York (and might have been considered tired old issues even then). The reviewer felt that many glassmaking terms and product names were misused or misunderstood, and that a degree of precision was lacking. Nevertheless, your reviewer held his tongue as much as possible, sat through the frustration, and lobbied for participants to become more familiar with work that has already been done. We may be sure that many European researchers will be joining their American and Canadian colleagues in the near future and will quickly catch up. Apart from this personal issue, the seminar was an outstanding success. The site was beautiful and fascinating, and worthy of a visit by anyone traveling in Denmark in the future. The food served was glorious and delicious–and no one could ask for better company among the enthusiastic participants and presenters. Director Morten Meldgaard and, especially, Seminar Coordinator Bente Draiby are to be congratulated and thanked for making this a fun and educational experience worth remembering. The seminar proceedings will be published in the near future, and will be announced in *The Bead Forum*.

3. VENETIAN GLASS BEAD PRODUCTION IN THE FIRST HALF OF THE 19TH CENTURY: RESEARCH AT THE VENETIAN NATIONAL ARCHIVES, by Alessia Bonannini (1999, 34:9-18)

While investigating the times and ways in which Venetian glass beads made it to the American Northwest, my friend and colleague Silvia Ferrari and I became convinced that it was necessary for us to look for documentary evidence at the very beginning of the trail: Venice and its archives. The first half of the 19th century, of particular interest for our research, appeared very little explored, most of the knowledge for that century being based on later publications, especially Bussolin, Cecchetti, Moschini, and Zanetti, all published from 1847 onward. While our research has proved unsuccessful as far as the trade of Venetian beads in America is concerned, it has revealed some unknown aspects of bead production and work organization in the period under study. This article presents some of the results of this research. The complementary part of the study is still in preparation by Silvia Ferrari who, it is hoped, will publish her results shortly.

The Venetian National Archives basically contain historical, political, economical, and statistical information about the glass beadmaking industry during the first half of the 19th century. Unfortunately, there is little or no information about the beads themselves. This inquiry into bead production, therefore, has resulted more in a picture of the glass beadmaking industry, its productive mechanism, and its social and economical implications rather than in the identification of the actual products, although mention of specific bead types is occasionally made.[1]

Fig. 1 provides an overview of the Venetian glass bead industry during the years 1800-1850, where I've synthesized an heterogeneous series of documents and data collected from different documentary sources at the Venetian archives.[2] It represents a systematic transcription of all the mentions made in the documents about the number of active bead producers over time, which becomes relevant and interesting only when compared with the major historical and political facts identified at the bottom of Fig. 1. During the early years, the documents register four categories of bead workers: *perleri* (makers of wound beads), *margheriteri* (makers of drawn beads), *fabbricanti di smalti* (enamel makers), and *fabbricanti di canne* (cane makers). This segmentation into four distinct competencies, established by the ancient Guild rules, continues, at least nominally, beyond the abolition of the rules in 1806, apparently until 1815. The number of active beadmakers (*margheriteri* and *perleri*) drops continuously from the beginning of the century (except for a sudden, unexplained increase around 1810), and then they totally disappear in 1815, leaving only cane and enamel makers to be mentioned in the documents from 1815 to 1818. Following a gap in the documentation from 1820 to 1830,[3] two new categories of bead workers appear: enamel and cane producers on the one hand, and beadmakers on the other.

The evidence suggests that these two groups incorporated and reorganized the former four, with the merging of capital and competencies and the creation of large-scale factories that characterize this century's production. Such a reorganization appears to have been necessary to avoid the legal and economic impediments that the Austrian government repeatedly imposed over time, starting in 1815. One of their first actions was to impose heavy duties on the import of such raw materials as wood, niter, lithargir, allumen–mitigated only in part by some later derogation[4]– and on the export of finished goods. By 1819, the export duty on beads had risen,[5] and despite the abolition of the duty on goods circulating within the Austrian Empire in 1822, formal complaints filed with the Chamber of Commerce keep expressing deep frustration.[6] In 1830, the port of Venice was declared duty-free, thus becoming "external" to the other Austrian territories and, as it appears, was subjected once

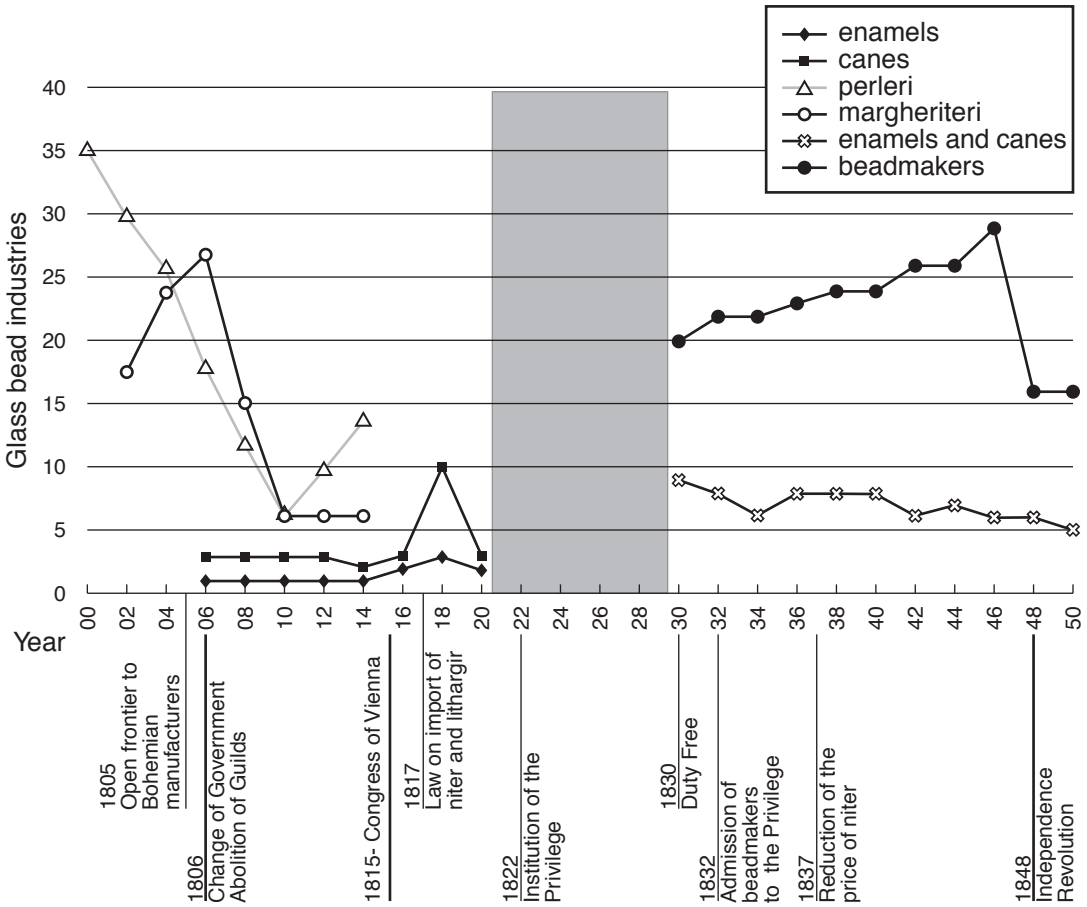

Figure 1. The Venetian glass bead industry, 1800-1850. Correlating archival documentation with historical events.

again to a duty for export to the countries of the empire.[7] The institution of the Privilege the same year gave Venetian bead factories the right to have a privileged fee on this duty, but the Privilege itself could only be obtained if the concern met a minimum factory standard and production quota, and had a specified number of associates, all regularly judged by a special inspection committee.[8] It is likely that all these factors provided impetus to the consolidation of economic forces and working skills. It is probably not by chance that the first real beadmaking enterprise was founded by Dal Mistro & Moravia in 1817, the year heavy duties were imposed on the import of niter and lithargir. Other successful associations of the 1820s include the names of the principal associates, like Barbini & Ferrari (until 1829), and Bellaudis & Santi (since 1828).

This new situation engendered two main working models of bead factories. On the one hand, the enterprises that covered the totality of production: enamels, canes, and beads. On the other, the factories devoted to bead fabrication only, either of wound or drawn beads, or both. In the first instance, beads were produced from A to Z, sometimes on the same site. Some factories were restructured and extended so that they could perform all the phases of the production process. In 1828, Pietro Bigaglia's factory on Murano, facing the Venetian lagoon, was huge and luxurious, with exceptionally long corridors devoted to cane drawing, with modern machinery for bead rounding (tube tumblers) as well as the old (*ferrazze*) and reverberatory ovens, and wheels activated by animal power. Finished drawn beads and canes for making wound beads were transferred to Venice, to Bigaglia's palace at S. Giovanni e Paolo, where wound bead makers would come to get their canes, while finished drawn beads were picked up by women and taken home for stringing.[9] Some other producers kept the fabrication of enamels and canes on Murano but maintained the laboratories for bead reduction in Venice, thus taking advantage of the existing structures. This was the case with Giuseppe Bellandis who fabricated enamels and canes at Murano, then had them worked into beads in Venice at San Francesco della Vigna, in the Castello neighborhood.[10] Everybody relied on the bead stringers working at home for the final packaging. In the most flourishing times of the 1840s, the main factories operated 7 to 12 crucibles, produced up to five thousand quintals of beads per year (like Giuseppe Santi did in 1846),[11] and had many hundreds of employees. In 1845, Bigaglia employed 100 workers at Murano, and 150 wound beadmakers and 350 bead stringers in Venice.[12] Overall, such major entrepreneurs were very few, ranging from five to nine in the years 1820-1850, and with very little renewal: those decades are dominated by the names of Bigaglia, Barbaria, Bellandis, Dal Mistro, Santi, later Voizot and Zecchin, as shown in Figs. 2-3.

In the second instance, where the factories produced only beads, the beadmakers bought enamels and canes from the previous factories, then produced wound and/or drawn beads. Depending on the size and organization of the concern, they would operate under their own name or–in parallel or alternately–as sub-contractors for the bigger enterprises. For example, in 1846, Francesco Donà, a producer of wound and drawn beads, appears in documents as working for himself as well as being a sub-contractor to Pietro Bigaglia.[13] In the same year, Giuseppe Lazzari, Antonio Piccoli, and Luigi Mingardi, small-scale bead producers, worked for themselves and also for a more major bead producer, Erardo Riesch.[14] The bead producers could have well-equipped quarters for making drawn beads from canes, with tools for chopping, rounding, and finishing on-site, and/or they could just rely on distributing the various tasks to beadmakers working at home, which was often the case for wound beads.

Bead producers were admitted to the Privilege (which enabled them to export their own merchandise) only in 1832, later than the other group. This could be the reason why in the late 1830s, some of them, probably enriched by the trade, were encouraged to start their own cane and enamel factory, or take over existing ones. This is the case, for example, with Giuseppe Zecchin who took over Barbaria's factory in 1835;[15] the Coen brothers, bead producers for decades, who formed a society for cane and enamel production with Bellandis in 1838;[16] and Edme Voizot, a former bead producer who became a cane and enamels producer in 1843.[17]

The ever-changing configuration of the active Venetian beadmaking industry is difficult to summarize. The disparity in the size and productive possibilities of the active factories elicited a different capacity of response to market fluctuations. During crisis times, market demands were filled by the "giants" of bead production, while smaller producers could either disappear, lose their Privilege, decide to form societies in their turn, or just work as sub-contractors in someone else's name. In good times, beadmakers could work under their own name, start an enterprise, ask to be admitted to the Privilege, and so on. This mechanism might partly explain why the number of industries is not necessarily in direct relationship to the quantity of beads produced, and why the recurring complaints to the Austrian government about the crisis of the bead industry don't always correspond to a real decrease in the total amount of beads produced.[18]

Market fluctuations had more impact on the number of active factories than on production itself, for which there are good figures at least until the late 1840s (the sudden decrease in the years 1848-1850 is due to the Venetian War of Independence against Austria). The mass of the population working in the bead business also shrank or increased

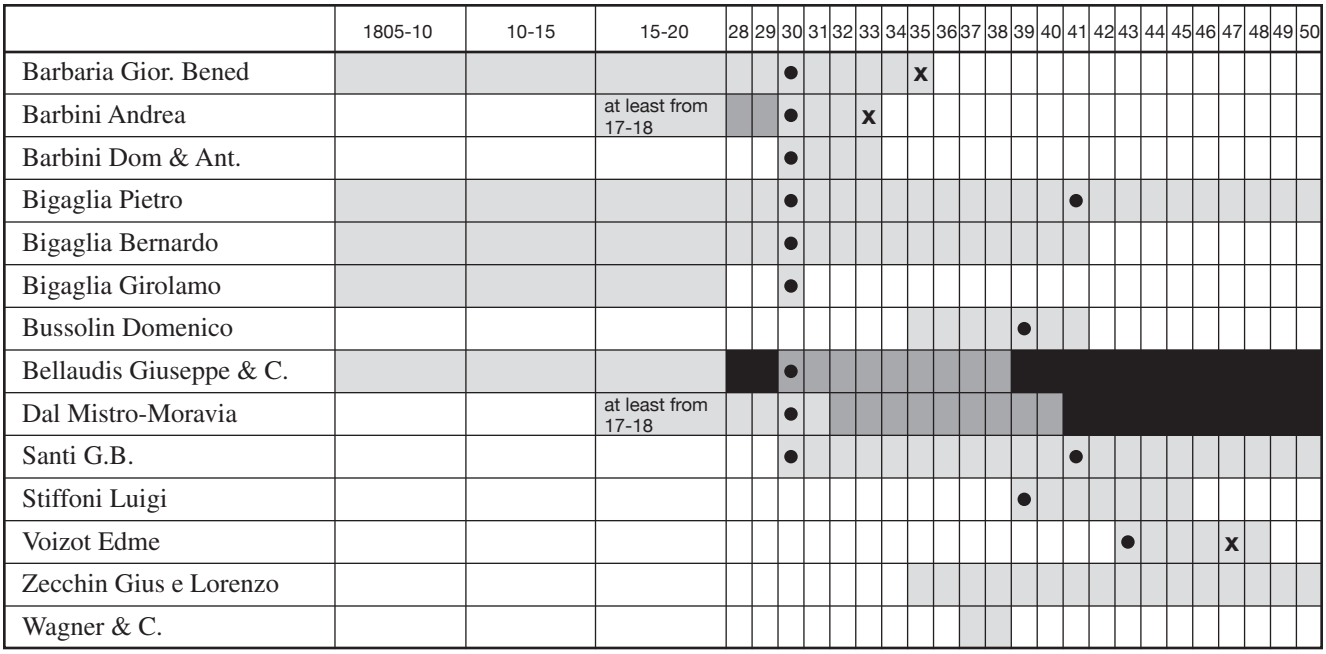

Figure 2. Venetian bead producers, 1805-1850. The shaded areas indicate the years for which documentation exists. A dot (•) indicates the year a factory obtained the Privilege, while an X indicates the year the Privilege was terminated (which sometimes was only temporary). The different shading indicates changes in the ownership of a factory: Barbini was associated with Ferrari only in 1828-29; Giuseppe Bellandis formed a society with Giuseppe Santi in 1828-1830, with Pozzato in 1830-1838, and then with the Coen brothers; Dal Mistro was associated with Moravia until 1830, with Minerbi until 1840, and then with Errera-Cerutti.

"following the need," as Austrian authorities noted at each factory inspection. Working at home became an essential part of the production chain, not only for stringing, but also for wound beadmaking, employing a huge quantity of people that the Austrian systems of control were unable to evaluate.[19]

In terms of professional status, the documentation very clearly reveals the birth of the figure of the "manager" and owner of the factory-men of great experience, expertise, and, sometimes, innovative attitude.[20] The manufacture of beads became in every respect a salaried activity. This was especially true for drawn beadmaking, which relied on a semi-mechanized mode of production alternating between handwork and machine work. Wound beadmakers, though salaried as well, seem to have kept a separate status as craftsmen, retaining their dignity as "artists," as they are often referred to.

Because of the deceptive nature of the documentary sources in the Venetian Archives, and because of the very mechanism upon which the bead industry was based, it is very difficult to establish the real importance–both in quantitative and qualitative terms–of Venetian bead production. The data collected provide an historical and social picture, and are interesting for local history. In the bigger context, they will prove useful only if compared and cross-referenced with other elements, such as sample cards and books that may contain the names of some of the Venetian producers of the time. The development of this research could include additional inquiry at the State Archives, at the archives of the Istituto di Scienze, Lettere ed Arti in Venice, as well as inquiry into the Austrian archives, and private archives and collections worldwide.

Endnotes

1. Particularly in the documents of the Capitanato Provinciale period (1803-1806). A very interesting source is the published *Tariffa de'prezzi di tutti li generi appartenenti all'arte dei perleri di questa citta* (a price list of all the bead types produced in town) by A. Valle (Venice, 1801). Several hundred bead types are mentioned, but despite the descriptive nature of their names, it is very hard to match them with known bead types.

2. Because of the way documents are organized in the archives, being divided by government and administration, data on a specific subject are found in various locations. Other than making the research lengthy and somewhat cumbersome, this has meant devoting much time to integrating all the different

	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	
Amadeo Angelo																						
Barbaria Gio. Antonio			●																			
Brocchieri G.																						
Cerri Domenico																						
Cerri Marcantonio			●																			
Coen f.lli di Benedetto				●																		
Dal Medico F.lli										●												
Dezan Giuseppe			●																			
D'Este Giuseppe																						no privilege
Diena Abramo										●												
Donà Francesco			●																			
Flantini Carlo			●																			
Foher L.																						
Franchini Carlo																						
Gaspari Giacomo																						
Gaspari Lorenzo																	x					
Gaspari Francesco			●														x					
Gaspari Vinc. e nipoti			●																			
Giacomuzzi Antonio																						
Giacomuzzi Angelo			●																			active since 1816
Gras Giacomo																						
Lazzari Giuseppe			●																			
Mingardi Luigi			●																			
Padoan Francesco e figli			●														x					at least since 1815
Pitteri Andrea			●																			at least since 1811
Polacco Benedetto			●																			
Pusinich Luigi			●														x					
Riesch &C			●																			
Rizzi Cristoforo			●																			
Rubini G.												●										
Soardi Onorio			●																			
Stiffoni Luigi																	●					
Voizot Edme			●														x					
Zanetti Pietro			●																			
Wolfin & Johr (ex Riesch)																						

Figure 3. Bead producers in Venice, 1830-1850.

components into a consistent whole. The main documentary sources are: *Capitanato Provinciale* (1803-1806); *Camera di Commercio* (1806-1870); *Commissione di Sorveglianza alle fabbriche ed arti privilegiate nel recinto del Portofranco di Venezia* (1830-1873), hereafter Porto Franco.

3. This documentary void is partly due to our limiting the research to the so-called "Privileged factories." A possible development of this research will include recognition of licences assigned by the mayor (through the Chamber of Commerce) to all the active craftsmen, as explained in L. Alberti, *Quadro del sistema di commercio e d'industria vigente nelle provincie venete*, Venice, 1823.

4. ASV, Camera di Commercio, b. 23 (1818), t. III, fasc. 10. In 1826, only the duty on the soda coming from Pola (Dalmatia) was abolished (ASV, Camera di Commercio, b. 52 [1826], t. III, fasc. 2).

5. ASV, Camera di Commercio, b. 29 (1820), t. III, fasc. 9.

6. ASV, Camera di Commercio, b. 52 (1826).

7. This mechanism is not very clear and will require further research to be fully understood.

8. A form of Privilege certainly existed at least since 1822, as Dal Mistro is reported as a "national privileged factory" in that year (ASV, Camera di Commercio, b. 82 (1826), t. III, fasc. 4). However, it is not clear whether this first Privilege system applied to exports abroad or not.

9. ASV, Camera di Commercio, b. 59 (1828), t. III, fasc. 4.

10. ASV, Porto Franco, b. 12 (1833-47), t. X, fasc. 13.

11. ASV, Porto Franco, b. 54 (1845-73), t. VIII, fasc. 3.

12. ASV, Porto Franco, b. 54 (1845-73), t. VIII, fasc. 4.

13. ASV, Porto Franco, b. 12 (1830-44), t. X, fasc. 5. See also ASV, Porto Franco b. 75 (1845-73), t. LI, fasc. 1.

14. ASV, Porto Franco b. 75 (1845-73), t. LI, fasc. 10.

15. ASV, Porto Franco b. 12 (1830-44), t. X, fasc. 4.

16. ASV, Porto Franco b. 12, (1830-44), t. X, fasc. 18.

17. ASV, Porto Franco b. 54 (1845-73), t. VIII, fasc. 4.

18. Data concerning production quantities were gathered by Silvia Ferrari and will be available soon.

19. In the bead industry, the existence of a mass of working people who were escaping the official system and ways of control is evident since the 18th century, as noted by F. Trivellato, "Echi della periferia. Note sulla circolazione e la produzione delle perle di vetro veneziane nei secoli XVII-XVIII," *La ricerca folklorica*, 1996, (34):25-34.

20. This is particularly true for the invention of new enamels, the introduction of new textures and colors, and the like. The most famous case is Bigaglia's *aventurina*, but many others were awarded prizes during these years for their innovative work. *See* V. Mutinelli, *Annali delle Provincie Venete (1816-40)*, Venice, 1843, and the *Atti dell'Istituto Veneto di Scienze, Lettere ed Arti*. As to the process of mechanization, on the contrary, Venetians appear to have been slow and not very innovative.

4. COMMENTS ON "RARE" MELON-SHAPED CHEVRONS, by Jürgen Busch (1997, 31:8-11)

Marie-José Opper's note in *Bead Forum* #30 on a melon-shaped Italian chevron bead found in the northern Mauritanian holy city of Chinguetti requires some corrections and additions. Locally called *sria*, the antique, small, seven-layered, melon-shaped chevrons are said to be "rare" by Mrs. Opper. This is somewhat misleading. Among the 2,000 chevron beads depicted by John and Ruth Picard (1986, 1993), one is a melon-shaped type. Three specimens of this kind (including one in a "rare" blue-green color), against 200 in "traditional" shape, are in the author's collection (Fig. 1); one is in Mrs. Opper's hands. Five "melons" in relation to approximately 2,400 pieces in traditional shape result in a percentage of ca. 0.2%. This percentage would be significantly higher (4.5%) if only the author's collection is considered, revealing that melon-shaped chevrons are not as "rare" as Mrs. Opper believes. Since no records exist of Italy's total chevron-bead production (some hundred million pieces may be just a pessimistic assumption) it is hard to estimate how many melon-shaped chevrons are represented by 0.2% in absolute numbers.

A knowledge of Mauritanian bead prices and local women's bead preferences leads me to disagree with Opper's statement that such *sria* are "highly prized" in Mauritania. In my experience, chevron beads are neither particularly highly valued nor expensive. "Highly prized" is a relative and confusing term (in the Mauritanian bead

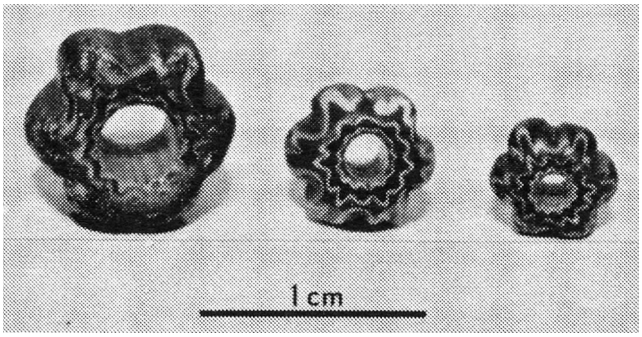

Figure 1. Three melon-shaped seven-layered chevron heads (the middle one with a "rare" blue-green outer layer) acquired in Tichitt and Oualata, Mauritania, in 1993-1995 (photo: J. Busch).

context anyway). Especially in Mauritanian bead markets, "highly prized" must be understood as meaning nothing but "highly priced!"

Religious prestige and the magical aura of a bead are the main parameters for value in the Mauritanian bead market. Beads with this reputation are automatically both "highly prized" and "highly priced!" Is this the case with chevrons in Mauritania? It is definitely not! The three dollars apiece I regularly paid for them between 1992-1996 explains their status and value better than words. One thing is clear: chevrons are cheap in Mauritania, especially in a market where certain kinds of glass beads (e.g., simple monochrome *nila* beads [blue glass beads of uncertain origin] and the *morfia* [Fustat Fused-Rod Beads] imported from Egypt) reach high-end prices comparable with the top beads on the U.S. bead market.

It should also be kept in mind that different ethnic groups set different values on the same kinds of beads. While a southern Sudani may pay ten dollars for a chevron bead, the northern Beidani may refuse it for three. Generally speaking, glass beads of European origin (including chevrons) are neither as expensive nor as "highly prized" in Mauritania as seems to be assumed by some researchers, especially in comparison with the country's West African neighbors. A few Hausa traders, mainly in the capital, offer some strings of Italian "trade beads" to foreigners, but the traditional Mauritanian bead market is completely in the hands of local women. Compared to beads of stone, metal, wood, amber, and coral, European glass beads, including chevrons, are under-represented, but not rare. Thus, "highly prized" is the wrong term to describe the value of any chevrons in Mauritania!

Mrs. Opper continues that the trans-Saharan route, located just 4 km from the town of Chinguetti where the melon-shaped *sria* was found, "linked southern Morocco with the Adrar, a mountainous region located in what is now Algeria and Niger." This is in error! Opper obviously confuses the northern Mauritanian Adrar province around Chinguetti with an area called Adrar des Iforas in what is now Algeria and Mali (not Algeria and Niger). This area is located 40 caravan days or 1,000 miles to the east (Fig. 2). This route once connected southern Morocco's commercial center Sigilmassa in the Tafilalet oasis with Tadmekka (*Es Souk*, Arabic for "the market") at the southern edge of Adrar des Iforas. Thus, this route cannot be considered when asking how this bead might have reached Chinguetti. Assuming that Mrs. Opper meant the indirect and minor Morocco-Adrar route (from Sigilmassa to Awlil via Nul, Idjil, and Asugi to Chinguetti), it raises the question whether European products, like glass beads, were traded on inner Saharan routes during the late Middle Ages. Since the 16th century, routes close to the coast (Sigilmassa-Sila/Takrur on the lower Senegal River is one example where glass beads were reported as a trade item) were given preference, mainly for better security. However, early beads could also have gotten to the Sahara by the overland route. In contrast to Mrs. Opper, I would suggest that glass beads intended for the West Saharan trade primarily came in through West African ports, at least since the early 16th century.

Chinguetti developed into a city in the second half of the 15th century; therefore, the "late Middle Ages" would be more precise than just "the Middle Ages" for dating it as stated by Mrs. Opper. It is also significant to note that Chinguetti, one-dimensionally described by Opper as a "major relay point for caravans...," is also an important religious center, one of the seven holy cities of Islam. It has the third-oldest African mosque, dating from the 13th century, and is one "meeting point" for western Saharan pilgrims joining the yearly caravans for the *hadj* to Mecca.

Opper's question as to why chevrons can be found in Mauritania when they were also exported to the Americas by 16th-century explorers is odd. Chevron beads are found in many parts of the world from Madagascar to the Philippines (Francis 1993), not only in the Americas and West Africa.

Finally, measurements should have been provided, not just the statement that the melon-shaped chevron was "small." [Ed. note: There was a metric scale in the photograph submitted by Mrs. Opper but it was cropped from the photo to save space; the specimen is ca. 7 mm in diameter.]

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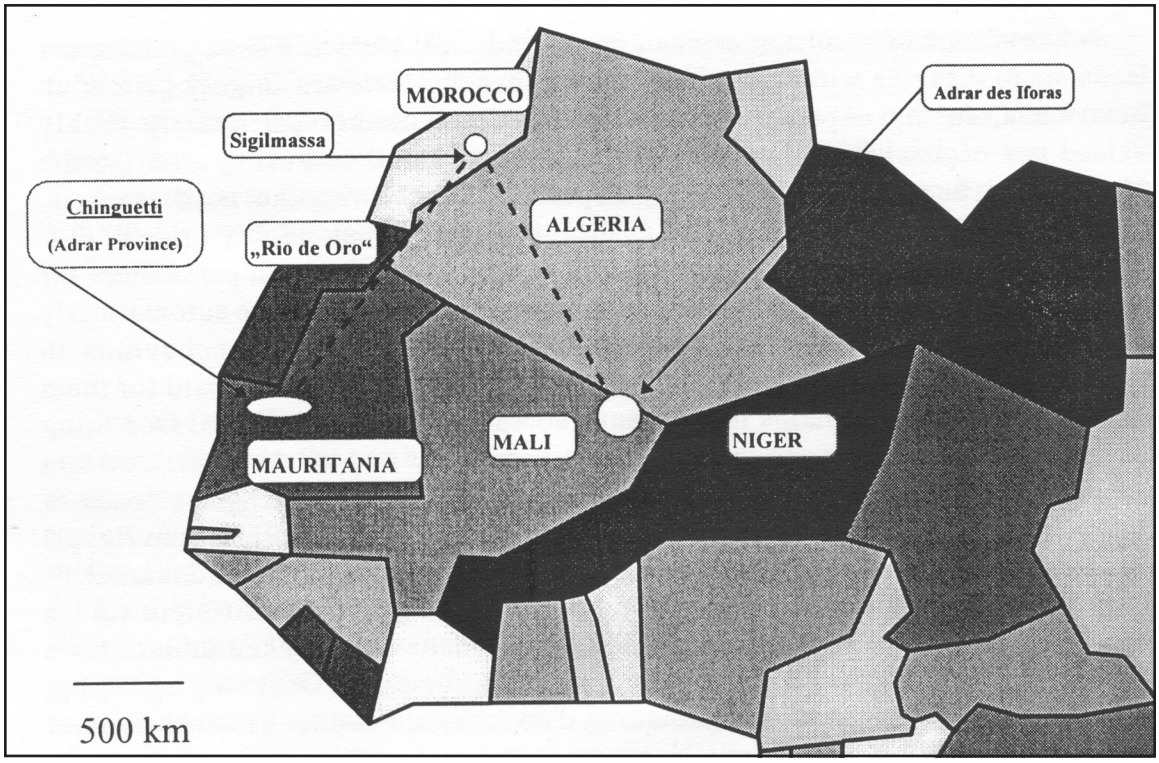

Figure 2. Map of West Africa showing the locations of the places and routes referred to in the text (drawing: J. Busch).

Picard, John and Ruth Picard

1986 Chevron Beads in the West African Trade. *Beads from the West African Trade Series* 1. Carmel, California.

1993 Chevron and Nueva Cadiz Beads. *Beads from the West African Trade Series* 7. Carmel, California.

5. A NOTE ON THE NEUTRON ACTIVATION ANALYSIS OF 16TH- AND 17TH-CENTURY BLUE GLASS TRADE BEADS FROM THE EASTERN GREAT LAKES, by Anne Chafe, Ron Hancock, and Ian Kenyon (1986, 9:13-18)

By the late 16th century, European-made glass trade beads were reaching the Native peoples of the eastern Great Lakes. From this time until the mid-17th century, beads of blue glass were widely traded items, being about as common in regions dominated by the French trade (Ontario) as by the Dutch (New York).

Although there is a wide range of blues observed in the glass trade beads of this period, there are two modal hues. One is a turquoise blue (hue about 2.5PB to 7.5B in the Munsell notation) called "robin's egg blue" in the Kidds' 1970 typological system (bead varieties IIa40, 41, 42, depending on the particular bead form), with some specimens tending towards "cerulean blue" (IIa44), "brite copen blue" (IIa45), and "shadow blue" (IIa46, 47). The second modal blue is a very dark, more purplish blue (about 7.5PB) which is called "brite navy" in the Kidds' system (varieties IIa55, 56, 57, depending on shape). This is the same blue that appears on the outer layer of "star" or "chevron" beads (IIIk3, IIIm1).

Although certain bead types can be used to identify particular time horizons or even European-centered trading zones, the turquoise blue beads (IIa40) have an extremely wide time-space distribution; that is, their presence on a site is not diagnostic. Yet, do these IIa40 beads in fact represent a homogeneous group or are there subtle differences through time or over space? More generally, why do there seem to be two basic colors of blue in these early historic trade beads? Furthermore, why is there a tendency for the turquoise blue glass beads on late 16th-century sites to be found in a highly disintegrated condition? To answer these questions, it seems that we must go "into" the beads, and look at their chemical composition. Other chemical analyses incorporating Great Lakes material have been reported by Karklins (1983) and Lewis (1979).

Consequently, 88 blue glass beads were selected for non-destructive neutron activation analysis using the SLOWPOKE Reactor Facility at the University of Toronto.

Ten chemical elements were sought: cobalt (Co), tin (Sn), copper (Cu), sodium (Na), aluminum (Al), manganese (Mn), chlorine (Cl), calcium (Ca), arsenic (As), and potassium (K). In addition, silicon content was measured in a subset of the bead samples. It would have been advantageous to have included iron (Fe) but unfortunately that would have required a neutron irradiation 1000 times greater, which would have left most of the beads slightly radioactive for more than a year. As it was, beads could be handled only 1-2 weeks after analysis.

The rationale for this particular selection of elements was that all of them produced, on neutron activation, short-lived radioisotopes, which decayed with the emission of characteristic gamma-rays, easily quantifiable with a gamma-ray spectrometer. The diagnostic suitability of these elements is that Co, Cu, and Mn are elements used commonly in pre-industrial glass technology to produce blue and purple colorations, while Sn is an opacifier. Glass is a randomly modified network structure, with the network made from oxides such as $Si0_2$ (silica), but modified by oxides of Na, K, Ca, and Fe. Usually Na and/or K are present in large amounts (5-15%), at which level they act as a flux to lower the melting temperature of the raw material mixture. Another essential element was Ca, the presence of which in moderate amounts improves the resistance of glass to chemical attack. A common constituent of certain cobalt-containing ores is As. Chlorine and aluminum, while only minor elements, are sometimes very useful in characterizing ceramic/glass materials.

To provide a time/space "grid" in which to examine for patterned chemical variations, beads were selected from a number of late 16th- and 17th-century sites in both Ontario (Huron and Neutral) and New York state (Seneca). Late 16th-century (ca. A.D. 1580-1600) samples included beads from the Molson and Kleinburg sites in Ontario and the Adams site in New York. The 17th-century samples (ca. 1620-1650) derived principally from the Train, Ossossane, and Burke sites in Ontario, and the Warren and Cornish sites in New York.

Colorants

The two basic "blues" can be clearly associated with two principal colorants, copper and cobalt. Copper, specifically copper in its Cu(II) state, yields a turquoise color (i.e., "robin's egg blue"); in fact, the mineral turquoise itself is a copper compound. In contrast, cobalt produces a dark blue glass ("brite navy"), and it was widely used in ceramic decoration; for example, on English "old blue" printed earthenwares of the early 19th century. In none of the beads was Mn the principal colorant, although in some specimens there is a significant amount of Mn present. Manganese imparts a violet tinge to glass, perhaps best known to historical archaeologists in solar-oxidized, late 19th-century medicine bottles.

Despite the various shades of blue identified by the Kidds in their bead typology, all the beads so far examined can be assigned to the two major color groups: those principally colored with copper and those with cobalt. As a colorant, cobalt is 20 times as powerful as copper and 10 times as powerful as manganese. In some beads the addition of only 300ppm (0.03%) cobalt is sufficient to produce the characteristic dark blue glass. In turquoise beads, copper content ranges from about 0.6 to 2.0%.

Most beads examined are made of translucent glass, although this translucency is masked in copper-colored beads by the presence of numerous air bubbles. Certain beads, however, are noticeably opaque (type IIa46/48?). On analysis, these opaque beads were found to have significant quantities of tin (5-7%), which in the absence of a colorant produces an opaque white glass. Since variety IIa46/48 beads contain significant amounts of cobalt, this tin and cobalt mix yields "pastel" blues.

There are certain temporal differences in the amounts of colorants. Late 16th-century copper-colored beads normally contain from 1.0 to 1.6% copper, while the 17th-century examples mostly range between 0.7% and 1.1%. The earlier beads, with their higher copper content, tend to visibly differ from later beads, the earlier ones displaying a more "intense" blue. Furthermore, there is some evidence for spatial variation in the Mn content of the copper-colored beads. A sample of beads from the 17th-century Seneca sites of Warren and Cornish, while having copper levels similar to contemporaneous Ontario sites, tend to have a higher manganese content: 9 of 12 beads from the Seneca sites have greater than 700ppm of Mn, compared to 7 of 28 for Huron/Neutral sites. In the high Mn beads, the "normal" turquoise color may have a slight violet tinge.

Major Elements

All of the non-disintegrated blue beads have relatively high amounts of sodium (about 7-14%) and low amounts of potassium (under 5%), thus confirming Karklins' (1983) observation that most drawn beads are soda glass in contrast to wound beads which are usually potash glass. There are, however, differences in the sodium content between 16th- and 17th-century copper-colored beads. The Na levels for the late 16th-century copper-colored beads mostly range between 7 and 11% compared to 10-13% for the 17th-century

ones. The cobalt-colored beads tend to have relatively low sodium (7 to 10%).

There are also differences in calcium levels. The cobalt-colored beads have relatively high Ca (4-8%), whereas most copper-colored beads range between 1 and 5%. Once again, there are temporal differences within the group of copper-colored beads: the 16th-century beads are very low in calcium (most between 1 and 2%), while 17th-century ones display slightly higher levels (2-5%).

One characteristic of the late 16th-century copper-colored beads is their tendency to be found in a disintegrated state, sometimes consisting of nothing but a blue or green powder with glass particles reduced to the size of sand grains. Analyses of such disintegrated beads from the Kleinberg, Molson, and Adams sites reveal that the glass has been largely stripped of its sodium content (under 4%).

It is perhaps significant that the 16th-century turquoise-glass beads in general have low Ca, particularly the disintegrated ones (0.5-1.5%). This suggests that these beads had an insufficient amount of calcium to prevent them from being chemically attacked. In contrast, the cobalt-colored beads, with their high Ca content, are not normally found in this disintegrated state.

Minor Elements

Chlorine ranges from about 0.5 to 2.1%, copper-colored beads displaying greater quantities than the cobalt ones. The chlorine content is closely correlated with Na levels, suggesting that the chlorine was added to the glass as an impurity in the soda ash.

Aluminum ranges from 0.3 to 1.2%, but there is no patterned variation with either time, space, or major colorant type.

The amount of arsenic is closely related to cobalt content. Since arsenic is present in many cobalt ores (e.g., cobaltite and skudderudite), the ratio of As to Co may ultimately prove useful in determining the cobalt source or sources used in coloring the dark blue beads.

Conclusions

The 16th- and 17th-century blue glass beads studied here have two basic chemically produced hues: turquoise blue (copper) and dark blue (cobalt), although variation exists depending on the particular amounts of these colorants as well as the presence of such color modifiers as manganese and tin. In the turquoise beads there are chemical differences through time, although it is presently unknown whether this represents a general change in manufacturing process or a shift in the source of supply. Spatial differences in the manganese content of the 17th-century copper-colored beads suggest the possibility of discriminating French and Dutch trade items, although more analysis is required to confirm this.

Acknowledgements

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6. GLASSWARE OF THE 10TH-13TH CENTURIES ON SITE 1, GDANSK, by Aldona Chmielowska (1985, 7: 14-16)

(English summary of "Wyroby Szklarskie z X-XIII Wieku na Stanowisku 1 w Gdansku," by Aldona Chmielowska, 1960, Prace Komisji Archeologicznej, Nr. 3, *Gdansk Wczesnosredniowieczny*, Tom 3, pp. 105-158, Plates 1-3. Gdansk.)

The archaeological investigation of site 1 in Gdansk has resulted in the recovery of a rich and varied collection

of cultural material which offers an excellent opportunity for the examination of social and economic relations in early feudal Poland. The material discussed comes from 17 habitation layers of a fortified urban settlement which existed from A.D. 980 to A.D. 1308, when it was burnt down by the Knights of the Order of St. Mary.

Of the glass objects, beads form the most numerous group, whereas rings and ring-settings rank second and fragments of glass vessels third. According to their external features, beads were divided into three groups: transparent beads, opaque beads, and glazed beads. The transparent beads were subdivided according to shape, whereas the basis for the classification of opaque beads was provided by their shape, ornament, and general character.

In contrast to Kruszwica and Wolin, Gdansk did not yield direct evidence for the local production of glass ornaments. Therefore their origin had to be established on the basis of technological analysis. In the early Middle Ages three principal types of glass were produced: soda glass in the east (identical glass was produced in the Rhenish land until the close of the 9th century), potash glass made particularly in the West since the 10th century, whereas in Old Russia glass composed mainly of lead and potash predominated.

Fourteen objects from Gdansk were subjected to chemical and spectroscopic analyses. The analysed relics consisted of transparent beads, opaque ornamented beads, rings, and fragments of glass vessels. Objects made of lead-potash glass predominated. This glass served principally for the production of transparent beads, rings, and opaque undecorated beads. On the other hand, analysis of the glass vessels revealed that one was made of potash-lime glass and another of soda-lime glass. A recovered glass lump was also of the soda-lime kind. The last mentioned objects may have been imported from foreign lands. The closest analogy for the lead-potash glass objects is furnished by Old Russian glassware. There is, however, an element which shows the peculiarity of Polish glass, namely tin. Neither Arabic nor Western European glass contains it. In Old Russia small quantities of tin occur in mosaic glass alone. Tin was probably used for the devitrification of glass. It was found in 7 of 11 examined beads and rings.

The examination of glass objects from Gdansk has revealed the following:

a) The predominant glass ornaments were chiefly made of lead-potash glass with an admixture of tin. Consequently it is possible that they were produced locally during the 320-year existence of the fortified urban settlement of Gdansk.

b) Glass objects differing from the former in chemical composition are probably of foreign origin.

c) Along with glass ornaments produced locally, the site yielded glass ornaments and vessels indicative of commercial contacts between Poland and other countries.

d) Of the glass ornaments, the most numerous are the transparent beads (81 specimens), next the opaque undecorated beads (48 specimens), then opaque decorated beads (33 specimens), while the glazed beads (20 specimens) are the least numerous.

The transparent beads of lead-potash glass may be of local origin. Probably also of local make are the opaque beads, irregular in shape and without ornamentation. The opaque beads decorated with coloured motifs seem to be the result of commercial relations between Poland and other countries.

e) Apart from foreign commerce, an internal trade in glass objects may have existed in early medieval Poland. For the present, however, we do not know which glass factories of Poland could have distributed their products on an extensive scale.

7. CZECH BEADS, by Vladislav Chvalina (1992, 21:5-8)

Jablonec Jewelry has contributed to the great tradition of Czech glass through its manufacture of glittering glass beads in numerous beautiful styles.

For almost two and a half centuries, the manufacturing center for Czech jewelry has been in the Jizera Mountains in Northern Bohemia, mainly in the vicinity of the picturesque town called Jablonec nad Nisou. The jewelry is, of course, closely related to the production of glass beads. Skilled glassmakers in the region used to make hundreds, perhaps thousands, of different kinds: various shapes, sizes, and colors of beads. The same type of bead production continues today.

The “seed” beads, most of all “rocailles” (a tiny, brightly colored round bead), and “two-cut” beads, have an interesting history and unforgettable charm. The exhibition called “Rocailles in the History of Nations,” held October-November, 1990, in St. Peterburg, Russia, revealed how important small glass beads were in the life of many nations. That is why we find Czech beads in the villages of native people in all corners of Africa, America, Canada, and the northern part of the former Soviet Union, as well as in the Far, Middle, and Near East. The traditional costumes of many European nationalities were richly decorated with seed-bead embroidery.

From the beginning of this century, seed beads became a very important part in all centers of fashion. We find skillfully embroidered bead creations in the collections of Haute Couture salons. Handbags and various kinds of jewelry made from seed beads now also play an important role as popular accessories.

The first record of the manufacture and export of seed cut beads in the Jablonec area dates to 1782. Production in the beginning was very primitive: thin tubes of glass were cut on vertically rotating wheels powered by a foot pedal. Since 1817, beads cut by this method were put in rotating drums with sand and heated in a furnace. By this operation, the seed beads became round. After removing the sand, the small beads were polished with a special powder and washed with water to make them shiny. Furthermore, the beads were cut or dyed in various ways or metal plated. In the Jablonec region, not only local material was used but also semi-finished products from Venice, the cradle of seed-bead manufacturing.

The Venetian beads were mostly cut in the Jablonec area. The significant change in the production of seed beads came about in the year 1890, when the cutting machine, similar to a guillotine, was introduced. This machine enabled a bunch of tubes to be cut at the same time.

The most important Bohemian makers of small glass beads before World War II were the companies of J. Riedel at Dolní Polubn, L. Breit at Luany, and V. Linka and Sons at Lounice. J. Riedel and L. Breit were the principal suppliers of glass tubes and unrefined kinds of seed beads; the Linka company had the important function of refining seed beads in the region of Zasada. The tradition of their production was closely connected with the initial development of the Jablonec jewelry industry.

Various "ceylons," silver-lined beads and "irises" were the most sought-after kinds for embroidery work in the fashion centers and the handbag industry. It is worth mentioning that the glass tubes in transparent colors for seed-bead manufacture have either a round or a square hole. Square holes help in the application of a silver solution to bring about a shiny gloss. The most famous iris finishes are gunmetal, red, blue, and green.

The tradition of manufacturing quality Bohemian beads is being kept alive by Jablonecké Sklárny at Desná in the Jizera Mountains. After the Second World War, the factory produced glass rods and tiny tubes both in the old traditional way and on modern equipment. From these rods and tubes, various beads, seed beads, glass stones, and glass accessories are being produced in different factories. There are nearly 400 colors and shades. The quality of this material and the wide variety of colors guarantee the quality of the final product; thus, the wider offering makes it possible to satisfy every customer.

Rocailles, bugles, two-cut beads, three-cut beads, pipes, tubes, and charlottes are all beads produced in the Jablonec region. The center for refining the beads and for stringing them into ready-made costume jewelry is the township of Zásada, in the vicinity of Jablonec nad Nisou. The inhabitants of this area were, no doubt, in touch with glass through the glassworks that were first built in the nearby village of Hu in 1558. Even Hu's translation in Czech means the general expression for a place where glass is smelted. First the people carried their small glass wares in baskets on their backs to nearby villages. Later carts were used to deliver various glass goods (glasses, perfume bottles, mugs, steins, etc.) to more distant places. At the end of the 18th century, many inhabitants of Zásada started to do this trade full-time. The most important product became the embroidered designs made from rocailles imported from Venice. The Venetian beads were expensive and therefore people tried to replace them with so-called *schmelz*; i.e., small beads cut from tubes. For some products, schmelz was not good enough. These beads were coarser than Venetian rocailles and not as polished as they were cut from tubes 4-7 mm in diameter.

These local "wordly" people started their selling trips at the beginning of spring. On the evening before their departure, they got together with their friends and families to say goodbye. They returned in the fall.

They were very respected citizens because they employed many local people during the winter.

These people

> ... prepared stringing of various ornaments for women, comb holders and brushes, cages with birds made from wax, small doilies to put under vases and bigger ones for tables, bracelets from schmelz and various brooches and hair pins. In addition there were many kinds of ties made from seed beads, and various beautiful belts from seed beads to beautify women in far away places.

This is the way the pioneer business trips are described in the village records of Zásada. Gradually the assortment of goods grew. Round rocailles made by the companies of Riedel and Breit were used for women's and children's handbags. These companies also made "pompadour" bags (a flat handbag with a lock), various necklaces, headbands, bracelets, brooches, etc. Their special items were Christmas ornaments. These were made from seed beads strung on wire.

Toward the end of the 19th century and in the first half of the 20th century, the export of all Jablonec goods, including seed beads, was taken over by export houses. The majority of these houses specialized in the export of certain goods. Some, on the other hand, dealt only with chosen markets. In the second half of this century, Jablonex became the sole exporter of Bohemian beads. Jablonex works with customers in all parts of the world. Jablonex is determined not only to keep the good name of Bohemian beads but also to improve it.

The exhibition "Beads in Czechoslovakia" which was held in 1988 in Jablonec nad Nisou in the local museum showed that seed beads have always been useful and popular in the life of man. The exhibition "Beads in the Culture of Nations" held in St. Petersburg at the Museum of Ethnography of the Nations of the former USSR revealed how man combines fantasy and skill to create beauty from tiny beads.

Ed. note: The above article is a slightly abbreviated translation of the *"Cheshkiy biser"* section of the exhibition catalogue *Biser v kulture norodov mira* (Beads in the Culture of the Peoples of the World), ed. by N. Sosnina and V. Chvalina, 1990, pp. 11-12 (*see Bead Forum* No. 19, p. 15).

8. LONDON CORRESPONDENCE, by Gloria Dale (1986, 8:4-7)

The report of the SBR dinner and subsequent informal meeting in Long Beach, California, was of interest (*Bead Forum* 7:1). As a member who lives a continent away from most other members I should like to comment on certain conclusions that were reached.

The present form of the SBR newsletter strikes me as satisfactory as it is for the moment. It is nicely printed on good quality paper. Photographs, if of very good quality, would be welcomed although clear, detailed drawings of beads are often more useful. Good color photography must be very expensive.

The Committee is correct in stating that what is needed is more original research but it is vital that the material included is well-researched and accurate if it is to be useful to scholars.

Archaeologists have long been concerned with the problem of a standardized system of bead nomenclature. Of course, Beck made a considerable contribution to this subject. Johan Callmer , in "Trade Beads and Bead Trade in Scandinavia ca. 800-1000 A.D.," 1977, attempted another system which is cumbersome and too complicated.

There are built-in problems in trying to give an exact description of a type of bead–to get agreement on terminology is nigh impossible. Even a basic globular bead is referred to as "spherical" or "round." If there were a limited number of perfect shapes the situation would be different, but in my collection of over 40,000 beads I find that there are numerous variations of biconical, barrel, cylindrical, faceted, disc, etc., beads. It would be impossible to name all of these shapes accurately and coding them, e.g. IXb1c, as Beck does is not practical.

What bead researchers need are documented material and excavation reports with detailed drawings of all the types of beads found in that particular site with an accurate description pertaining to material, size, color, type of perforation, and parallels for dating purposes. What you call the shape is unimportant and I should be sorry to see the limited membership of the SBR spending its energy on semantics.

As for color, there are color charts that one can already refer to. However, color is subjective and there can be varying opinions as to whether a piece of glass is bluish-green or greenish-blue.

Too many errors are made in identifying bead material. This is really the work of a mineralogist and/or gemologist. Excavation reports often contain misinformation because those cataloging the materials are not familiar with a variety of materials.

A case in point is to be found in the Jericho report, volume I, where Early Bronze Age-Middle Bronze Age disc beads are described as orange and red glass. Glass beads dating from the mid- to late 3rd millennium would indeed be a dramatic find as the first glass artifacts are dated by Donald Harden to circa 1500 B.C. I strongly suspect that these disc beads are transparent reddish-orange carnelian. Unfortunately the Jericho material has been dispersed and it has been difficult to track these beads down.

A mineralogist told me that in order to give exact information on the nature of a stone (bead) it is necessary to take a slice of it to be examined under a microscope. It is often difficult to judge a stone once it has been transformed into an artifact. There is also confusion about the names of stones. Chalcedony, agate, and carnelian are often used interchangeably and this causes confusion.

Dr. Schienerl's article on "Cornerless Cube Stone Beads in Egypt and Palestine" (*Bead Forum* 7:8-9) is evidence of the problem of material identification. Without seeing the green stone beads to which he refers it is impossible to ascertain what the stone is. However, I am familiar with beads of this type which are associated with the "heart" pendants (Islamic

amulets of the Mekkawi shape–known as *Thlhatana* in Hausa) and long faceted beads. I have such a necklace of large green cornerless beads from Persia as well as smaller examples from Syro-Palestine. If one studies photographs of ethnic peoples it is clear that the size and weight of bead adornment is no hindrance. I have been advised that these cornerless cube beads are bloodstone, a type of hematite. I've also seen more recent examples in moss agate. They may have been manufactured in Cambay or Germany or in both places. Cornerless cube beads are also made of lapis lazuli and date to the 3rd millennium in the Middle East.

It is valid to associate them with protective amulets and beads. I found that all the beads and pendants worn by the Bedouin in the Middle East have magical significance, usually to ward off the evil eye or to promote fertility.

The articles on the Arkell Collection that *Ornament* will be publishing deal with the magical properties of beads and with the Egyptian dealers who provided Arkell with many of the beads in his collection. One such dealer was G. Hindi who was convinced that all stone beads were made in Cambay. Having carefully examined the Arkell beads, I am certain that many of the carnelian beads are of considerable antiquity and were either kept as heirlooms or traded in the distant past.

Dr. Schienerl is probably not very familiar with ancient beads from the Middle East as he states that "no other material [except for agate?] seems to have been used for cornerless cube beads."

I have in my collection cornerless cube beads of various stone materials as yet unidentified, a splendid string of rock crystal cornerless cubes, and a beautifully cut string of small Hellenistic carnelian cornerless cubes. These were often used on Hellenistic gold chains and there is such an example in the Nicosia Museum in Cyprus. I also have amber and jet cornerless cube beads. This was a very popular shape and was copied in glass as early as 900 B.C.

I would like to encourage SBR members to base their research on source material that is documented and on excavation reports. We will gain the respect of the archaeological world only if our published reports are accurate and well researched. Once the SBR has gained this recognition we may be able to have a positive influence on the study of this subject.

P.S. I have decided to give all my bead correspondence and research papers to the Institute of Archaeology, University of London, 31-34 Gordon Square, London WC1H 0PY, England. The material, which deals primarily with ancient beads, should be cataloged by the end of April. Mr. Peter Parr, Head of the Department of Archaeology, assures me that those involved in bead research will be welcome to use the papers. Interested persons should contact Mr. Parr directly.

9. RUSSIAN TRADE BEADS MADE IN IRKUTSK, SIBERIA, by Glenn Farris (1992, 21:2-3)

At the Alaska Anthropological Association meetings held in Fairbanks on March 27-28, 1992, Dr. Oleg Bychkov, Science Director at the State Unified Museum of Irkutsk (Siberia), gave an impromptu presentation on Russian trade beads. Apparently, Irkutsk had a glass factory which began production about 1782 and lasted until the 1820s. This factory was established by a famous natural scientist who had come to Siberia to do a study of the various minerals present. His name was Finns-Erik Lachsmann. An Academic of the Saint Petersburg Academy of Science, Lachsmann had been trained by a leading Russian scientist of the day, Academic M.V. Lomonosov, who had himself established a glassmaking factory in St. Petersburg which made fine glass beads.

Lachsmann discovered s source of "clay salts" (*ghuzir*) in the vicinity of Lake Baikal. This material was substituted for potash in the making of glass at the factory he established midway between the deposit and Irkutsk (about 47 km from either one). About this time the governor of Irkutsk was a man named Jacob Klichka who was originally from Bohemia and was undoubtedly familiar with the value of glass beads. Glass "seed" beads were the first item of production. The problem was the relatively low quality of the glass due to the presence of carbonate salts. This gave the beads a milky appearance. In archaeological contexts, the clay would often be washed out and leave a pockmarked appearance of the beads, especially if they were in acidic soil. The basic color of these beads was a light blue, although some were also milky white.

Until 1790, a fur-trading company owned by Shelikov got virtually all the beads. One of his managers at the factory was Alexander Baranov who later became the manager of the Russian-American Company in Alaska. There are two letters from Shelikov in 1792 directing company agents to use beads to pay for furs. City business records show beads being manufactured, but only up until 1801. Even so, the factory continued in production beyond that time. Many records were destroyed in a fire in 1879, which is part of the reason why the archival material is not complete. It is possible that the glass factory was actually owned by the Russian American Company (the successor to the Shelikov Company, still under Shelikov's control). This company gained an exclusive charter in 1799 from the Tsar to hunt fur-bearing animals in the North Pacific.

The site of the bead factory itself is, unfortunately, now under an artificial lake. However, the nearby village where the craftsmen lived is now the site of the Irkutsk Museum. Archaeological samples of some of the old glass wasters from the manufacture of beads have been recovered from excavations in the area. Dr. Bychkov is currently preparing an article that he hopes to publish soon giving much more detail about these real Russian trade beads.

10. PRE-COLUMBIAN TAIRONA TINKLERS, by Ellen M. FitzSimmons (1993, 23:11-14)

Analysis of 95 pierced pre-Columbian shells in the Smith collection from the Tairona culture area of Colombia, South America, reveals these items to have been component parts of necklaces and, perhaps, bracelets, and not the whistles, rattles, or bells that they have previously been termed in anthropological literature.

Introduction

In 1902, The Carnegie Museum of Natural History, Pittsburgh, acquired over 1400 pre-Columbian items from the Tairona area through the efforts of Herbert H. Smith, an American naturalist. Smith collected these artifacts from 21 sites in the Sierra Nevada region of northeastern Columbia. Although none have been radiocarbon dated, the articles can most probably be assigned to the period from the 11th through 16th centuries A.D. when the Tairona culture area chiefdoms flourished. Gold, mammal bone, shell, coral, serpentine, greenstone, quartz, jasper, and carnelian beads comprise approximately one-third of the collection.

Description of the Shell Objects

Notable in the Smith assemblage are 95 pierced shells, excavated from various interments at the littoral site of Gairaca and secured during surface collection of the rifled site of the prehistoric cemetery of Las Tres Cruces. Examination of these objects revealed that they are fabricated from *Oliva*, *Marginella* and *Cypraea exanthema* shells.

In every instance, the posterior spire of the shell has been ground or sawn away (Fig. 1). Francis (1982:714) illustrates one grinding technique which might have been used to remove this portion of the shell. In most cases, an inward-slanting horizontal-oval opening has been produced on the curved dorsal aspect. This perforation is in the center of another larger ellipse carved into the dorsum. The elliptical piercing is consistently located approximately 0.5 cm above the anterior extremity of the *Oliva* and *Marginella* specimens. The same type hole is positioned roughly 1.0 cm above the anterior extremity of the *Cypraea exanthema* examples, whose overall sizes range from 5.5-7.7 cm. The average length of the *Marginella* shells is 2.5 cm. The sizes of the worked olivid shells (0.8 cm to approximately 4.5 cm in length) place them within the ranges of the *Oliva cuya*, *O. angulata*, and *O. caribaeenis*. However, an exact species determination cannot be made because of post-depositional erosion and weathering of the specimens.

Reinterpreting their Function

These particular sawn and pierced shell items of Tairona-region manufacture have heretofore been designated either as “whistles” (Smith 1898) or “rattles” in the archaeological literature (Mason 1936:233, Pl. 127). Analogously worked shells, excavated elsewhere in Colombia, have simply been listed as “shell objects” or “bells” in South American publications (Reichel-Dolmatoff 1954:153, Pl. 10, Fig. 1, 2).

Of note, *Oliva* shells, a valued commodity, were traded from the Caribbean to the Muiscas near Bogota in pre-Hispanic times along an overland trade network mentioned by Fr. Pedro Simon (1882). Examples of such traded shells in the Museo Nacional (Bogota) collection have not had their spires removed. These shells were found at Vereda Salitre, Paz del Rio, Boyaca; however, the context in which they were found is not delineated in the literature. Two simple holes are pierced on either side of the shells’ anterior extremities, across the aperture, perhaps for stringing during transport (Bray 1978:143, Pls. 185, 186). If these shells were finished ornaments, then they are a different type than those typically made for and used by littoral groups.

A Coarse Red Ware effigy sherd from the Tairona culture area now at the American Museum of Natural History, New York, portrays a human figure, in low relief, wearing pierced-shell beads identical to the sawn/ground and pierced *Oliva*, *Marginella*, and *Cypraea exanthema* shells in the Smith collection (Mason 1939: Pl. 184, Fig. 5). In the neck region, a semicircular band appears above the shells with corresponding double bands below them. It cannot be determined whether this design indicates that the shells were incorporated into a neckpiece rather than being strung alone, or whether the bands indicate clothing. Other Tairona-region figures depict both males and females wearing collared necklaces which tie behind the head.

Similarly worked shell ornaments, many of which are also fashioned from *Oliva*, have been found in archaeological contexts throughout the Caribbean. They are commonly called “tinklers” (Watters 1991:298-299).

Figure 1. *Oliva* ornaments from sites in the Tairona culture area of Colombia (Smith collection, The Carnegie Museum of Natural History, Pittsburgh).

Acknowledgements

Access to the Smith collection and field notes was provided through the kindness of James B. Richardson, III, chairman, and his staff, Section of Anthropology, The Carnegie Museum of Natural History, Pittsburgh, Pennsylvania.

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11. AN ENIGMATIC ARTIFACT, by Peter Francis, Jr. (1982, 1:3)

What We Know

The lithified object pictured [Fig. 1] was found on the surface near Poona, India. It weighs 4.91 g, has a sp. gr. of 1.63, and H 5-6. It twice tested negatively to HCl reaction (no carbonate), but positively to containing some phosphate. It appears to be a fossil in opaline form. Given the geology of the Poona region (in the middle of the Deccan Trap lava flows), it must have been manuported there. This may have happened any time in the last 10,000 years; the immediate area has evidence of occupation by microlith users, and is today a suburb of an old urban area.

What We do not Know

We do not know what the object is. I have taken it to several institutions in the U.S. and in India, and have received numerous suggestions. Thus far, none of these has proven completely satisfactory.

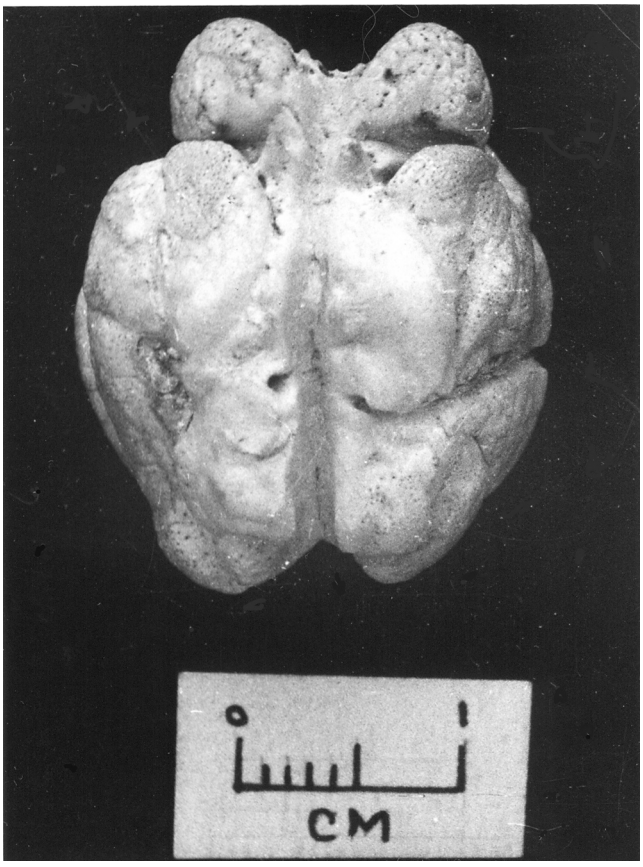

Figure 1. Opaline fossil apparently used as a bead. Found near Poona, India.

What we can Surmise

The object is an artifact, probably used as a bead. It has a number of grooves which allow it to be suspended in several different ways. The large transversal groove visible in the photo may or may not be man-made, but on the opposite side of the object (which has a very different appearance) points of wear correspond exactly to the path a strand would have taken had it been wrapped around the object through this groove. There are also clearly artificial cuts, including the widening of the gap under the right lobe at the top of the photo. A string can suspend the object in 3 ways: transversely through the large groove, below the two lobes, or crossing in front in a diamond pattern. Each of these paths have wear marks and/or cuts which must be humanly produced.

Grooved pendants and beads are generally characteristic of a relatively low technology. Such pendants are found in the lowest Upper Paleolithic levels in Europe, disappearing thereafter, only to return on some hard stones early in the Chalcolithic. This object, pendant, if you will, must have been made and worn by people with fairly primitive technology, whether ancient (e.g., microlith users) or modern (e.g., tribal aborigines).

If anyone can suggest the nature of this object or shed any further light on this mystery, I would appreciate it greatly. It has been puzzling me for 4 years.

Postscript (1983, 2:4)

From the Icthyology section, L.A. County Museum of Natural History comes the suggestion that the enigmatic artifact (*Forum* 1) may be a fossilized (marine) mammal skull. This is the 5th different identification received from zoologists and paleontologists.

12. MOLLUSCAN SHELL AS BEADS, by Peter Francis, Jr. (1982, 1:4-5)

No one interested in primitive ornaments can overlook the use of molluscan shells. Beads made of shell are among the earliest recorded beads from Europe and Asia.

The problem of molluscan shells used for beads raises several questions: 1) what is their antiquity and distribution?;

2) marine species are often found at inland sites; what mechanism brought them there?; 3) how were they treated to be formed into beads?; and 4) to what purpose were they put?

I do not claim to be able to answer all these questions, but I have been working on some of them and would like to share the highlights of what I have learned.

1) Age and Distribution: Not unexpectedly, shell ranks as one of the oldest and most wide-spread bead materials. Shell beads are found in the earliest assemblages of Europe, China (Choukoutein Upper Cave), and India (Patne, Maharashtra). The picture is likely true for the Americas; I would appreciate knowing more details from there. To form an idea of materials used in the Upper Paleolithic for beads, I tallied those listed in Muller-Karpe's *Handbuch Der Vorgeschichte* (1966). Excluding the very detailed Petersfels, Germany, materials from 31 European sites were as follows:

Material	# of pieces	# of sites
Shell	898	11
Tooth (inc. ivory)	351	21
Bone	68	16
Stone (chalk, jet)	7	5
Wood (!)	6	1

Shell was clearly one of the more important materials, though not as widely distributed as bone or tooth. The number of pieces was skewed by large finds at 2 sites.

2) Transportation mechanisms: Here we know very little. Several possibilities exist: trade, gift-giving, raids, expeditions, etc. I would appreciate more ethnographic data from America on this point. Certainly trade was used, but Forde mentions the Yokuts (Calif.) making long expeditions into enemy territory to gather shells.

3) Worked into beads: I conducted a series of experiments on common bead shells. A full paper has been submitted; some of the results are as follows:

a) Shells most commonly worked (at least in Old World contexts) are those with certain advantages–the pre-perforated *Dentalium*, the animal absorbing the columella so only the apex needs removal (*Oliva, Conus*), or a very large fina1 whorl (*Cypraea, Nerita*);

b) 5 methods have been described in the literature for perforating shells. Of them, *gouging* with a stone point is efficient for thin shells, but does not work on thick ones. *Hammering* with a stone is very efficient on thick shells, and with practice will work on thin ones. *Grinding* against a flat stone is efficient in tool wear and leaves a nice, smooth hole. *Sawing* with a blade takes a long time and is hard on the tool (used surface-found chalcedonic blades picked up locally). *Scratching* with a point is hard on the tool and takes a very long time (one clam took nearly 3 hours).

c) Shells at a site can probably be considered used for beads if they are found in context (i.e., burial), part of a series of similarly worked shells, or have been clearly man-perforated.

d) Man-made perforations can often be recognized: flattened surfaces from grinding, many furrows from scratching (which otherwise looks rather like drilling), deep furrows from sawing; hammering and gouging leave similar jagged holes.

4) Use of shells: Though much has been collected already, we can use more ethnographic data. Primary uses are decoration, currency, and status symbols. Magic, curios, or souvenirs are other uses. This will vary greatly between groups.

13. EARLY POST-CONTACT NATIVE-MADE GLASS BEADS IN AMERICA?, by Peter Francis, Jr. (1983, 2:5-6)

Small, light to dark translucent green beads found in Peru and Ecuador have recently come to the attention of several of our members. They vary in shape from sub-oblate and donut to cylindrical and in size from 3 to 8 mm or more in diameter. They are distinguished by poorly fused bubbly glass, conical perforations with rough surfaces on the end with the small hole, and bubbles oriented along the axis of the perforations.

The beads were first reported by Harris and Liu (*Ornament*, 1979, 4[2]:60). Experiments by Harris indicated that they might have been made by heating a small bit of glass in a crucible and piercing it with a hot pointed metal tool. The technique was within the ability of early metalsmiths in the region, and it was hypothesized that the beads were locally made by the natives soon after Spanish contact.

Smith and Good (*Early 16th Century Glass Beads in the Spanish Colonial Trade*, 1982, p. 20) have questioned this idea. They classify the beads as wound, and state the clarity of the glass is unlike native-made beads from Africa and N. America. Smith has expressed to me (letters 23 June 1982 & 9 May 1983) that glass bottles are rare on European sites of

the early 1500s and that the natives may not have had access to glass for making such beads. The many bubbles in these beads also suggest to him that European glass bottles did not furnish the raw material for making the beads.

In the absence of archaeological proof, we can try to resolve these differences by asking: 1) is the experimental technique likely to have been used for making beads?, 2) are the beads' characteristics those which would match this technique?, and 3) did the natives have access to glass for possibly making such beads?

In addition to Harris' experiments, Harris and Liu noted beads made in a similar method in India, citing van der Sleen (*Handbook*, 1975, pp. 27, 74; the perforation in his Fig. 40, p. 68, illustrating one such bead is at variance with the presumed method of manufacture). Sleen was relying on Dikshit, who mentioned beads made by heating and "piercing" in several papers. Dikshit has interpreted a passage of Kautilya's *Arthasastra* (ca. 4th c. A.D.) as a reference to this beadmaking technique (*East & West*, 1965, 15[1-2]:67) and said that he had witnessed the process himself being used at Ghodegere, Karnataka.

Dikshit further said that such beads had been found at Indian sites from early A.D., especially Ahichchhatra and Kondapur. Though I have examined some of the beads from these sites, none appear to have been made by heating and piercing a bit of glass. However, 2 beads from Kolhapur do seem to have been made this way; they are dark opaque blue with conical perforations and flat disc profiles.

Smith and I have discussed the green beads from S. America and examined such beads together in the collection of the University of Florida. I pointed out to him that the clarity of the glass is not a problem in this case, as the beads were not apparently made by the powder-glass method used in Africa and N. America. Glass beads made at Bida, Nigeria, by melting bottles and winding the glass as it melts are also very bubbly. He now agrees that the beads we have examined together do not appear to have been wound.

There remains the question of where the natives may have gotten the glass. Early explorers to the New World report that the natives wanted and were given not only glass beads but also pieces of glass or glass sherds. In October 1492, Columbus gave away pieces of glass on 3 occasions (S.E. Morison, 1967, *Journals and Other Documents*, pp. 67, 75, 79).

The Chimu Incas of Peru are known to have used European glass for a green glaze on some very early post-contact pottery (Bushnell, 1957, p. 137). The natives would not likely have had complete glass vessels, but pieces of glass given to them by Europeans with no further use for them or picked up around European settlements would not have been impossible for them to obtain.

In sum, the technique of heating a bit of glass in a crucible or mold or alternately dropping a bit of molten glass on a clay plate and piercing it with a pointed nail or similar metal object is a viable one for making small glass beads. The beads under discussion do appear to have the characteristics of beads made in this way; the conical perforations and roughened surface on one end are similar to Indian beads made in this manner, and the orientation of the bubbles toward and down through the perforations also suggest the technique. A limited number of glass sherds were available to S. American natives immediately after contact, and in at least one case (glazed pottery) are documented as having been recycled by them. Their metalsmiths, unacquainted with glassworking, could have mastered and even invented this piercing technique.

Further work is necessary to determine exactly which peoples might have made these beads. It is interesting to note that they were the only beads used in burials of the Manteno culture before 1550.

14. BEADMAKERS' STRIKE IN INDIA, by Peter Francis, Jr. (1984, 5:7-8)

February and early March just weren't the same in Papanaidupet. The village of 12,000 in southern Andhra Pradesh state provides all India with small drawn glass beads and marbles. But the tube-drawers working at 24 furnaces in the village had stopped drawing.

Tube-drawers come in pairs: one to manage the *lada* or *ladi*, a tapered tube which holds the glass as it is being drawn, and another to draw the tube out hand- over-hand for three hours running. The *pair* are paid 22 rupees a day (11 each), while the minimum daily wage for a man and the average daily per capita income is 5 rupees (a rupee is currently worth 9 cents U.S.). But they have also been forced to pay rent to the owners of the furnaces where they draw the tubes. So they drew the line at drawing glass tubes.

The issue highlights the "feudal" structure of the Papanaidupet glass bead industry. Two dozen families own furnaces and the land on which they are built. Some 300 men find work at the tube-drawing furnaces or the 30 small heating-and-tumbling units. Many people cut tubes and size and string beads–perhaps 5,000 altogether, counting women who do occasional stringing in neighboring villages. At the top of the ladder are four families who market the beads, some of whom make their own raw glass.

In the 1950s the government tried to start a glass bead and bangle center in Gudimallam, 3 kms (but a long walk) away. There is not even a trace of an industry now; perhaps the social system prevented any interfering government factory from being successfully launched.

Anyway, back at Papanaidupet, the workers who were paid $.99 a day were forced to pay 9 cents of that to the furnace owner (120 rupees per month divided by two teams). The strike was settled when the four trading houses agreed to pay the monthly rent to the furnace owners.

I visited Papanaidupet during and after the strike; afterwards work was going at double speed. Tube drawing which usually ceases at dawn was continuing until noon. The bead village is back in business.

15. CENTER FOR BEAD RESEARCH ESTABLISHED, by Peter Francis, Jr. (1985, 6:6-7)

The Center for Bead Research has been established in Lake Placid, New York. It is designed to serve as a repository of information about beads of all kinds and is open to scholars interested in any aspect of bead research.

The resources of the Center are a library of over 3,000 references, a photographic collection of over 2,500 prints and slides from public and private collections around the world, and a study collection. At the core of the study collection are examples obtained from excavations or directly from beadmaking centers with known provenances which may serve as references for scholarly investigation.

The activities of the Center include a publication series, *Occasional Papers of the Center for Bead Research*. The first monograph in the series, "A Survey of Beads in Korea," has now been published and several others are being planned. In February 1986, the Center will sponsor a bead tour of India which will visit museum collections, archaeological sites of past beadmaking centers, and the modern centers of Cambay, Purdalpur, Firozabad, and Papanaidupet.

Among the ongoing projects of the Center are the building of a computerized data bank of the literature to facilitate access to this information and the review and monitoring of periodical series in history, archaeology, anthropology, and other relevant fields to identify material on beads. Over 80 such periodical series have now been completed and are being monitored; others are designated for review. In the future the Center hopes to hold seminars and workshops on various problems related to bead research and to sponsor other tours of important beadmaking and bead-using areas.

16. A BIT MORE ON THE CORNERLESS CUBE, by Peter Francis, Jr. (1986, 8:8-10)

The note by Peter Schienerl in *The Bead Forum* (7:8-9) about the green stone cornerless cubes used as amulets by Egyptians, Bedouins, and Palestinians brought to mind a similar bead encountered in Iran. Like those described by Schienerl, they are of a green stone, found individually, and show heavy wear; they may have been worn as amulets in Iran as well. Among beads in my collection from Egypt are two "imitations" of these beads. One is a deep green glass wound bead pressed into the cornerless cube shape; the other is a bloodstone, which appears to be modern Cambay in origin.

The green stone appears to be jasper. Like agate, jasper is a crypto- ("hidden") or micro- ("tiny") crystalline form of quartz. The crystalline form of quartz includes rock crystal, smoky quartz, and amethyst. Chalcedony, including agate and carnelian, has a fibrous microcrystalline structure, while jasper has a granular microcrystalline structure. Bloodstone is a combined form of the two with a chalcedonic green base and red jasper flecks through it. Bloodstone is currently mined at a few spots in Gujarat, India (Tankara near Morvi and in the Little Rann of Kutch). Bloodstone cornerless cubes are exported from Cambay today, often on strands mixed with other types of agate beads. The earlier beads, however, were not bloodstone but green jasper.

The only dated green jasper cornerless cubes I have noted are in the National Museum in Tehran, Iran, displayed with material from Susa from the Sasassanian Period (A.D. 224-642). It is difficult to know how much trust can be put in these museum displays; Tehrani dealers bragged to me how they had sold the museum this or that necklace from such and such a site. I have written about this problem in Iranian museums before (Francis 1979:44).

In Iran cornerless cubes of green jasper, carnelian, quartz crystal, hematite, lapis lazuli, and pyrite are known. The pyrite is interesting, as one source for it is near Ratanpur (the source of most stones for the west India bead industry), and it can occur as natural cornerless cubes in its crystalline form.

As far as cornerless cubes in general are concerned, the earliest example that Beck (1928:17) noted was of blue glass from the Crimea in the 5th century B.C. While this date may be considered the beginning of general popularity of these beads, earlier examples are recorded. Two cornerless cubes, one of gold and the other of glazed steatite, were excavated from the upper levels at Mohenjo-Daro by Mackay (1938:516; LXXXII.5, CXXXIV.2). A lapis lazuli cornerless cube was found at Tall-i-Bakun, a

chalcolithic site in Fars, Iran, generally dated 4500 to 3500 B.C. (Langsdorf and McCowan 1972:84.17). At least one lapis lazuli cornerless cube was found in the Royal Grave of Queen Shub-ad of Ur, ca. 2500 B.C.; I know of no published references to it, but it is on display in the Archaeological Museum of the University of Pennsylvania.

After the Harappan examples, cornerless cubes in India appeared in carnelian and quartz crystal between 400 and 300 B.C. at Taxila in modern Pakistan, Tilaurakot and Vasaili in the Gangetic Valley, and Peddamaru in the south (Andhra Pradesh state). Quartz crystal, agate, shell, red jasper, shale (!), glass, and faience cornerless cubes were found at Taxila, Bagor (Rajastahan), Achchhatra and Kosambi (the Gangetic Valley), Nevasa and Navadatoli (in the Deccan), and at Peddabunkur (Andhra Pradesh) throughout the Early Historic Period.

The cornerless cube shape is amuletic at least in modern Gujarat, India. Small silver cornerless cube beads are strung with black glass beads on a chain and worn by both men and women for good luck. They are relatively expensive (10 or 12 times the minimum daily wage for a man) and are often the only form of jewelry that men wear. The Todas of the Nilgris Hills (Karnataka state) wore large (probably hollow) silver cornerless cube beads at the beginning of the century; I believe there is a picture of a couple wearing them in Thurston and Rangachari (1909).

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17. MULBERRIES AND TWISTED SQUARES: SOME QUESTIONS, by Peter Francis, Jr. (1987, 11:8-12)

Although much has been learned about glass trade bead origins in the last decade, large gaps remain, and I wish to draw attention to one. Here I link two well known bead types, though whether they share a common origin is not possible to say yet. Both are known by various names in the literature. One is called a mulberry or raspberry bead (Kidd WIId; Beck XXV.A.3.b; Roundtable 469), while the other is called a twisted square, a pentagon bead, or a faceted "five sided" bead (Kidd WIIe; Beck XIX.A.4; Roundtable 225). Since I believe we should give priority in nomenclature to the earliest name for a bead (Francis 1980), as is common in scientific fields, I refer to these as mulberries and twisted squares.

I group them together for several reasons. Both are wound beads further manipulated into shape (exactly how the mulberry beads were made is being studied; I would appreciate suggestions). Both are made of translucent glass, and all mulberry colors are found in the larger group of twisted squares (Kidd and Kidd 1970:85), to which may be added a deep gold-red. Their distributions in America are very similar, and the few analyses made suggest the glass is similar (Karklins 1983:123, 125).

At first these beads were thought to be ancient; Beck (1928:17, 27) listed them both as "Egypt, Roman Period." Although a strand of twisted squares is displayed in the Cairo Museum, to my knowledge neither type has been excavated from any ancient site, although different mulberry beads may have been (Eisen 1930:37-38). Both types are found in Indonesia (van der Sleen 1975:99-101), and I have examples bought in Iran; the twisted square is known in Egypt, Turkey (Fenstermaker 1985), Sarawak (Beck 1930:127), West Africa (Connah 1975: bead category 29), etc. Two mulberries excavated by Jean Aigner of the University of Alaska, Fairbanks, at Reese Bay, Unalaska Island, were brought by Russians between ca. 1759 to 1806 (Francis n.d.). Judging from this scanty data, both types are probably widely distributed.

In the contiguous U.S., they are found mostly along the Mississippi up to the Great Lakes, as well as Mississippi tributaries and along the Alabama River (Brain 1979:127-130). They are also found in the Northeast, as on Seneca sites (Wray 1983:45). Chronologically, Quimby (1966:86) noted their abundance in his Middle Historic Period (1670-1760). Brain's citations for five types of twisted squares (types WIIA1-5; WIIA6-8 are different) all have terminal dates between 1825 and 1833. Their *terminus a quo* are between "about" 1650 and 1700 (Brain 1979:110-111).

Mulberry beads ranged from 1699 to 1833 (eliminating the suspect early dating for the Keller site) (Brain 1979:111).

The question is: where were these beads made? Van der Sleen (1975:110) said they were both Dutch. Although the twisted squares have been found in association with glass bead factory waste (Karklins 1974:80-81, 1983; van der Made 1978:6), the mulberry beads have not (those van der Sleen has are from Indonesia).

Two other facts belie Holland as a source for all but a few twisted squares. One is their late temporal distribution, mostly after the last Dutch bead factory is said to have closed in 1698 (Karklins 1974:66). Another is their absence at Dutch sites. One would expect them at Fort Orange (Albany, New York), the major Iroquois trading post, but none were found there (Huey 1983). In the Seneca region they do not appear until 1687, after the English displaced the Dutch (Wray 1983:45).

Another potential source is Venice, but these beads are not found on any Venetian sample cards known to me; e.g., the Venetian bead book and Levin catalogue (Karklins 1982); the cards at the Museo Vetrario di Murano (slides on file at the Center for Bead Research, Lake Placid, N.Y.); and the Giacomuzzi samplers (The Bead Museum, Prescott, Arizona). However, all these cards seem to be post-1850, after the *terminus ad quem* in the American trade. In sum:

1) If these beads are Dutch, then production there must have extended beyond the end of the 17th century.

2) If they are Venetian, why did the Venetians stop making them? They were popular beads and not especially difficult to produce.

3) Were they made at some other (European?) center, of which we have only hints of their existence, such as France, Germany, England or...?

(Note: The Roundtable Classification numbers are the provisional numbers assigned to bead types in the Bead Roundtable Classification Project. They are subject to revision.)

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18. THE ALLEN BOOK OF BEADS, by Peter Francis, Jr. (1988, 13:5-7)

Information even about relatively recent beads made in the most important centers is scarce. A few years ago an article on early 20th-century bead catalogues appeared, featuring one called "The Allen Book of Beads" (Liu 1975). This 32-page booklet (priced at 10 cents) was well illustrated, and included informative descriptions of beads currently on the market. It must have been published after 1917, as it refers to Czechoslovakia (p. 27). Liu suggested a probable date in the 1920s. Confirming such a date sheds light on the changes in bead styles in the early part of this century.

Allen's Boston Bead Store was located at 8 Winter Street, a building devoted to garments, furs, and fashion accessories in a district known for shops selling these sorts of goods. *The Boston Directory* first listed Allen's Boston Bead Store in 1920. Its proprietor was Herbert D. Allen, who continued to be listed through 1930. In 1931, it was run by Mrs. Mildred E. Wolk.

From 1932 to 1935, Mrs. Mildred E. Schwartz was named as owner of the store; in 1936 Mrs. Wolk was again in charge. In 1940 the store's name was changed to Allen's Bead Store, still under Mrs. Wolk. This continued through 1956. There is no listing from 1957 to 1959. In 1960 there was an Allen's Bead *Shop*, still with Mrs. Wolk; it specialized in repair work. No shop or store is to be found after that date. It seems likely that Mildred E. Wolk and Mildred E. Schwartz were the same person; she may have changed her name due to a short-lived second marriage or a reversion to her maiden name.

The Allen Book of Beads must have been issued while H.D. Allen was still alive, as he was named president of the store in two places. Thus, the catalogue can be dated between 1920 and 1930, much as Liu suspected. This helps to date beads which are quite different from those on several Venetian bead sample cards of the late 19th century (e.g., Fratelli Giacomuzzi n.d.; Karklins 1982). In general the lamp work is less fine than on older beads. There is an absence of floral or "arabesque" patterns, and more free-form waves. There is also quite a variety of millefiori shapes.

There are still things to be learned from this catalogue. In an "Important Notice," it says the store had published circulars and price lists for the past 15 years. Since the name of the store is the Allen *Boston* Bead Store, might Mr. Allen have started his business elsewhere? Can any of the earlier circulars named in the catalogue be located? There is also a section (p. 27) about glass rings for curtain and shade pulls. Allen had been importing these from China, but "The Chinese are not experts in glass making, so in addition to being poor colors, they were mostly of opaque glass." He had just begun importing finer translucent ones from the Czechs. These rings are now popular as jewelry elements, and this contemporary insight into their origins calls for more study.

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19. ROCAILLE BEADS, by Peter Francis, Jr. (1988, 12:17-21)

"Rocaille" is a term frequently encountered when dealing with French beads and French bead traders. Its precise meaning has been a subject of discussion by English-speaking bead researchers, with different definitions proposed. The present note is offered to help clear up some of these ambiguities, or at least foster further discussion.

Rocaille in English Bead Literature

The first writer in English to use the term was van der Sleen. When discussing the production of Bapterosses et Cie in Briare, France, he said, "They are very typical cylinder beads, as straight as a military drum, called rocaille beads... in the trade. They are from 5 to 10 mm in length... feldspar is a real constituent of the mass, taking the place of some of the quartz" (Sleen 1967:114-115). A simple sketch shows a short tubular bead.

A Baedeker guide to northern France early in the century says, "Briare (pop. 5227) produces quantities of so-called 'porcelain' buttons made of feldspar rendered plastic by milk, a process introduced by M. Bapterosses, whose bust (by Chapin 1897) is in the Grande-Plaza (Baedeker 1909:625)." I cannot comment on the effect of milk upon feldspar, but otherwise this is the same process van der Sleen discussed for Bapterosses beads.

The beads (and buttons) in question are known as "tile" beads/buttons. They are often called "porcelain" because of their resemblance to the ceramic, and have been studied most thoroughly by Sprague (1983:172), who had several analyzed and concluded that they were made of glass. The three descriptions he quoted, including the U.S. patent by one of the Prosser brothers, the inventors of the technique, all state that clay and/or feldspar (clay is largely feldspar) are used in the process. This and the above descriptions are a bit difficult to correlate with the analyses showing them to be essentially glass, but this is a point for further discussion. Our interest focuses on a bead sample card published by Sprague (1983:169) made by F. Bapterosses and Co. of Paris about 1930. It contains uniform short cylinder tile beads which are called rocaille beads on the card.

The next person to discuss rocaille beads was Kidd (1979:59), who defined them as: "French term for large beads in general." His source was Barrelet (1953:166), whose entry reads: "Rasade ou Rocaille. Perles de verre pour chapelets, patenôtres, ou colliers. «Tous nos merciers vendent cette rocaille qui son des grains et verts» (H. de Blancourt XVn^{e} s). On en envoyait aux Indes, en Afrique au Canada et dans les Iles (XVIII^{e} s)."

The Bohemian beadmakers also use the word rocaille (or rocail) to mean small drawn "bugles" or tubular "seed" beads (Francis 1979:6). Modern French beadmakers produce rocaille beads, which are simple, rounded "seed" beads (Bovis n.d.). In sum, we have three types of beads called "rocaille:" 1) tile beads, as reported by van der Sleen and used by the Bapterosses Company; 2) any large bead, as reported by Kidd; and 3) "seed" beads, whether rounded or not, as used in Bohemia and by modern French beadmakers.

Rocaille in the French Literature

French dictionaries do not define "rocaille" beads. Huget's (1965) dictionary of sixteenth-century French does not list the word at all, although it was in use by that time. Bescherelle's (1865:1211) *National Dictionary* states that rocaille is the diminutive of "roc" or rock, and lists six definitions: 1) small fossil shells in rock; 2) small grains of enamel used to paint upon glass, an ancient technique; 3) an architectural ornament; 4) a genre of furniture popular under Louis XV in the 18th century; 5) an artistic genre; and 6) something garnished with rocaille. Fleming and Tibbin's (1860:930) French-English dictionary defines rocaille as small pieces of stones, shell, or other things which ornament a cave or as imitations of these.

The standard French dictionary, the *Grand Larousse* (1977), also says that rocaille is derived from "roc" or rock, and traces the first use of the word to 1360 in the plural (roquailles) and 1648 in the singular (rocaille). The first definition given is of a mass of small stones, shells, and other debris on the ground, noting that in Normandy it has come to mean small shells and crustaceans fossilized in stone. The second definition is that of small stones which, along with shells, decorate something imitating a natural surface. By extension this became a decorative style especially popular in the Regency and under Louis XV for architecture, furniture, jewelry, and other objects with contoured lines and volutes. As an adjective, the French Academy and Victor Hugo used it in the 1840s as a synonym of rococo (*Grand Larousse* 1977:5233). Strangely, the *Grand Larousse*, the French equivalent to the *Oxford English Dictionary*, cites no uses of the word in regard to beads.

Conclusions

The references to the use of "rocaille" in French furnish clues as to how the beads should be regarded. The term is diminutive and means "little stones," and by extension "little beads." Secondly, the basic definition is of a surface decorated with small objects. This, of course, is a primary use of "seed" beads; tile beads served a similar function– van der Sleen emphasized their use to decorate wooden carvings.

In sum, I would argue that there is no particular bead which can be called a "rocaille" bead in the same way we can call certain beads chevrons, cornaline d'Aleppos, or tile beads. The term is suggestive of small beads, but primarily refers to the function of decorating a surface (whether African statues, cloth, or other objects) with small "stones" to produce a contoured effect. "Seed" beads are most often used for this purpose, but other, larger beads may be as well.

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20. WHAT'S A RANGO?, by Peter Francis, Jr. (1992, 21:8-11)

This note is submitted in hopes that someone can shed light on the beads called "Range" or "Arango." Exactly what sort of beads are they? Where does the name originate and how did it come to be so widespread, only to disappear later?

Both editions of the *Oxford English Dictionary* list "Arango," though not "Range." The entries are identical:

arango, Pl. -oes "A species of beads made of rough carnelian... formerly imported from Bombay for re-exportation to Africa. McCulloch Dist. Comm. 1844. 1715 London Gaz mmmmmcccxxiv/3 Arangoes, Ostridge Feathers, Beads (Murray and others 1933:424; Simpson and Weiner 1989:600).

The references cited by the *OED* are not the first uses in English. The earliest I have found is in papers of the East India Company. Robert Bower, Henry Bolton, and Humphrey Pirom wrote to "the Commanders of Subsequent Ships" from St. Augustine's Bay, Madagascar (Malagasy) on 15 May 1644: "Beefe may be bought on the other side of the river for 10 rangoes a beefe, or 8 rangoes and 20 samma sammas" (Foster 1913:182). Foster (1913:182, n. 1) appended a footnote: "Sarnisamy is Malagasy for some kind of bead; while rango (long) probably indicates the long beads which were in special demand. Lockyer (1706) mentions 'beads and rangos' among articles suitable for sale at the Cape [of Good Hope]." *Arrangoes* is also reported to be used currently in "Gambian English" for carnelian (Opper and Opper 1989:7).

There are actually two mysteries here. "Samma samma" (however spelled) is a bead Burton (1860:392) described in East Africa: "Samsam (Ar.) sàme-sàme (Kis.)... are the various names for the small coral bead, a scarlet enamelled upon a white ground;" that is, a cornaline d'Aleppo or "white heart." As white hearts were not available in 1644, what beads were called this name then? The older "green hearts?" I do not know; that is the subject for another inquiry.

But, on to Rango. I first assumed it was a local name for a long bead, and since long carnelians were much in demand in Madagascar in those days, I thought that was it. But where does this word come from? It could not be Arabic, nor is it found in Malay (related to the Malagasy language). It is not in any Portuguese dictionary I have consulted. In Spanish (and Italian) it means rank, degree, station, quality, class, etc. French has *rang* and *rangée* , meaning file of things put in a row. In Hindi and probably Gujarati *rañg* is "color." On what basis Foster interpreted the word as "long" and how it was derived remains to be learned.

At one point I though I had found a hint in West Africa. Ibn Battuta about 1350 told his readers that travelers there need only some salt, some perfume or incense, and beads. The French translation reads: *"des ornements au colifichets de verre, que l'on appelle nazhim, ou rangée"* (Defrémery and Sanguinetti 1922:394), or "ornaments and baubles of glass, which are called *nazhim*, or *rangée*:" *Nazhim* is an Arabic word for bead, but *Rangée* is not in the Arabic text. *Rangée* is French; the translators must have used it to say "string of beads" in an unconventional way; this use does not appear in Robert's (1966) or Littrés (1961) dictionaries. Ibn Battuta never heard of Rangoes.

But the word was known in the region later. Joseph Corry, who traded in what is now Sierra Leone in 1805-1806, and was at least partly responsible for the abolition of slavery and the founding of the Sierra Leone colony, listed goods for trade in the area. He gives us "barter prices now established throughout the Windward Coast; but it is to be observed, they are subject to fluctuation from locality of situation and other circumstances" (Corry 1807:57-58). The list consists of 36 items ranging from types of cloth to tobacco and rum. They were valued in iron "bars," which he said were then worth a gold (presumably U.S.) dollar. The list mentions these goods in this order (Corry 1807:58):

1000 arangoes	30 bars
1 bunch of point beads	1
1 bunch of mock coral	1
Red pecado 3 lb, for	1
Seed beads, ditto	1

As the list groups similar things (cloth, weapons, beads, hardware, and miscellaneous [salt, a hat, tobacco, and rum]) together, I assume that the above are all beads of some sort. Note the high price for the arangoes.

The last source I have is from the intrepid Mungo Park's journal of his fateful expedition of 1805. He listed goods in Sansanding (in modern Mali), the final place he was reported alive. His list included 27 items, 15 of which were beads. Everything was valued in cowries, which were priced from 6,000 to 12,000 per dollar. The beads on the list were (Park 1815:160-161):

	Value in Cowries
Amber No. 1	1000
Ditto No. 2	800
Ditto No. 3	400
Amber No. 4	160
Ditto No. 5	80
Ditto No. 6	60
Coral No. 4 each stone	60
Black points, per bead	20
Red garnets, per string	40
White, ditto, per string	40
Blue agates, per string	100
Round rock coral, per bead	5
Long ditto, per bead	5
Short arrangoes, per bead	40
Gold beads, per bead	10

It would be interesting to try to work out what each of these beads was; some can be guessed at fairly well. In any case, it is clear that even short arrangoes were relatively valuable. The word was defined in an explanatory section, written by an editor (Park 1815:LXXXII) as: "Arrangoes, a large kind of bead."

Rango and Arango (Arrango) are no doubt the same bead. They were valuable and traded widely in Africa. We have notices from Malagasy, the Cape of Good Hope, Mali, and Sierra Leone dating from 1644 to 1805-1806. They were large, relatively expensive carnelians, but whether the word referred to all carnelians, just one style, or to different styles in different circumstances, we cannot be sure. Its etymology remains unknown.

These questions have been raised because references to Rangoes crossed my path. I would appreciate hearing from anyone with comments, other references, or ideas, directly or through *The Bead Forum* or, better yet, both.

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21. ROMANCING THE HIDDEN BEAD, Peter Francis, Jr. (1992, 21:12-15)

The uses of beads are legion. One which has not been examined has implications for researchers and for those who use beads. It has only rarely been reported, and the sources are difficult to access, so I shall quote most of them at some length.

Quarm (1989:47-48), in an unpublished "long paper" (a sort of bachelor's thesis) at the University of Ghana, Legon, reported the results of an extensive survey conducted by him and his classmates from different ethnic groups in Ghana. In his section on the uses of beads he stated (I have made a few minor corrections):

> The rattling of beads is said to arouse sexual interest, especially in men. An informant at Ahwanease of an advanced age told me that the feeling of it is sufficient to awaken an impotent penis (name withheld for courtesy). Whereas it serves as an invitation to sex (or *twe draa* as the Akan call it) in bed it is considered as a plaything for the men. This was mainly expressed by informants above forty years [in age]. The young men and women appeared to be quite ignorant of that experience. This notion of bead use is, however, common in all the areas I visited .
>
> ... In the Asante, Akim, Nzima and Aowin areas, I learned that one can swear on oath by one's wife's waist beads. Bead are held sacred and it is believed to bring bad [luck] if one gives a false statement or evidence. This sacredness stems from the fact that some beads are believed to possess some productive influence on the women's fertility potential and this could be impaired in the case of falsehood. [A shrine attendant and a queen mother told me] that the telling of the kind and colours of beads a married woman wears by [to?] a man is tantamount to adultery and the person can be sued for damages.

The erotic use of beads worn around the waist and under the skirts of women is (or was) widespread among several groups in Ghana. The "bead dance" of the Laobe of Senegal appears to have such connotations (Opper and Opper 1989:5), and the private erotic use of beads has been confirmed for Senegal and Mali by Marie-José Opper (1992: pers. comm.).

A similar account was given by El-Tunisi (El-Tounsy 1851:334-335) when discussing beads in Wadai, now part of Chad. El-Tunisi lived in Wadai in 1811-1812. The following is my translation from the French by Perron:

> These two types of beads are employed by the Fors as a hidden ornament, that is to say... in a sort of girdle worn next to the skin. The intention of this type of adornment is to excite the voluptuous emotions of the men, who are provoked and excited by the hint of the light rattling of the girdles at the time of amorous contact. When one meets a women alone and wants to entice her, he touches the girdle and makes the beads rattle. If the women appears to accept the provocation and does not distance herself immediately, he will take her hand and they will come to terms. If the woman repels him, he will go on his way.
>
> What proves that the Fors do not wear these girdles of beads in order to hear the rattling by accident, is that the first turn is very solidly fixed to the loins, whereas the others are mobile and almost floating.

The beads which El-Tunisi just discussed were the *mangoûr* and the *rougâd-el-fâqah*, The *mangoûr* were yellow and green furnace-wound beads made in Hebron in the West Bank, which have more recently been recycled by Hausa traders who ground their ends flat and now sell them as "Kano Beads" (Francis 1990a:23-26). It is not clear what sort of beads the *rougâd-el-fâqah* were. El-Tunisi described them as smoother and more beautiful than the *mangoûr*. They were also more expensive and worn by the wealthier Fors (El-Tounsy 1851:334).

El-Tunisi also discussed a bead called *khaddoûr*. These he said were long and white, red or blue (El-Tounsy 1851:339). They were little esteemed and worn by the poor and servants. The word *khaddur* in Arabic means hidden. El-Tunisi had also discussed them in Darfur, in modern Sudan, where he lived from the age of 14 (1803 to 1811) before moving on to Wadai and then home to Tunisia. While he does not specify their use, he hints at it:

> Around the loins and against the skin, the Fors wear different sorts of beads. Among the rich women the beads are the size of a nut, and are called *rougâd-el-fâqah* (the sleep of tranquility); among the women of medium means, it is the *mangour*, and among the poor women, the *harich* or the *khaddoûr*. These beads are made in Syria (El-Tounsy 1845:210).

It appears that El-Tunisi is indicating that all these beads serve the same purpose, the choice of bead largely made by the economic status of the woman wearing them. The bead not discussed above, the *harich*, is merely a smaller version of the *mangoûr*.

In 1873-1874, Gustav Nachtigal visited Wadai and Darfur. His account often mentioned beads and he included *khaddur* in several lists of beads. On one occasion in Wadai he described it thus:

> In addition to the cotton goods which have been mentioned, imports from Cairo include the large red clay beads which, with the name *khaddur*, "hidden", are used as women's ornaments, worn under their clothing around the waist, large amber beads, and small quantities of silk, velvet, cloth, and shirting (Fisher, Fisher, and O'Fahey 1971:201).

According to El-Tunisi, the *khaddur* were made in Syria (that is, Hebron). Nachtigal says they were from Cairo, but they may have only been brought from there. Nachtigal says they were clay. This may account for their relative poor standing among the beads El-Tunisi discussed, despite their large size. On the other hand, it is difficult to see how clay beads would rattle very well, unless they were glazed, which might explain why El-Tunisi said they were red, white, and blue in color. Their exact identification must await further work.

In any case, it appears likely that these beads are no longer being used for this purpose. They were out of style in Darfur in the 1930s (Arkell 1937). Whether other beads have replaced them is not known.

What we do have, however, is confirmation of the erotic uses of beads worn on women's waists under their skirts in what are now five modern sub-Saharan nations: Ghana, Senegal, Mali, Chad, and Sudan. These countries are not all contiguous, and if linked they would form a broad band across the continent. In how many other places is (or was) this a custom? Soliciting answers to this question is a major reason for writing this note.

Another reason for this note is the significance of this practice to bead researchers. A few years ago Karlis Karklins went through the African photographic collections of the ethnographic departments of several of Europe's major museums. He was perturbed to find relatively few pictures of beads being worn in West Africa (Karklins 1988: pers. comm.).

I have observed the same effect in similar collections in the U.S. and West Africa. It is well known that there are a lot of beads in West Africa. This is obvious from the vast quantities coming onto Western markets from there. Trade figures which have been published for Senegal and Gambia (Curtin 1975:252, 1978:88, 90) and Ghana (Francis 1990b:6-7, 1992) show that glass beads and beads of other types were imported in large numbers by Europeans to their colonies over the last few centuries. Now we know why they are not visible in photographs: we have been looking in the wrong places (I shall refrain from suggesting how we might look in the right places).

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22. BLOODSTONE, AGATE, AND CARNELIAN, by Peter Francis, Jr. (1993, 22:16-20)

Although glass beads played the most active role in the opening of the bead trade between Europe and Africa and the Americas, not all of the beads that the Europeans used were of glass. One, in particular, has been variously identified, and its true nature often obscured.

On 30 December 1492, Christopher Columbus, on shore at Haiti, "took from his neck a collar of bloodstones and very handsome beads of many pretty colors, which appeared very good in every way, and put it on [the neck of a local chief]" (Morison 1963:125). A more recent translation of that passage by Dunn and Kelly (1988:297), which also reproduces the Spanish, reads: "And the Admiral took from his own neck a collar of fine agates and handsome beads of beautiful colors that looked well in all its parts and put it on the king...." The word in the Spanish version of Las Casas (the nearest thing we have to Columbus' original diary) is *alaquequas*. Francis (1986:33) has suggested that the "handsome beads of beautiful colors" might be chevrons, but that is another story. What is the other bead?

In the next decade Duarte Pacheco Pereira, who left the earliest diary of Portuguese explorations along the West African coast, described a market at Tucrol in what is now Senegal: "There six or seven slaves are bartered for one horse of no great value, and some gold in return for kerchiefs and red cloths and stones called 'alaquequas' which we are familiar with as stones that staunch blood" (Kimble 1937:81). Kimble (1937:81, n. 6), translating the work into English, said that this was bloodstone. In the next passage where this stone is mentioned, the text also reads *alaquequas* and a footnote calls them bloodstone (Kimble 1937:88; n. 5). From then on Kimble (1937:92, 98, 105) translates the word as bloodstone.

Another translation of Pacheco Pereira was made later into French by Mauny (1956), with the Portuguese reproduced on the page opposite the translation. In each relevant passage the Portugese word is *alaquequas* and translated by Mauny (1956:64, 65, 72-73, 84-85, 94-95) as *cornelian* (carnelian).

Kimble (1937:81, n. 6) drew attention to a similar passage written in 1620 by the Englishman Richard Jobson, describing Setico along the Gambian River. Jobson reported: "They [the natives] buy also Bloud-stones long and square of the Portugals, which their Women wear about their middles, to preserve them from bloodie issues, the Mens membrositie seeming to give thereto much occasion" (Purchas 1905:300).

Both Columbus and Pacheco Pereira used the word *alaquequas (alaqueques)* in their accounts. Jobson used "bloud-stone" in his. *Alaqueques* was translated twice (Kimble and Morison) as bloodstone, once as agate (Dunn and Kelly), and once as carnelian (Mauny).

Alaquequa appears to have been used exclusively by the Portuguese. At least in modern Spanish there seems to be no equivalent (I am not sure if it is still current in modern Portuguese). Pacheco Pereira was Portuguese, and Columbus spent many years in Portugal, and perhaps even sailed to West Africa on a Portuguese ship (Morison 1942:41-42). *Alaquequa* is evidently derived from the Arabic, in which *'aqiq* is agate and, by extension, a semiprecious stone or simply bead. This word and our own "agate" (*agata* in Spanish) are derived from the Greek *achates*. That the Portuguese *alaquequas* comes indirectly through the Arabic is shown by the *al* prefix, which is the Arabic determiner (compare our words alchemy, alcohol, algebra, alkali, almanac, and so on, all from Arabic).

How did the Portuguese pick up this Arabic word? It was certainly current in the stone-bead trade originating in western India, which by this time was in Muslim hands. We have an almost contemporary account of this industry by another Portuguese, Duarte Barbosa, who visited India in 1518. At Limodura (modern Limudra) he said: "there is a stone for making aquequas, for making beads for Berberia. It is a stone white as milk, and has some red in it, and with fire they heighten the colour.... They also find in this town much chalcedony, which they call *babagore*. They make beads with it..." (Stanley 1866:66-67). And in a later and generally more accurate translation: "Here is found an *alaquequa* rock which is a white, milky or red stone which is made much redder in the fire.... And here they find great abundance of *Babagoure*, which we call... chalcedony, which are stones with gray and white veins in them..." (Dames 1918:167-169).

Barbosa clearly distinguished between *alaquequas*, which are stones that are reddened in the fire (i.e., carnelians), and *babaghoria* or banded agate, named after Baba Ghor, the patron saint of the industry (Francis 1982:22-27, 1985). These two stones have long been the major raw materials for western Indian stone beads.

What, then, about bloodstone? Kimble told us that he translated *alaquequas* as bloodstone because they staunch blood. Jobson, writing on the spot, was also clearly thinking of this supposed effect of the stone. Morison does not tell us why he chose this word. What stone can staunch blood? Homeopathy dictates that it resembles blood; that is, be the color of blood. Kuntz (1971:28) noted this when discussing the ability of red stones "especially the so-called bloodstone" to stop the flow of blood.

However, in English the word "bloodstone" means something else. It is a green stone with specks of red in it, both colors generally considered to be jaspers. The stone is otherwise known as heliotrope. On occasion hematite is also called bloodstone; this it the literal translation of its name. *The Oxford English Dictionary* lists ten citations from 1551 onward for "bloodstone." Six clearly refer to green jasper and two to hematite. Two others are ambiguous: one from T. Wilson in 1556 ("The bloodstone stoppeth blood") and one from a will in Bristol in 1587 ("To the said Thomas my blood-stone") (Simpson and Weiner 1989:307). Hence, the term was fairly new to the language when Jobson was writing in 1620, and perhaps was not yet fixed in its meaning.

But it is now clear that the Portuguese word *alaquequas* means carnelian. This makes sense when we consider the archaeological evidence of European contact with America and West Africa. To my knowledge, no bloodstone is associated with this period, while carnelians certainly are. It is also evident that the early European explorers got their stone beads from India through the Arab trade. The Arabs would have introduced these beads to West Africa, and it may have been his own experience there that induced Columbus to take carnelians (and amber) with him to America.

This discussion should remind us that we have to be cautious when using historical material in trying to identify beads, even when using original sources or translations which are usually trustworthy. I admit to this error myself before working on this problem in detail. I had suggested in my talk to the 1992 Bead Trade in the Americas conference in Santa Fe that Columbus may have been carrying banded agate, but it is now clear to me that *alaquequas* is not agate, as one might suppose, nor bloodstone, as befits its purported medicinal value, but carnelian.

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23. MORE ON FUSTAT FUSED ROD BEADS, by Peter Francis, Jr. (1993, 23:3-4)

Mrs. Spaer's observations on the beads from Fustat in *Forum* No. 22 are most provocative. I would suggest continuing to call them "Fustat Fused Rod Beads" rather than simply "Fustat Beads" because it was the name coined by the excavator who brought attention to them and there were other beads made in Fustat as well.

Her comments suggest that we may be dealing with more than one sort of bead here, perhaps produced in different places. Her suggestion of how the bead in the Israel Museum may have been made is quite interesting. Assuming that a beadmaker at that time could have cut a block of glass as she suggests, it would be an elegant way to make beads. However, this is not the way they were made in Fustat. I say that based on two observations:

1) The broken beads show that the spiral lines of the decoration enclose the whole of the decorative rods.

2) One such rod was found at Fustat, as reported both by Pinder-Wilson and Scanlon, and myself.

Mrs. Spaer may well have identified a somewhat different bead, made by a similar but not precisely same method. That suggests a different beadmaking location, since all beads found at Fustat were apparently made with rods, not wedge-shaped slices of glass. Where that might have been is certainly worth investigating.

We also need more data on the distribution of the beads. Spaer has indicated that they may be relatively widespread. However, if she has worked entirely from publications, it may have been difficult to identify these beads and distinguish them from those decorated with trailed lines later combed into herringbone patterns. What is needed is firsthand investigation of the reported beads.

24. NOTES ON SOME *FORUM* ARTICLES, by Peter Francis, Jr. (1995, 26:4-7)

This note was originally to have been for Ellen FitzSimmons, whose article on Tairona "tinklers" caught my eye. However, I have since accumulated other data of interest and am presenting them here as well.

Re: "Pre-Columbian Tairona Tinklers" (*Bead Forum* 23:11-14)

I was surprised to read that Caribbean and South American scholars refer to these shells as "tinklers" or "whistles." Had they looked a little further north, they would have had a completely different view of them.

Oliva shells like those illustrated are present in numerous Mexican museums, especially in the Maya sections, always strung as necklaces. Collections that come to mind include the National Museum of Anthropology in Mexico, the Mérida Regional Museum of Archaeology, the museum at La Bolom Institute in San Cristóbal de las Casas, and the Chiapas Regional Museum in Tuxtla Gutiérrez.

Nor are these stringings arbitrary. Numerous examples of these shells being worn exist on statuary. I shall cite one spectacular example: a life-size hollow clay figure from the Late Classical (ca. A.D. 600-900) site of El Zapotel in Veracruz. The female figure wears an enormous collar consisting of up to eight rows of what are probably *Marginella* shells. Around her waist is a row of large shells with the spires sticking out; they are likely to be *Olivas*.

Safer and Gill (1982:153-155) discuss the use of *Oliva* shells in conjunction with the Zapotec god Xipe Totec, the god of rain. They report the finding of rattles made of these shells and the use of the shells mounted on sticks which are hit on the ground to make noise during the rain ceremony of the Otomi.

Oliva shells are also depicted in the painted manuscripts often collectively known as codices. The ones involved come from the Zapotec-Mixtec tradition. The Codex Borgia (lam. 64) is a production that antedates the conquest. Codex Vaticanus 3738 and its cruder non-native copy, Codex Rios, both show the wearing of *Oliva* shells by common people of the time (Códice Rios 1900:lam. 57v, 59r, 60r).

An even more sophisticated development is the elaborate carving of *Oliva* shells to resemble human faces. One example is in the Chiapas Regional Museum and another, recovered from the sacred cenote at Chichen Itza, is in the Mérida Regional Museum. The large ellipsoidal perforation on the dorsal side is incorporated as a mouth. Incidentally, this perforation is created by sawing. Ms. FitzSimmons might enjoy reading Francis (1989) where more detailed experiments are actually illustrated.

Re: "A Note from 1878 on Glass Beadmaking" (*Bead Forum* 24:5-6)

So as not to disappoint Rick Sprague, I shall offer a comment on his note concerning the production of beads "by twisting glass threads spirally...." The description sounds like what is known as the Venetian variety of "satin glass," as opposed to the Bohemian variety. The beads themselves must have been expensive. They are rarely seen; there is only one in the Center's collection (Francis 1988:Color Pl. D 16).

The largest group of them that I know of are on a sample card in the Glass Museum of Murano, a slide of which was kindly donated to the Center by Peter Pratt. They fill most of the card on slide no. 4 (B2, 101-250), which is helpfully marked *Vetro alla Lucérna* (lamp glass). There also appear to be a few on the Giacomuzzi cards (ca. 1852-1870) in The Bead Museum in Prescott, Arizona.

Re: "The Illicit Bead Trade in Gao" (*Bead Forum* 24:6-10)

Thanks very much to Timothy Insoll for his article calling attention to the destruction of the archaeological site of Gao, Mali. Similar devastating practices have been documented all around the world (Francis 1987). While Insoll is no doubt correct that many beads looted from Gao are sold in Mauritania, many of them end up in the hands of Western, especially American, collectors. He would be shocked by the

size and extent of bead assemblages held in dealer's stocks and private collections, all gleefully represented as having been "excavated" from Jenné, Timbuktu, or wherever.

Society members should make it a priority to educate themselves and others about this terrible situation. While there is some demand within West Africa itself, the real money and the real incentive come from outside. The halting of demand from the rich nations for these antiquities would go far in slowing the looting Insoll describes.

Re: A Query Concerning a Mayan Practice (*Bead Forum* 1:8)

And now to answer one of my own questions. In the very first issue of *The Bead Forum* (1:8), I asked for references to a practice described in a popular journal of the Maya tying a bead to the hair of babies to dangle between their eyes to make them cross-eyed. Peter Pratt (*Bead Forum* 2:8) sent quotations from Coe and Morely. Coe (1966:144) said the parents hung small beads on the noses of the children (not easily envisioned), and Morely (1956:163) said they used little balls of resin dangling from the ends of the children's hair. Now there were three different accounts and no original source.

I now believe I have found one. Fray Diego Landa was one of a handful of Spanish clerics generally empathetic to the native peoples of the Americas. His mission was in the Yucatan where Maya culture still furnished. His *Relacion de las Co sas de Yucatán* is a work of sympathetic, careful observation on all aspects of post-classic Maya culture. He wrote: "It was held as a grace to be cross-eyed, and this was artificially brought about by the mothers, who in infancy suspended a small plaster from the hair down between the eyebrows and reaching the eyes; this constantly binding, they finally became cross-eyed" (Gates 1978:33). I also consulted a Spanish edition and the word in question is *pegotillo*, the diminutive of *pegote* which is sticking-plaster.

Sadly, no beads were involved and, even more sadly, they were not attached to the nose; Morely clearly had a better idea of the practice. Maybe this information only pleases me, but I *have* been wondering about it for a dozen years.

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25. SOME NOTES ON ARTICLES IN *BEADS*, by Peter Francis, Jr. (1996, 28:10-12)

First of all, congratulations to Karlis Karklins for continuing to make *Beads* the single best source of information on international bead research. The following are additions to two of my own articles in that journal concerning beads in the Middle East and one which Karlis reprinted for our benefit.

"Beads of the Early Islamic Period," *Beads* 1

The mystery of the bead wasters pictured in Plate IIA and discussed as part of the Fouqi Collection on pp. 29-30 is now solved. In the storerooms of the Allard Pierson Museum in Amsterdam is material known to have been found at Fustat. It is very like the wasters discussed in my paper, but even more convincing of an Early Islamic date because of its provenience and because several unfinished beads are among the finds. The specimens are mosaic beads formed without a core in the manner typical of the Early Islamic period. I now have no doubt that this is what they are.

"Beadmaking in Islam: The African Trade and the Rise of Hebron," *Beads* 2

The glass beads which I identified as having come from Hebron, following the lead of Arkell (pp. 23-26, Plate VD), have been further confirmed by their presence in the W.G.N. van der Sleen collection of the Allard Pierson Museum in Amsterdam. The collection includes beads of this type and are marked "Palestine." That would be Hebron (which is now again Palestinian). Double "thanks" to Geralda Jurriaans-Helle.

"On the Date of the Copper Age in the United States," *Beads* 4

This is a reprint of a paper published in 1862 by A. Morlot, who concluded–on the basis of chevron beads–that the Phoenicians had come to the New World a couple of millennia before Columbus. He quotes material from the pioneer American anthropologist, Henry Schoolcraft, in defense of this hypothesis. Karklins kindly reproduced the relevant material, but there is more to the story.

In the "Editor's Introduction," Karklins (1992:39) writes:

> Of course, not everyone shared his [Morlot's] views. In fact, Henry Schoolcraft (1853:103-104), who published descriptions and color illustrations of the Canadian [chevron] beads referred to by Morlot, logically concluded that they dated to the period between the arrival of the French (1608) and the date of the beads' discovery (1837).

This is both right and wrong. Schoolcraft did reach such a conclusion, but not in the passage quoted by Karklins (Schoolcraft 1853:104) and the one referred to by Morlot. This reads:

> The colored enamel beads are a curious article. No manufacture of this kind is now known. They are believed to be of European origin, and agree completely with the beads found in 1817, in antique Indian graves, at Hamburg, Erie Co., N.Y. (Karklins 1992:43).

In this passage and in Part I of *Information*, Schoolcraft does not discuss the age of the beads, only their origin. Morlot happily quotes Schoolcraft. After all, the beads have been found in another (presumably) ancient cemetery and Schoolcraft did not know that chevron beads were still being made, even though to call the Phoenicians "Europeans" is a little farfetched, despite their colonies in Spain. However, Schoolcraft did firmly rule out the chevrons found at Beverly, Ontario, and all other glass beads found in North America as being ancient (Phoenician or otherwise) in Part V (p. 110) of *Information* in which he wrote:

> It is important to distinguish between the antiquarian vestiges of the early French, and of the Indian occupancy. Many of the articles of each period have been confounded, because they have been found in the same locations, and some of them in the same graves or sepulchral. This is the case with all articles of glass-beads. enamel and porcelain. transparent or opake [sic], and all substances requiring vitrification (Vide. Vol. I, Plate 25, Figs. 7 to 13). [Emphasis mine. There is a misprint here; it is not Pl. 25 but 24, beads 7-11, magnified in Figs. 12 and 13. These are the aforementioned chevrons from Beverly.]

So, Morlot made a big thing of the Phoenicians coming to America and threw much sand in many people's eyes for a long time, even though Schoolcraft had ruled out such a hypothesis as early as 1846 (Francis 1985). But, would he have done so had he read the passage in Part V? Did he never see it? Did he read it and suppress it, or was he just a lazy scholar? Did he just not see the right volume or did he not look far enough? Was he too enthused about his grand idea or was it all an accident? Is there a lesson here?

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26. SOME NOTES ON THE WORDS FOR BEAD, by Peter Francis, Jr. (1997, 30:11-13)

***Nazhim* in Arabic**

Around 1350, Ibn Battuta wrote about his travels in West Africa. In the French translation by Defrémery and Sanguinetti (1922:394), his words about what to take to trade in the area were translated as: *des ornaments ou colifichets de verre, que l'on appelle nazhim, ou rangée* ("ornaments or baubles of glass, which are called *nazhim*, or *rangée*").

I have cited this passage on several occasions, including in *The Bead Forum* (Francis 1992:9). In the *Forum* article,

I noted that *rangée* was not in the Arabic text, but was a French word the translators were using to mean a "string of beads." *Rangée* means to put things in order or in a file (to arrange them).

Nazhim was used as "bead," but I now realize why. *Nazhim* means the same as *rangée*; that is, to put something in order or in a file. It also has the meaning "to string (esp. pearls)" (Madina 1973:675). Post (1911:734) wrote: "The verb *nazam* in Arab., coupled with *lulu* = 'pearl.' signified 'to string pearls.' Coupled with *s'hir* = 'poetry,' it means 'to arrange verses.'" In short, the translators of Ibn Battuta translated the word literally.

However, in Ibn Battuta's day, at least in West Africa, the Arabic verb had apparently been transformed into a noun. The correct reading of the passage would be "ornaments or baubles of glass, which are called beads."

"Bead" in Swahili

While poking around an online dictionary site, I checked out the word for bead in a Swahili dictionary (http://jefferson.village.virginia.edu/swahili/). Swahili is a Bantu language, spoken natively by some 4 million people, but used by another 30 million as a link language (Crystal 1987:314). Bantu is one of many languages with a complex system of classifying nouns. These classifications are not always arranged with Aristotelian logic. For example, there is an insect class, but the word "insect" is classified in the "human being" category (http:91). As a result, words for beads appear in several different classifications in Swahili, though they all seem to make sense.

In the class of "things with curved outlines," *tinda* is a "string of beads to go around the neck." In the class of "powerful things," *mdundugo* is a "charm said to make one invisible," and *mzumai* is a "bead of the Muslim rosary [sic]." In the classification of "collections of discrete things," *shada* is a "string of flowers, beads," and in the category of "religious things," *mzumai* again appears as a "rosary [sic] bead." I do not know any Swahili. It would be interesting to learn if there are any other associations with these words. To the best of my knowledge, *mzumai* is not Arabic nor derived from that language.

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27. SOME REMARKS ON BODOM BEADS, by Peter Francis, Jr. (2002, 40:10-12)

Recently two articles have appeared on the subject of Bodom beads (Stanfield 2000-2001; Liu et al. 2001). I do not claim to have all the answers about Bodom, but I do believe that some facts have been overlooked in these two articles and ought to be brought to attention.

The principal concern here is the origin of these beads. The fact that the Krobo of Ghana make beads that they call Bodom and that (sometimes) resemble Bodom is not sufficient to assume that true Bodom were made by them as Stanfield (2000-2001:68, 74) asserts. As Stanfield (2000-2001:64) himself points out, the word is of Akan origin and it was likely introduced to the Krobo by Lamb (1976:37-38). Lamb, who was not trained as an ethnographer, took the word of Mr. Tettah, his informant, at face value when he "emphatically" stated that the Bodom he was shown were of Krobo origin. Unfortunately, that is not sufficient. If it were, I would, for example, be convinced that chevrons were made in Yazd, Iran, or that Indian mosaic beads originated in Egypt.

While some beads may be called Bodom in Kroboland or the markets of Accra, this is no more definitive than all the many beads that have been called "aggrey" or "padre" or any number of names. Bodom are beads of the Asante and related Akan speakers. For his "long paper" (roughly a bachelor's thesis) for the University of Ghana, Quarm (1989) distributed complex questionnaires to fellow students of different ethnic groups in Ghana concerning bead lore and use. His conclusions included:

> Among the Asante and the Akim a big yellowish ancient glass bead called Bodom is the significant bead... (Quarm 1989:35); In the Akan areas of Akim, Nzima and Aowin ancient glass beads like the ones called gyanie, aboo, Bodom are the most popular while the Krobo and the Ga people use ayeblibi, kpokyikyi... (Quarm 1989:37); The Akim and Asante people of the Ebiredze, Koona and Ahine clans also use strands of beads with a big Bodom bead in it (Quarm 1989:52).

Nowhere in the survey were Bodom beads associated with the Krobo: they were always affiliated with the Asante and other Akan-speaking groups.

How old is powder-glass bead making in the territory of modern Ghana? Stanfield (2000-2001: 66) refers to "limited" archaeological data putting the date back to the 1600s and cites Bowditch's confused, long, rambling footnote that contained a reference to "boiled" beads as the only pre-1900 European account of them (Stanfield 2000-2001:65). In fact, the "limited" archaeological evidence I listed (which Stanfield cites) consists of six sites, two of which are late 18th century. Of the others, Ywifo Heming is the most tightly dated to 1690-1710 (Bellis 1972:85). Additionally, there is a much earlier and more complete European description than Bowditch's written by Barbot (1746:231) discussing what he had observed in 1704: "The third sort of false gold, grown pretty common among the Blacks, is a composition which they make of a certain powder of coral [i.e., glass beads] which they cast." Stanfield (2000-2001:68-69) asserts that the yellow glass of Bodom was recycled from 19th-century yellow Venetian beads. He gives no reason for this assumption except that it "seems obvious" to him. If so, the yellow would be a lead glass, but no one has tested this. Note above that Barbot in 1704 referred to locally made powder-glass beads as being yellow ("false gold"). Other yellow beads were available in this part of West Africa much earlier than the Venetian lead-glass beads, including the yellow wound beads made at Hebron (Francis 1990).

However, there is even more, older, and in the case of Bodom, significant evidence that I have cited (Francis 1993:11). Stanfield simply ignored it, while Liu et al. perhaps never saw it. Powder-glass beadmaking, apparently using the "wet core" method like that of Bodom has been documented archaeologically in Mauritania from the 10th to the 12th century. Such beads and a number of molds were uncovered at Tegdaoust (Vanacker 1984:46-51), assumed to be the remains of the city of Aoudaghost (variously spelled) (Robert 1970). As is well known, this is the method used today in Mauritania to produce the so-called "Kiffa beads."

Could it be that Bodom were made in this region? As 1 have also pointed out, there is a strong tradition among the Asante that Bodom came from the north. Lamb (1976:37) asked Kwame Daaku, who was collecting oral tradition among the Asante, to inquire specifically about Bodom. Among the Adanse, who claim to be the original Asante, informants interviewed in all sixteen villages he covered acknowledged the importance of Bodom and in twelve (three quarters) of the villages they said the beads came from the north (Daaku 1969:266, 315). The same thing was said to be the case by the Asante of Asokore-Koona, who reported that Bodom came from north of Jenne in the interior Niger delta (Meyerowitz 1951:50, n. 2). Thus, it is often, not "sometimes" (Stanfield 2000-2001:64) asserted by the Asante that Bodom came from the north.

I shall conclude by repeating what I have written before.

> Even though the evidence is scanty, we can form a tentative hypothesis about Bodom origins. Oral traditions are often accurate, and the conviction of a northern origin is strong among the Asante. A powder-glass bead making technique a thousand years ago at Tegdaoust, north of the inland Niger delta, is pertinent, especially if they were made on cores. Kiffa beads, technically similar to Bodom, are made in southeastern Mauritania, where Tegdaoust is located. Ghanaians may have once made beads this way, but if so, they have forgotten. Could it be that Bodom were made in this area, controlled by the ancient Kingdom of Ghana and later of Mali? Modern Ghana received considerable cultural input from the Malian Kingdom (Wilkes 1962). This hypothesis takes into account their reported northern origin, the lack of the technique in Ghana, and a related technique surviving in Mauritania, as well as explaining their rarity (Francis 1993:12).

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28. BEAD-DECORATED GLASS ARMLETS OF BONTUKU, WEST AFRICA, by Richard A. Freeman (1989, 14:12-14)

[Ed. note: Extracted from Richard A. Freeman's *Travels and Life in Ashanti and Jaman*, 1898, Archibald Constable, Westminster, pp. 230-233, the following item describes the innovative use of glass beads as decorative elements by the glass-armlet makers of Bontuku on the Guinea Coast of West Africa during the late 19th century. It would be interesting to see if such armlets have or can be identified in ethnological or archaeological collections.]

Mahama Ba-Katchina... is in many respects a somewhat distinguished member of Bontukian society; distinguished by his genial and pleasant manners, by his extensive travels and knowledge of the African world, by his skill in the manufacture of glass armlets (*tagulai*), and lastly, I regret to say, distinguished among his fellow Mahommedans by his too convivial habits.

The means and appliances by which Mahama carries on his curious craft are nearly as simple as those of the tailor whose house we have just visited. The furnace consists of a large water-jar buried in the floor, its mouth opening on the surface; its bottom being perforated, two tubes are led into it, their opposite ends being inserted into two goat-skins, which are worked alternately as bellows by a small boy who squats between them. The fuel is wood, which, in the intervals of rest, smoulders into charcoal, and when roused by the blast of the bellows gives out a clear, white, smokeless glow. The other appliances consist of a few pairs of rude iron tongs, thin iron rods, a heap of broken Dutch gin-bottles, and a narrow wooden tray filled with tiny, many-coloured beads, such as are used at home for ornamenting mats.

The first proceeding is to stir up the dull embers with one of the iron rods, and then the word is given to the small boy, who rejoices in the curious but not uncommon name of Allah, whereupon the bellows are worked vigorously for a few seconds until a bright white light issues from the mouth of the furnace.

Mahama now selects from the heap of broken glass a large fragment of a Dutch gin-bottle, which he holds with tongs in the mouth of the furnace, not bringing it in contact with the glowing embers. Presently the glass reaches a dull red heat, and then its angles become gradually rounded, and it shows evident signs of softening. The workman next seizes the softened mass with a second pair of tongs, and pulls it out into a narrow strip, the two ends of which he joins by pressing them together. The tongs are now discarded, and the softened red-hot ring of glass is played about over the mouth of the furnace on two rods until it has been modelled into the desired shape and size. The next step is the ornamentation of the surface; which is achieved by carrying the ring (still in a red-hot state) on the two rods, and rolling it quickly along the tray of beads, of which numbers adhere to the molten surface. The armlet is then returned, thickly incrusted with beads, to the furnace, where the beads quickly melt down into a uniform, many-coloured mass, completely covering the original white glass. The still soft armlet is now stretched slightly, so that the spots of different colours are drawn out into lines, producing a kind of marbled or agate-like appearance; and with a little more modelling, the article is finished and set aside to cool.

The armlets when completed, have a much neater and more ornamental appearance than might be expected from the rather rude method of their manufacture. The prevailing colour is red, with streaks of blue, white, and other colours– giving them, as I have said, somewhat the character of agate. The shape is very much like that of a quoit; and they are usually worn [by men] in pairs, two on each arm, just above the elbow, the flat surface of the contiguous armlets being in contact. Those made by Mahama were greatly in request amongst the more dandified Wongáras of Bontúku and the surrounding towns, and usually sold for about twenty cowrie-shells each, and one set, which he manufactured from the fragments of a broken green glass lampshade of mine, was sold, I believe, for quite a fabulous sum.

29. BEADS AND THE EMERGENCE OF THE ISLAMIC SLAVE TRADE IN THE SOUTHERN CHAD BASIN (NIGERIA), by Detlef Gronenborn (2001, 38:4-11)

During the course of an extensive research project funded by the German Research Foundation (DFG), archaeological excavations were undertaken in the southern Chad Basin in present-day northwestern Nigeria, close to the Cameroonian border (Gronenborn 1998). This research followed earlier endeavors on the Nigerian side by Connah (1981), Holl (1988), Lebeuf (1981), and others on the Cameroonian and Chadian side of the extensive clay plains south of Lake Chad (Fig. 1).

On this still yearly and widely inundated territory, human settlement is limited to isolated sand dunes, which protrude through extensive clay layers. The latter are the remains of the once much more extensive Lake Chad (e.g., Thiemeyer 1997). After about 6000 cal B.C., the lake began to retreat, and after around 1000 cal B.C. vast territories south of the lake were open for human settlement. At first late Neolithic pastoralists settled on the dry sand "islands," and after a hiatus of several hundred years, Early Iron Age farmers began to build permanent villages. The Early Iron Age is again separated from the Late Iron Age by a short-term hiatus and the Late Iron Age sets in sometime during the 7th-8th centuries (Gronenborn 1998).

The excavations by the German team resulted in a revised ceramic sequence, namely of the Late Iron Age and Historic Periods. The chronological succession of pottery traditions has further been confirmed by a series of ^{14}C-Dates (Gronenborn 2001). With this newly established chronology in mind we turned back to the sequence of the site of Daima, one of the largest settlement mounds in the whole region which was trenched by Connah (1976, 1981) in the 1960s. It became apparent that his earlier chronological interpretation as to the end of settlement had to be modified and that, in fact, his first impression (Connah 1967) was more likely, namely that the site was abandoned sometime during the early 17th century and not during the 13th as he had later concluded from ^{14}C evidence. Already Wesler (1999) had suggested a modification of the stratigraphic interpretation on the basis of a seriation of Connah's pottery types. This interpretation, then, was supported by our work; conclusively the terminal date for Daima had to be lifted up which resulted in the chronological spreading of the whole packet of upper layers (Fig. 2). This rearrangement also affected the interpretation of exchange-connections implied from the appearance of non-local materials such as copper alloys, carnelian, and glass beads. When the stratigraphic position of these materials is plotted (Fig. 3) their limitation to the upper layers of the stratigraphy becomes apparent. While previous analyses of the development of external contacts were based on the assumption that the layers would date between the 10th and 13th centuries (Connah 1981; Holl 1995), the new chronological scheme shifts them to the 14th to 16th centuries. According to the new chronology, only then wide-reaching external contacts are evident in the archaeological record. The sources of the copper alloys are of no concern in this article (for further information *see* Gronenborn 1998), but rather the origin of the glass and carnelian beads found at Daima and other sites in the southern Chad Basin and even more so the question as to why do they appear?

Many of the carnelian beads at Daima are similar to ones found by us in association with a burial that dates between the 14th and 16th centuries (Fig. 3). Specimens are elongated to keg-shaped, dark to bright red in color and often show internal flaws. According to a preliminary visual examination by Timothy Insoll of Manchester University, beads of this kind could come from the Western Sahel or the Central Sahara and are comparable to material from Gao (Insoll and Shaw 1997; geochemical analyses are under way). Delaroziere (1994:68-69) depicts similar shapes from present-day markets in Niger, Nigeria, and Gabon, but considers them to be of red jasper. Hence, the exact attribution will have to await the University of Manchester's analyses. Nevertheless, they are not of a Chad Basin origin.

Another type of bead which was recovered in our excavations is quite different in shape. It is slightly larger and elongated with six facets (Fig. 4). The specimen depicted comes from the upper layers of the site of Ndufu (Gronenborn 1998) which dates between the 14th and 16th centuries, probably towards the end of this time span. Insoll visually examined this material and came to the conclusion, that "it is very similar to Gujerati (Indian) material which was produced for the African export trade" (Insoll, pers. comm.;

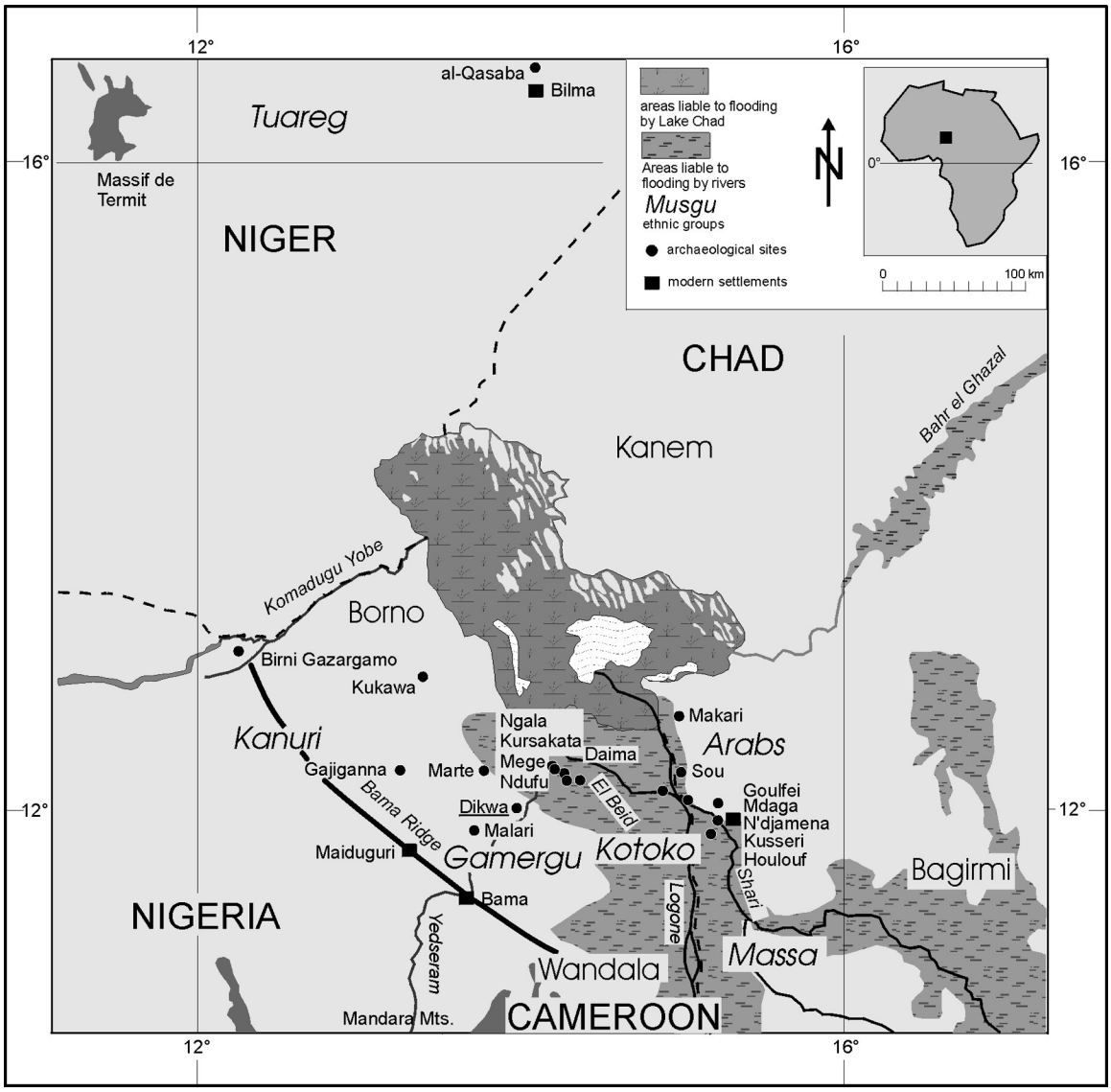

Figure 1. The southern Chad Basin showing important archaeological sites and modern towns.

for the Indian sources *see* Arkell 1936). The provenance of the glass beads is even more difficult to discern. They are mostly blue, green, or white and cylinder- and keg-shaped or discoidal. Lebeuf (1980) considers a Venetian origin for the blue varieties and the green beads should have been produced locally. Holl (1995) generally considers a provenance from Nupe or Yorubaland. Blue beads were produced in Gao from the 9th century A.D. onwards (Insoll and Shaw 1997). In any case, as uncertain as the exact origin of the beads presently is, it is certainly very clear that they do not derive from the southern Chad Basin but rather constitute items which were either moved in the northward-oriented trans-Saharan trade or along routes which connected the large sub-Saharan commercial and political centers.

The relatively late and sudden appearance of trade goods of external origin in the southern Chad Basin–beads, copper alloys–and their absence from earlier layers in the sequences raises the question as to which historic processes led to this archaeological picture. A careful examination of Arab accounts on the Central Chad basin reveals that contacts between the emerging Islamic states–namely Kanem-Borno–and the non-Islamic segmentary societies south of Lake Chad were minimal before the 13th to 14th centuries. Only occasionally did the sultans undertake expeditions towards the south, and this solely with the object of obtaining slaves (Gronenborn 1998). Very instructive is a passage by al-Maqrizi, a historian who lived in Cairo between 1364 and 1442. He wrote:

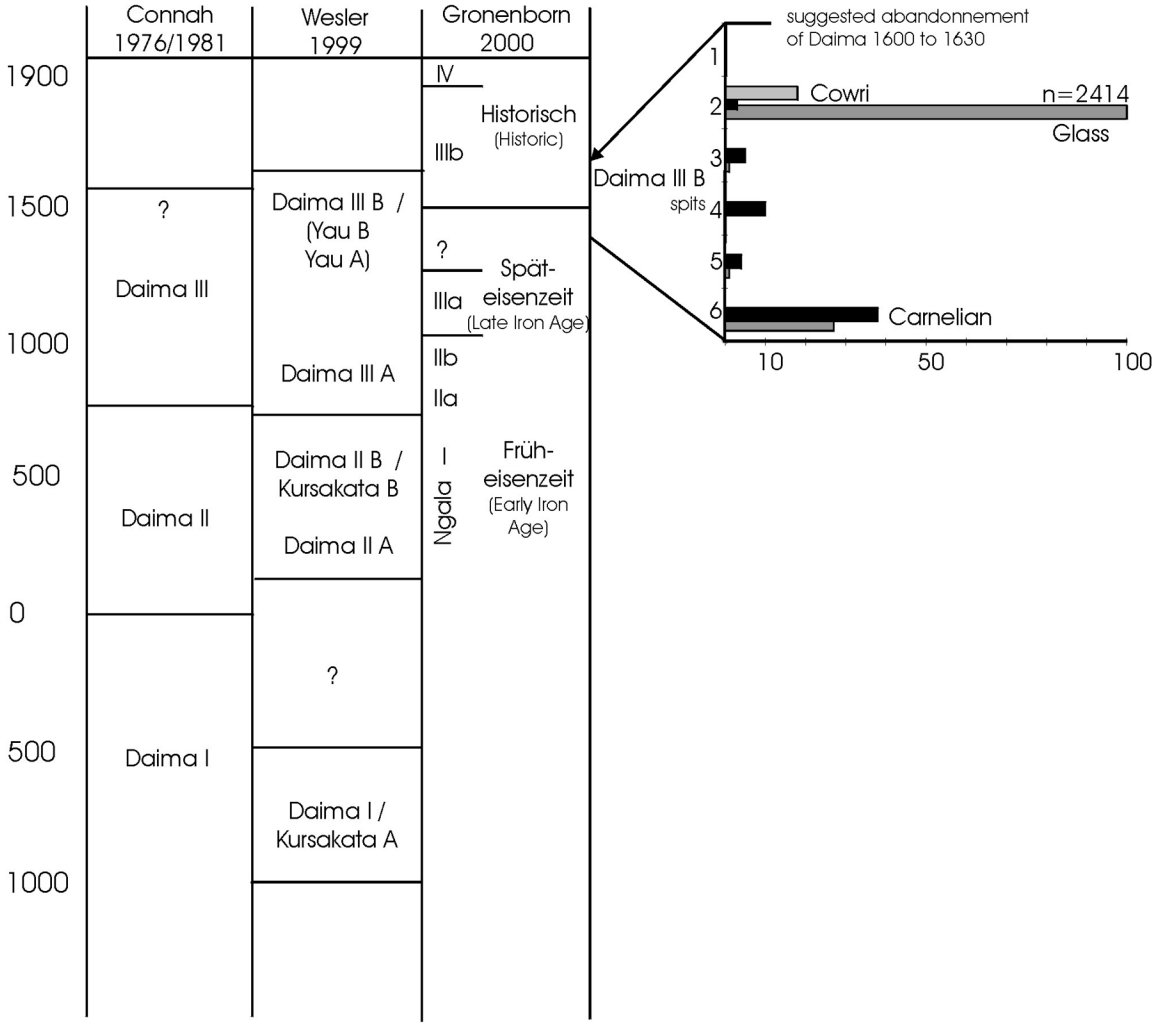

Figure 2. Different pottery sequences showing the stratigraphic position of "exotic" pieces of adornment from burials at Daima.

> In their country [diverse ethnic groups listed before] there are big trees and pools (*birak*) from the Nile [a common misunderstanding in Medieval Arab sources, likely either the Shari or Logone, tributaries to Lake Chad]. The King of Kanim made a raid on them from Aljama [capital of the Kanem-Borno Empire] about 1252-3 and slaughtered and took prisoners (Levtzion and Hopkins 1981:354).

Throughout the 13th century, the Kanem-Borno empire had no territorial interest in the regions south of the Lake. This changes, however, when under pressure of neighboring groups and probably also because of climatic decline, the ruling dynasty was forced to leave their traditional homelands. Now the empire engaged in a series of military advances with the aim to subjugate the region. As so common in the Sahelian and Sudanic zones of Africa, these military actions were combined with slave raids (Gronenborn 2001; Reyna 1990). But, as can be inferred from 19th century's analogies, interaction between raiders and the enslaved was by no means a simple and unilineal process. Rather, a complicated network between the Borno military commanders and local headmen should have emerged and the latter might quite often have sold their politically weaker neighbors to the Muslims. Also, fierce resistance was organized by the non-Muslims and the sultans finally had to leave the region. However, with the adoption of firearms by the Kanem-Borno army during the middle of the 16th century, the region was finally subdued and parts of the population were led into slavery; others migrated southward (Gronenborn 2001). The appearance of "exotic" trade goods in burials as well as on settlement sites with the beginning of the slave raids from the north is thus seen in connection with these raids. Likely

Figure 3. Mege; burial with beads. The rightmost one is of quartz (L 10, W 12, W 2 g). The carnelian/jasper specimens vary in length from 13 to 15 mm, and in weight between 2 and 3 g; the width is always 11 mm.

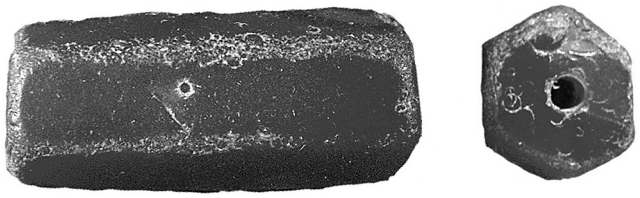

Figure 4. Ndufu; Carnelian bead. L 29 mm, D 13 mm, W 7 g.

through alliances with local potentates, slaves had been exchanged for beads and copper alloys. Indeed, as historic accounts show, still during the terminal 19th century, beads were used as an exchange medium in the trade on slave markets in northern Cameroon (Fig. 5). This is reflected by the following passage from Passarge (1895:433 [translation by the author]):

> Beads come in two sorts called *garambú* and *gursáli*, respectively. The *gursáli* are large and keg-shaped, the drilling hole shows spiral grooving. Three kinds can be differentiated according to color and translucency. *Bákki* are dark blue and opaque, *schúdi* are of sky blue color and slightly translucent, and *fálli* are bluish-white and translucent. The *garambú* are small, flat disks. Of these I have only seen bluish-white beads with a shine. The Fulbe women prefer the *gursáli*. These are also used to buy ivory, while the *garambú* are used in the slave trade.

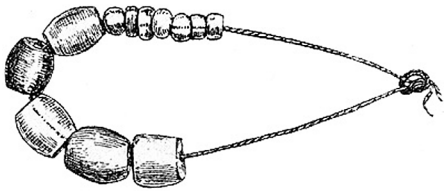

Figure 5. *Garambú* and *gursáli* beads from Kukawa market, Borno; 3/10 nat. size (Passarge 1895:433, Fig. 205).

Another trade item from the non-Muslim lands to the south of the lake which is mentioned by al-Maqrizi, is ivory. Also, during the 16th century iron seems to have been a major export article. By then local powerful princedoms had emerged under the pressure of the slave raids, of which many were, curiously enough, allied with Kanem-Borno; slave raids had largely ceased in the region and were directed further south where they continued up to the early 20th century (Gronenborn 2000; MacEachern 1993).

As so often is the case on the African continent, and seemingly also for the southern Chad Basin during the 14th to 16th centuries, a link may be established between trade beads, external slavers, and local potentates: non-muslim people were exchanged for beads and other "exotic" pieces of adornment in the course of the merciless Islamic slave trade (e.g., Hogendoorn and Johnson 1986); a theme recurrent elsewhere in the history of slavery (e.g., Perdue 1979).

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30. NOTES ON THE EUROPEAN BEAD INDUSTRY–1897, by Albert Hartshorne (1986, 9:20)

Up to about forty years ago beads of the ordinary self colours were made by small workers in Bethnal Green and Shoreditch [London]. They bought their coloured glass canes from the glass-makers and melted them at a jet, dropping the metal upon a copper wire coated with whitening, the wire being turned during the process, and when cold the beads would slip off. The men were, however, so careless and unpunctual that the trade came to an end. Bead-making at the present day is in continental hands, principally in the district of which Reichenberg, the second manufacturing town in Bohemia, is the centre. The largest export from hence is of glass beads coming chiefly from Gablonz and finding their principal market in Paris. Figured beads come from Venice as of yore. The opening up of Africa is giving an impetus to the trade, and an idea may be formed of its extent by the fact of between sixty and seventy tons of beads having been lately destroyed by fire on the premises of Mr. L. Levin, a bead merchant in Bevis Marks. (Albert Hartshorne, 1897, *Old English Glasses*, p. 106 n.)

31. A NOTE ON CHEVRON AND OTHER BEADS FROM TRINIDAD, by Charles A. Hoffman and Thomas F. Lynch (1990, 17:14)

Two large, Spanish, faceted chevron beads were found in the Late Ceramic site of Mamoral, in central Trinidad.

Their size (30 x 25-27 mm) and color sequence (blue/white/red/white/green/white) suggest a date prior to 1550. The associated Amerindian pottery had the micaceous sand temper characteristic of the St. Joseph's complex, an assemblage local to northern Trinidad, and probably, therefore, Mainland Carib or just possibly Nepuyo. Beads may represent purchase of provisions or slaves during Spanish west-coast slave raiding, but, interestingly, the site is 22 km inland.

One small (13 mm) red bead with longitudinal white stripes was found in the Late Ceramic site of Esmeralda in southern Trinidad. The bead is made from a hard stone such as jasper, and the white stripes are narrow incisions filled with molten white material, possibly powdered glass. The associated Amerindian pottery has the *cariape* temper associated with the Mayoid series, an assemblage restricted to southeastern and southern Trinidad before Columbus, and then to the mission villages of the "Naparima" Indians (A.D. 1687-1849). [Extracted from "Current Research: Caribbean," *American Antiquity* 55(1):168-169; 1990].

32. SUMMARY OF HURON BEAD SEQUENCE, A.D. 1590-1650, by James R. Hunter (1986, 8:16-18)

The Huron confederacy consisted of four distinct Indian nations which occupied a small geographical area adjacent to the southeastern corner of Georgian Bay in what is now south-central Ontario.

Each nation within the confederacy was responsible for its own commercial relations and would act independently from decisions made by the confederacy. As a consequence, each of the four nations, represented by twenty-two contemporary villages, acquired trade goods from European traders at roughly the same time; i.e., between 1590-1600 (the start of formalized trading into Huronia) and around 1649 (the destruction of the Huron confederacy by the Iroquois).

Of 26 samples from village and burial sites in Huron country, only 15 contained more than 30 glass beads. The sequence, showing approximate date ranges, and the three to five most popular Kidd (1970) varieties and their frequency at each site or group of sites, is as follows:

Ball Village (1590-1600): 10, Ia5; 7, IIa31; 2, IIa10; 1, frit-cored bead; 1, IIg4.

Warminster North Village, Warminster South Village, and Warminster Ossuary (1600-1610): 169, Ia5; 119, IIa15; 57, IIa49; 27, Ia19; 22, IIa14.

Auger (1610-1620): 17, IIa15; 16, Ia5; 14, IIIbb3; 7, Ia19.

Peden (1620-1630): 107, IVa5; 30, IIa31; 7, IIa51; 3, IIa1.

Santimo (1630-1640): 171, IVa1; 43, IIa31, 21, IIal; 6, IVk3; 6, IIbb1.

St. Louis (1630-1640): 11, IVa1; 4, Ia1; 4, IIa43; 4, IIa5; 2, Ia20.

Ossossane Village (1630-1640): 32, Ia1; 14, IIa33; 8, IVa5; 7, IIa1.

Ossossane Ossuary (1636): 79, IVa5; 37, IIa34-40; 41, IIa53; 16, Ia1; 16, IIa13.

Maurice Ossuary (??): 42, IVa5; 12, Ia1; 6, IIa31; 6, IVk4.

Orr Lake (1640-1650): 41, Ia1; 15, Ic1; 11, Id1; 8, Ic1; 8, IIa33.

Train (1640-1650): 23, Ia1; 23, IIa23; 21, IIa1-3; 12, IVa1-8.

Thompson Walker (1640-1648): 57, IIa4; 6, IIa33; 1, Ic1.

Sainte-Marie I (1639-1649): 73, IIa33; 63, IIa5; 16, Ia1; 6, IIa9; 5, IVa1.

When compared to the Neutral bead sequence (Kenyon and Kenyon 1983), the Huron assemblage exhibits close similarities. For example, the Neutral Sealey site bead assemblage is virtually identical to that from the contemporary Peden site. It is hoped that this system will provide researchers with a fairly clear chronological sequence of trade bead styles for the early French fur trade period in the St. Lawrence River-Great Lakes Basin. It is also hoped that the sequence will be further refined to allow more precise dating of Huron village sites and for determining European bead styles and varieties as they changed through time.

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33. LOOTING ARCHAEOLOGICAL SITES, by M.E. Hutchinson (1996, 29:4)

[The following item is excerpted from *Newsletter* No. 26 of the Bead Study Trust, spring 1996. It has been said before, but needs to be repeated every so often to remind us of the consequences of "just buying that one old bead."]

Every time you buy a bead which has come from the unauthorized "excavation" (looting) of an ancient site, you are encouraging the looter to continue his destructive work. In principal, every bead enthusiast is against this, but it does not stop people arranging buying trips to those parts of the world which are worst affected, or bead vendors knowingly advertizing and selling these beads.

At some point, bead collectors (and this includes all researchers who have a reference collection) arc going to have to decide where they stand. Are they going to continue buying beads from pillaged ancient sites, thereby possibly wrecking any chance of establishing proper chronologies for the history of these areas, or are they going to stand by their principles, refuse to buy looted beads, and by this means help to put an end to looting by making it unprofitable? It is no use saying "one bead won't make much difference;" 1,000 people each buying one bead is 1,000 beads.

Although several persons have written about the looting of ancient sites for antiquities and beads (e.g., Timothy Insoll in *The Bead Forum* 24:6-10 and Ian Glover in the Bead Study Trust *Newsletter* 26:11), it still continues. Beads from a properly excavated site are historical "documents" and can be used as evidence of ancient trade routes or for dating, but a looted bead is just a pretty bead.

34. THE ILLICIT BEAD TRADE IN GAO, THE REPUBLIC OF MALI, by Timothy Insoll (1994, 24:6-10)

Introduction

This article is a follow up to a note already published describing the looting of antiquities in the Gao region of the Republic of Mali in West Africa (Fig. 1) (Insoll 1993a). Undoubtedly this article could be written about many sites, not only in West Africa but within the world as a whole. The Gao region is being discussed as the author has conducted fieldwork within this area as part of his ongoing doctoral research project, The Archaeological Recognition of the Acceptance of Islam in the Western Sahel, ca. A.D. 800-1200, during the course of which it was impossible not to notice the immense damage done to important archaeological sites by teams of robbers searching for beads and other material. Secondly, the processes of destruction witnessed in this region are probably symptomatic of the situation in a much wider area.

The city of Gao is located within the sixth region of the Republic of Mali (De Moraes Farias 1990:65; Insoll 1993b). Although Gao developed at the end of the first millennium A.D. as one of the first southern termini for the trans-Saharan trade routes, it is famous historically as the capital of the Songhai empire which reached its peak between the mid-15th and late 16th centuries A.D. The Songhai empire was the last of the three great medieval empires of the West African Savanna and Sahel, and was preceded by the empires of Ghana and Mali (Levtzion 1985). Trade centers such as Gao flourished through participation in the lucrative trade between North and West Africa. Gold, ivory, and slaves were shipped north across the Sahara and finished goods and salt were received in return.

Two sites will be used as examples here: Saney, a large habitation mound or tell located 4 km outside of Gao, and the area within Gao known as old Gao (*Gao ancien*). Saney is the probable location of the first Muslim Songhai capital, and *Gao ancien* would appear to be the site of the town occupied by the merchants involved in the trans-Saharan trade. The site of Saney has been dated on the basis of a series of inscribed grave stones to the 12th and 13th centuries A.D., while excavations at the site known as the "Mosque of Mansa Musa" in *Gao ancien* have provided an assemblage of North African pottery and glass from the 11th and 12th centuries A.D. (Flight 1975; Insoll forthcoming).

A New Problem?

The destruction of archaeological sites in the Gao region to obtain beads and other items is not a recent phenomena. Raymond Mauny, a French archaeologist who excavated in Gao in the early 1950s records that a considerable trade in antique beads was carried on throughout the Sahel and southern Sahara. Beads were collected from archaeological sites during the rainy season (presumably the beads were exposed by rainwater erosion), and sold to merchants who then transported the beads to southern markets, such as the Gold Coast (modern Ghana), where they were resold (Latruffe 1953:102; Mauny 1951:850). Mauny (1951:850) laments that only a small number of beads were found on the surface of the archaeological sites he surveyed as the majority had been removed to supply this trade.

Rather than just picking over the archaeological sites after a rainstorm, which is bad enough, the methods now used are even more severe. In January 1993, the author, accompanied by officials from the Division du Patrimoine

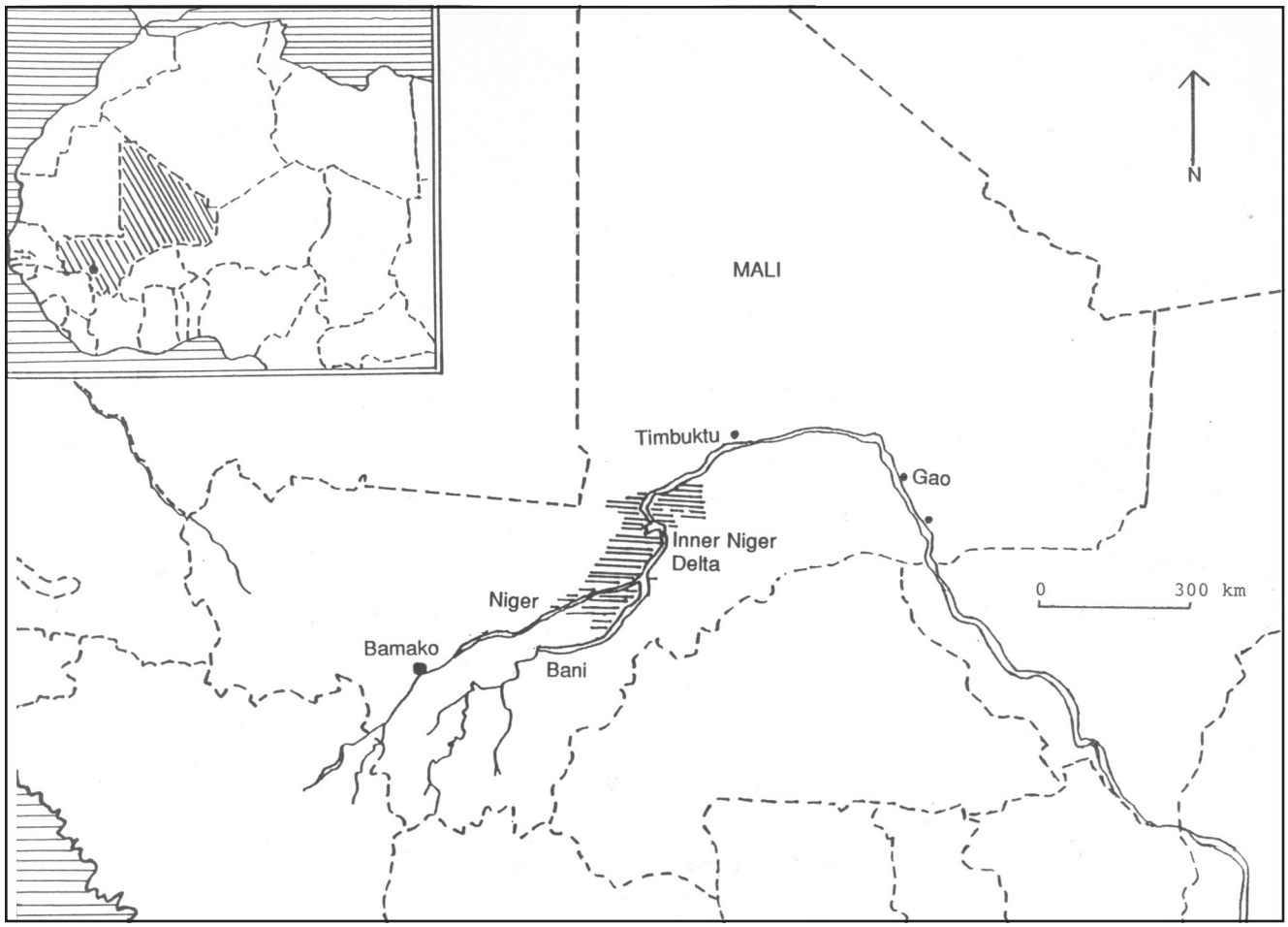

Figure 1. The Republic of Mali and its location within West Africa. Adapted from Insoll (1993:629).

Culturel, visited the site of Saney (lnsoll 1993a). The scene which greeted us was literally shocking. Two-man teams of robbers had worked their way across the habitation mound sinking four-meter-deep bore holes into the archaeological deposits, leaving the surface of the site covered in craters. The object of the robbers' attentions can easily be seen merely by looking at the material they have discarded. Metalwork, glass, bones, potsherds, and complete vessels litter the surface of the site. The items noticeable by their absence are beads. Only the occasional fragment of a broken glass or stone bead is left behind. The beads are recovered from the deposits by one of the two robbers who stays on the surface and hauls up and sieves the earth passed up by his accomplice from the pit below.

Gao ancien has also suffered from the attention of treasure hunters. Here, though, the archaeological deposits are somewhat shallower, so people have been more content with collecting from the surface, thereby sparing this area from complete destruction. The assemblage of beads recovered from excavations conducted in September and October 1993 at the site of the "Mosque of Mansa Musa" in *Gao ancien* gives an idea of the richness and variety of beads which have disappeared from so many other sites. Hundreds of imported and locally manufactured beads of bone, glass, copper, and stone were found. No further detail can be given as analysis of these beads is not yet complete.

The beads which have been plundered are transported to the Islamic Republic of Mauritania, where they are used in charm and jewellery production (Toure: pers. comm.). Some also turn up in the stalls of antiquity sellers where they are restrung and sold to tourists.

Whose Responsibility?

The Malian government and its agents, the local authorities, are well aware of the problem and must be congratulated for doing what they can to stop these activities. The authorities in Gao have recognised the seriousness of the problem and have responded by fencing off the site of

the "Mosque of Mansa Musa" and providing a four-man guard to watch over the site. Funds are also being sought to provide similar measures at Saney. This, however, is not a viable option for every archaeological site in the Gao region, let alone the whole of Mali, as obviously the costs of such action would be crippling. Similarly, it is difficult to blame the robbers themselves who are supplementing their very meager incomes dangerously to supply eager, distant (often very distant) markets (lnsoll 1993a:631).

Even though in this case the prime market is not a Western one, some of these beads are bought by tourists from North America and from Europe. Educating people not to buy beads from these sources could well slow down the rate of destruction of important archaeological sites. It is the responsibility of archaeologists, bead researchers, collectors, and all those who study and write about beads and other such material to set an example to the general public by, as far as possible, checking the provenience of the material they deal with and by not purchasing or handling materials of dubious origin. It is worth remembering that a bead without context is not much more than a pretty object.

Acknowledgements

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35. SACRED PALM-LEAF BEADS, by Alok Kumar Kanungo (2000, 37:9-15)

This paper discusses palm-leaf beads, each comprised of 31 overlying discs. Being of a religious nature, their production and usage are intimately related to a particular cultural context in which the right to wear such beads is restricted to a person's status (religious hierarchy). Their manufacture is done solely by hand, entailing a high level of dexterity, sophistication, and exquisite craftsmanship.

Introduction

The palm-leaf bead is a type of sacred bead composed of 31 disc-shaped, centrally punched palm leaflets, of which 29 are inscribed with religious texts on both sides. The remaining two leaves, which are placed at the two ends of the bead, are uninscribed. These leaflets are sized and strung in a manner imparting a spherical shape. The largest disc fits in the middle position, i.e., the 16th position, and the size of the remaining leaflets reduces towards both the ends. Once strung, each bead begins and ends in a knot which keeps it, segregated from others, thereby rendering the string infallible. The diameter of leaflets ranges from 0.5 cm to 2.5 cm. The number of characters on each disc varies from 4 to 20 in accordance with their respective size.

The author came across four such palm-leaf bead strings and one pendant, located in different parts of India. These are as follows:

1. A string made of 58 beads and one pendant with *Srimad Bhagvat Gita* part I, inscribed on it, at the Berhampur University Manuscript Library, Berhampur, Orissa.

2. *Srimad Bhagvat Gita* part II, consisting again of 58 beads and one pendant, at the Orissa State Museum, Bhubaneswar, Orissa (Fig. 1).

3. A string containing 27 beads and one pendant with

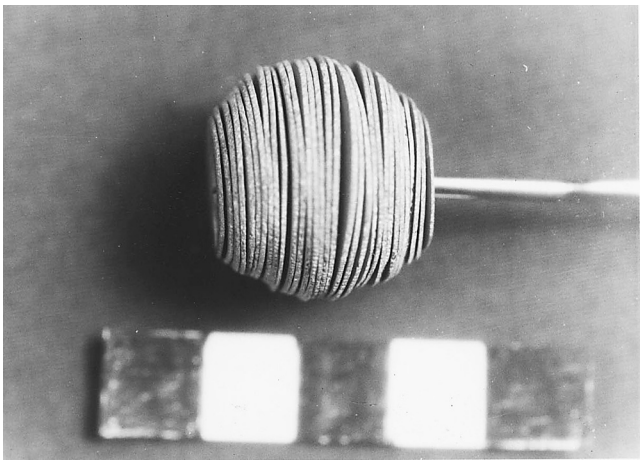

Figure 1. The case-study bead having 31 discs (the scale is 5 cm long).

the *Gitagovinda* inscribed on it, at Orissa State Museum, Bhubaneswar, Orissa.

4. "Written palm leaf pieces tied in the form of beads and strung into a rosary (Kerala University Oriental Manuscripts Library, Tiruvanantapuram)" (Murty 1996:31).

5. One pendant (single bead on a string) made of 31 inscribed palm leaflets with *Saptashloki Gita* (Gita in seven verses) and *Chaturshloki Bhagavata* (Bhagavata in four verses) inscribed on it, in the private possession of Niranjan Paatjoshi, Lathi village of Berhampur, Ganjam, Orissa.

The poor preservation, combined with the rules of Berhampur University and the Orissa State Museum, did not allow for an in-depth study of the beads. Repeated attempts by the author to communicate with the authorities at the Kerala University Oriental Library have been in vain. In 1999 the author located a pendant in the possession of Niranjan Paatojoshi and a case study was carried out, which is the basis of this work.

Brief Outline of the Religious Texts found on the Beads

The *Srimad Bhagavad Gita* (1st-2nd centuries A.D.), often known simply as the *Gita* (song) is a material interpretation of the instructions of the *Upanishads*[1] and their bearing on social life. It highlights and rewards nothing but *karma* (duty). It is considered one of the most sacred works for the Hindus and consists of 700 verses divided into 18 chapters. Most of these are dialogues between Krishna and Arjuna on the battlefield of *Kurusshetra*.[2]

The *Srimad Bhagvat Purana* deals with the life and adventures of Krishna, an incarnation of Vishnu. It is probably the most popular of the Puranas and the story of Krishna has had a great influence on both north Indian folk and classical music as well as on literature. The ecstatic devotion of the *gopis* (milkmaids), especially that of Radha for Krishna, and their yearning for him, occur over and over again. It is believed that the *Srimad Bhagvat Purana* was composed by Maharshi Vyasa (the author of the *Mahabharata*).

The *Gitagovinda* relates the love story of Krishna and Radha. The medieval devotional acts that developed in Bengal largely dwelt upon the Gitagovinda (12th century A.D.). These songs are still sung during the Vaishnava festivals in Bengal and Orissa. The spread of Vaishnavism in the East was largely due to this poem.

The Beads

The *Gitagovinda* string consists of 28 (27 beads + 1 pendant) beads and each volume of the *Srimad Bhagvat Gita* strings contain 59 (58 beads + 1 pendant) beads. The exterior of the *Gitagovinda* string has been painted in green pigments to protect it from insects and other detrimental agents. Due to the inadvertent care of the other string it is not possible to verify the same. The pendants (basically a bead strung from the apex of the chain) carry information about the author's name, date, year of completion of the work, and the introductory inscriptions. The remaining beads consist of verses from the *Gita/Gitagovinda*. From the inscription engraved on the pendant of both *Gita* part I and II, it was found that both strings are two parts of the same and were engraved by a person named Raghu Paika Mahadeba Panda in Sakabda 1838, i.e., A.D. 1916, at Kunikhanda village of the Ganjam district in the state of Orissa. The *Gitagovinda* string was engraved in 1971 at Athagada, Ganjam district (the name of the author was not readable).

Antiquity

"The manuscripts now available are not generally older than about 600 years (only in a few cases, it may be 1000 years or more) because of the fragile nature of the material used for writing" (Murty 1996:31). However, palm leaf usage has been in vogue since the 5th century B.C. *"Panna"* of the *jatakas* is presumably palm leaf. Palm leaves as a medium for writing have been referred to by Husen-Tsang (7th century A.D.). There is evidence as early as the 15th century A.D., when copper plates used for charters were fashioned after palm leaf; i.e., oblong and narrow. The earliest copper plate of this sort is the Taxila plate of Patika dated to A.D. 21 (Buehler 1897:54). Palm leaves were being used as late as the middle of the 20th century. Today, palm-leaf writing might not be a frequent event but the art is still practiced in Kerala and Orissa for writing horoscopes, initial lessons of students, etc. However, the incision of palm leaves

to manufacture such beads are not a common phenomena today.

The oldest inscribed palm leaf bead available today is that of the *Gita* dated to A.D. 1916 It is a formidable task to trace the origins of such beadmaking traditions in Orissa on the basis of the currently existing bead-strings, but their historical origin cannot be questioned, particularly as when Vaishnavism was at its peak in this region, and printing on paper was not in abundance. People, keen to possess a replica of sacred works like the *Gita*, copied such material on palm leaves, as they were easily and readily available.

Vaishnavism witnessed its rise in the Classical age of Indian history, and marked the era of cultural efflorescence in India. Under the patronage of the Mathuras (5th century A.D.) and Nalas, it flourished in Kalinga and Kosala. Under the Imperial Gangas[3] (about A.D. 1110), it spread throughout the length and breadth of Orissa from the Ganga to the Gautama Ganga. Ramanuja[4] (A.D. 1107-1117), Jayadava[5] (12th century A.D.), and Narahari Tirtha[6] (A.D. 1264-1278) upheld its cause and enriched it with their ideologies. Under the *Suryavamsi Gajapatis*, the worship of Vishnu was identified with that of *Jagannatha*. In this new consciousness that marked the climax of Vaishnavism in Orissa, the contribution of Rai Ramananda, Sri Chaitanya[7] (A.D. 1510), and five of his associates shall remain imperishable in the history of Vaishnavism (Behera 1977:376). With the influence of Vaishnavism it became more or less a prerequisite for most of the inhabitants of Orissa either to recite the name of Krishna, through the *Bhagavat* or to hear the same from the *Bhagavat Tungi* (a house in each village for reciting the *Bhagavat*) everyday, to help them identity with main stream Hinduism. Some people considered having the *Bhagavat* with them all the time a sign of great devotion. This clearly indicates that beads like those discussed here probably played a role in the process of keeping the devout and their devotion together.

Manuscripts

Tsai Lun of China is credited with the invention of paper in A.D. 105. Paper was introduced to India by the Mughals. Prior to this all texts were written by hand on various materials including stone, copper, birch bark, and palm leaves. However palm leaves dominated all the other materials. These books are today referred to as palm-leaf manuscripts.

Preparation of the Leaves

There are a number of procedures by which palm leaves are prepared for writing or incision. In north India, the leaves are exposed for a few days during the day and night. The heat of the sun dries the leaves and the dew in the night makes the color of the leaves white. When the preference is for writing and not for incision, the surface needs more softening. For this purpose the leaves are soaked in water for some days and then left to dry without direct exposure to the sun. Later, with a smooth and soft stone, the sides of the leaves are polished till all the pores are flat. In some places the leaves were kept underneath a heap of mud and water of the required quantity was poured upon them daily. Then they were removed and the treatment of polishing was undertaken to smooth the sides (Sampath 1975:264).

De Silva (1938:xiv) describes the preparation of palm leaves, as in vogue, in Sri Lanka. Leaf buds were collected and immersed in cold water and heated over a slow fire. As the water began to boil, the heat was reduced gradually and the leaves were allowed to simmer in the water for three to four hours. Thereafter, the leaves were dried in the shade for three days and nights. The leaves were smoothed by pulling them up and down against a smooth cylindrical wood surface, mostly of the Areca palm. Then they were cut to the required size. The leaves were lightly pressed at the ends and sides and then singed with a hot iron. This ensured preservation from the damp and mold.

Murty (1996:27) states that mature leaves are first dried and then boiled in water and again dried in the shade. The surface of the leaves is made smooth by rubbing them with a burnishing stone. They are then cut to the required size. He mentions two traditional verses pertaining to the features of the leaf that is fit for writing:

Tada patram drdham saumyam riju sagram dvidha-krtam; mrdulam yat prasastam tan matam lekha-vilekhane. Karkasam klmasam vakram hinagram sphutitam yugam; talapatram na tat s'restham matam lekha-vilekhane. Meaning: Palm leaf which is not cleft, is clean (or smooth) and straight, having ends (not broken), separated from the rib, sort, is best for writing. Palm leaf that is hard, unclean (or rough), not straight, without ends (i.e., broken), cleft not separated from rib, is unfit for writing (Murty 1996:27).

After sizing the palm leaves, punching is required to string them all, before the incision starts. De Silva quotes a verse that gives directions for punching holes:

Ayamena catur bhagam tribhagam punar eva caj ubhayah sutra-madhyena tatha kuryat chidralaksanam. Meaning: The leaf is folded in three and unfolded, again folded in four and unfolded. The leaf is punched between the creases (De Silva 1938:xiv).

Case Study

The bead chosen for this case study has the compressed version of two sacred texts of the Hindus; viz., *Chatursloki Bhagavata* (the whole Bhagavata compressed into four verses) and *Saptasloki Gita* (the whole *Gita* compressed into seven verses). They are incised in the Oriya script and in the Sanskrit language, on both sides of the leaves excluding the first and the last leaflets of each bead (Fig. 2).

The following is a discussion of the palm-leaf bead production technique and the role of beads as noted by 70-year-old Niranjan Paatojoshi. He inherited this bead from his father Dasarathi Purohita Rajaguru Sharma. Dasarathi produced such palm-leaf beads, the skill having been inherited from his mother. He was the royal preceptor to the feudal king of Mahuri and made such beads for the King and for himself exclusively. He wore such a palm-leaf bead on his wrist (produced in 1944-1945) and a bead string around his neck with the *Gita* inscribed on it. At the occasion of his death in 1947, hounded by the fear of blasphemy, the palm-leaf beads were removed from his body before the funeral. The full string consisting of approximately a hundred plus beads with the entire *Gita* inscribed on it is supposedly in the possession of one of his cousin's sons (who is reluctant to supply any information about the same). The case study was thus carried out on the bead bound to his wrist.

Manufacturing Technique

The technique followed for producing beads of inscribed palm leaves is in some stages similar and in other stages in contrast to that generally prevalent for the manufacture of palm-leaf manuscripts.

Of the three widely available species of palm tree (*Corypha umbraculifera*, *Corypha faliera*, and *Borassus flabellifera*), only the first was used for the manufacture of palm-leaf beads. The leaves were collected and soaked in the water for one or two days. They were taken out and kept under the sun for one or two more days and then pressed with a flat piece of wood on which some stones were placed so as to exert additional weight, thus making the writing area flat and straight. The leaves were cut into rectangular sizes, from which a number of required circular leaves could be later worked. Thereafter circular marks in required sizes were impressed on the leaves with the help of a compass. The center of the circles was punched with the help of a hot iron nail with a circular interior depression. The *tantras* enjoin that the holes should always be punched–never cut with a knife or produced by burning.

The inscriber sat, keeping this palm-leaf square on a flat piece of wood on one knee, and holding a *lekhani* (stylus) in his hand. The latter is a rod of iron about 10-30 cm in length with the thickness of a pencil and tapering towards one end which is used as a writing instrument for palm-leaf manuscripts. Then, with the help of the *lekhani*, the inscriber started the inscription from the center outwards on both sides. The inscription area was restricted to the space in-between the punched areas and the circular marks incised upon the squares.

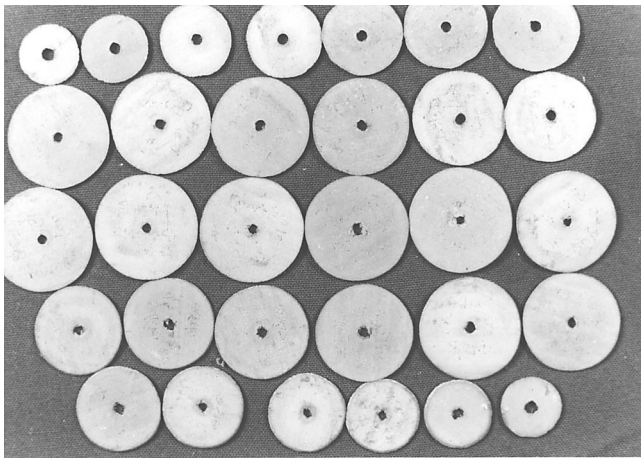

Figure 2. The 31 palm-leaf discs analyzed for this study.

The length and the compactness of the writing were followed from top to bottom. A rectangular space was left blank around the string holes. However, in the case of beads, the writing is circular and is centered around the perforation.

In order to ensure the clarity of incised characters on the palm leaf, *masi* (dye/ink) was applied. There were various recipes for preparing this ink. The ordinary variety of ink was prepared by mixing powdered charcoal with locally collected tree gum and some other glutinous substance, like sugar. After incising the leaves, the paste was completely smeared over the leaf and then wiped off. The paste settled into the grooves and the letters appeared clearly (Fig. 3).

Then the required circular inscribed palm leaf plates were detached from the parent leaf with the help of a sharp knife. The leaflets were strung in ascending and descending orders, and knots are tied at the beginning and the end of each bead, so that leaves of adjoining beads did not intermingle. The shape of the beads was judged and the peripheries of the leaves were rubbed with slag collected from the nearby brick kilns (the informer used to collect the slag for his father) to attain a circular shape and to not allow cracks to develop on the leaflets.

Role of the Bead

The *Gita* bead string was used as a rosary for morning and evening prayers and was worn around the neck during

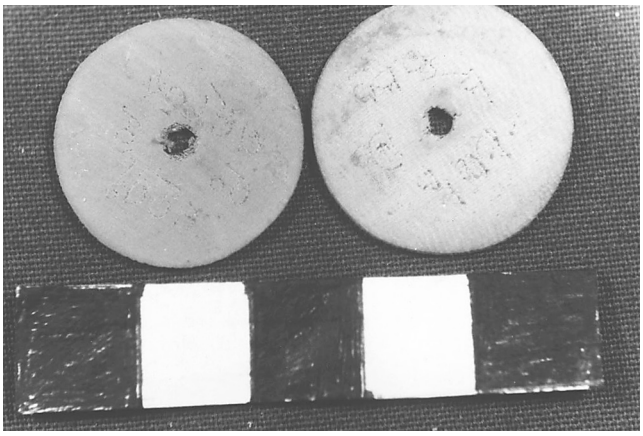

Figure 3. Close up of the two inscribed palm discs.

the rest of the day; the single piece was worn on the wrist. According to the informer, the local inhabitants hold his family in respect on account of their discordance to the feudal king of Mahuri as well as their scholarship. Besides, every individual had a high respect for his father due to his possession of the rosary containing the most respected religious text of the Hindus, i.e., the *Gita*. According to Niranjan Paatojoshi only the king, an erudite individual like his father, or the high priest of the kingdom, could use such beads.

Books, Manuscripts, and the Bead

Referring to the *Rayapaseniya-sutta*, a Jain work, Murty (1996:24) identified seven of the ten parts of the palm-leaf book. They are: *patra, dora, granthi, chadana, masi, lekhani,* and *aksara;* in order: the leaves (the writing surface), the cord (binding the manuscripts), the knot (at one end of the cord), the covering (of cloth), the ink, the pen, and the characters (written). The identity of the other three (*kambi*, *lipyasana*, and *srnkhala*) need further discussion. As far as the bead is concerned, it has all the seven previously mentioned parts.

Paper and palm leaf, the two chief materials for writing books, are prone to destruction in due course of time. Their durability depends largely on their material quality and patterns of usage. Generally speaking, time, fire, water, heat, dust, humidity, atmosphere, fungi, ants, rats, and humans threaten their survival.

Conclusion

This work is an addition to the research on beads. Perhaps done in time, as the specimens are limited in number and very fragile in nature.

Acknowledgements

The author came across these beads in the museums mentioned above while doing archival research on the beads of the Juang and Bondo,[8] financially supported by the Horace C. Beck Fund, UK, and the Chicago Midwest Bead Society, U.S.A. Thus, he is grateful to these organizations for financial support and to Peter Francis, Jr., Kurush Dalal, and Shahida Ansari for their comments and suggestion on the earlier draft of this paper. He is also thankful to Mr. Dave Hemant and Ms. Anupama for their help and assistance in the preparation of this paper.

Endnotes

1. *Upanishads* are the ancient philosophical texts of the Hindus.

2. *Kuruskhetra* is the battlefield of the Mahabharata, where the royal cousins, the Pandavas and the Kauravas, fought with each other.

3. Chologanga is one of the famous kings who conquered Utkala, alias Orissa in A.D. 1110 and ruled over a vast empire from the Ganga to the Godavari.

4. Ramanuja visited Orissa and stayed at Puri, in the course of his journey from Melukote to Delhi, between A.D. 1107 and 1117.

5. Jayadeva visited Orissa in the mid-12th century and authored the immortal *Gitagovinda*.

6. Narahari Tirtha came to Orissa during the reign of Bhanu I, A.D. 1264-1278 and initially acted as the spiritual guardian of the young prince Narshima. He later became the governor of Kalinga.

7. Chaitanya came to Orissa in A.D. 1510 and stayed for 18 years at Purl. He identified Krishna with Jagannatha and consequently Krishna consciousness and Jagannatha consciousness were merged into one.

8. The Juang and the Bondo are two major primitive communities inhabiting the forested regions of the state of Orissa.

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36. BEADS FROM IRON AGE HOARDS IN LATVIA, by Karlis Karklins (1985, 6:9-11)

Since 1790, approximately 108 hoards and votive offerings buried during the Bronze and Iron ages (1300 B.C.-A.D. 1200) have been uncovered within the borders of Latvia, a [former] Soviet Socialist Republic situated between Estonia and Lithuania on the east side of the Baltic Sea. Five of the Iron Age finds contained beads.

Burned fragments of **bone beads** or discs about 20 mm in diameter (Fig. 1:1) were among some 130 broken or burned objects found in the Kokumuiža (Līgotnes) II offering (Fig. 1, map, no. 1) which was buried in a marsh in apparent votive thanks for good fortune in battle or for the aversion of death or misfortune. It is uncertain whether the discs, some of which have conical perforations, served as beads or fulfilled some other function. Based on the associated artifacts, the discs are attributed to the end of the 5th century A.D.

An **amber bead** was found in the Celmiņi hoard (Fig. 1, map, no. 2) which was buried in the 11th century A.D. Irregular in outline, the bead is in the form of a short circular barrel (Beck type I.B.l.b.) with a slightly sloped "upper surface" (Fig. 1:2). Its irregularity and small size (16.5-19.0 mm diameter; 11.0 mm length) preclude its having been used as a spindle whorl and suggest that it most likely served as a bead or pendant. The specimen was imported from the territory of the western Balts, probably the coast of Lithuania or Poland.

Bronze beads of indigenous manufacture formed part of a woman's breast ornament in a hoard at Reznes (Fig. 1, map, no. 3). Two pins of tinned bronze with cross-shaped heads were connected in two places by two barrel-shaped beads of cast bronze. Similar beads have also been unearthed in 11th- and 12th-century graves and habitation areas of the Livs, a Finno-Ugrian people who inhabited the region to the east and southeast of the Gulf of Riga.

The Reznes hoard also contained a double strand of bronze-wire spiral beads strung on linen thread. Such neck ornaments have frequently been encountered in the graves of 11th-12th century Liv women.

Silver beads, eleven in all, formed part of the rich Ipšas hoard (Fig. 1, map, no. 4). Oblong and globular in shape, these hollow beads were produced using the "filigree and granulation" technique (Fig. 1:4). The specimens measure 12-14 mm in diameter and 11-20 mm in length. Their combined weight is 15.65 grams. Associated coinage, the most recent of which is that of the Hungarian ruler Salomon (A.D. 1063-1074), suggests that the beads date to the second half of the 11th century. They were imported from Russia.

Similar beads of various styles have been found at the Salaspils Laukskola settlement near Riga, as well as in Gotland, Sweden, Old Prussia, Kievan Russia, and the territory of the western Slavs, primarily in 11th- and 12th-century contexts.

Glass beads were encountered in the Koknese I (Fig. 1, map, no. 5) and Reznes hoards. The former produced three whole beads, two bead halves, and several fragments. Round originally, the specimens were all burned and deformed to some degree (Fig. 1:3). Beads of this type are common finds at 12th-century hill-forts in Latvia and adjacent countries.

The Reznes hoard produced half of a round gilded bead as well as several decomposed fragments. The beads, together with six perforated silver coin pendants of 10th-11th-century West European origin, undoubtedly comprised a Liv woman's necklace, such as have been found at Lehavere, Estonia, and Mārtiņsala near Riga.

Associated artifacts reveal that both hoards date to the 12th century. The beads are believed to have been imported from "somewhere to the east."

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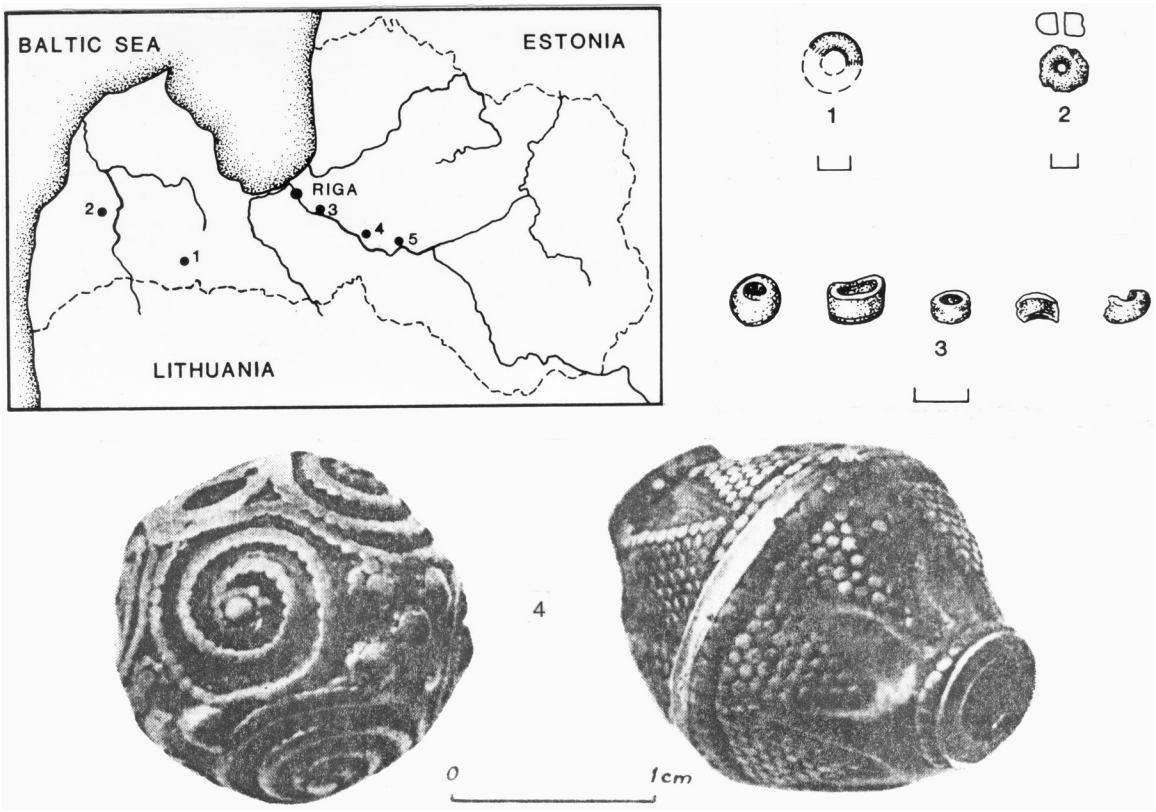

Figure 1. Beads from Iron Age hoards in Latvia: 1) bone; 2) amber; 3) glass; and 4) silver (drawing: D. Kappler; photo from Urtāns 1977: Fig. 25).

37. THE BIRMINGHAM BEAD INDUSTRY, by Karlis Karklins (1987, 10:9-11)

Several entries in late 19th- and early 20th-century encyclopedias reveal that a prosperous bead manufacturing industry once existed in the English Midland's city of Birmingham. The earliest item, which appeared in the 1860 edition of *Chambers's Encyclopaedia* (Vol. 1, p. 771), states that "large quantities of beads, used for dolls' eyes, are manufactured at Birmingham." Published in 1879, *The Globe Encyclopaedia* (Vol. 1, p. 315) further informs us that "large quantities of plain beads are made in Birmingham, which are used for embroidery and fancy work." *The English Cyclopaedia* (1891, Vol. 1, p. 24) contains the statement that "beads are also made to an enormous extent in Birmingham; where certain varieties of them are sold in thousands of dozens for doll's eyes." And, finally, *The Harmsworth Encyclopaedia* of 1906 proclaims that "Birmingham is the centre of the [bead] industry in England."

Attempts to uncover further details in the bead literature and various works dealing with the English glass industry yielded few results. However, a thorough examination of sundry Birmingham city directories dating from 1767 to the present produced sufficient information for the preparation of a skeletal description of the Birmingham bead industry.

Although it could not be determined when the industry began, it was certainly in existence by 1767. Of eleven "glass pinchers" listed in *Sketchley's Birmingham Directory* for that year, one–William Simmons–is specifically listed as a "necklace maker." (The designation "glass pincher" intimates that the beads were produced by "pinching" moulten glass in a mould.) In 1785, steel beads are added to the list of local products (Pye's *Birmingham Directory*), followed in 1800 by gilt, glass, patent pearl, wax, and fancy beads, and gilt and glass necklaces (*Chapman's Birmingham Directory*).

Thomson and Wrightson's Triennial Directory for 1812 lists eleven individuals who are identified as beadmakers. Their products included glass beads (3), glass beads and bugles (1), gilt and/or steel beads (3), black necklaces and beads (1), both glass and gilt beads, as well as patent pearls, and wax, and fancy beads (1), and beads of unspecified materials (2).

By 1829, the number had swelled to 16 producers. Four of them made glass beads, eleven made steel and/or gilt beads, and one made both metal and glass beads, etc. (*Pigot and Company's Commercial Directory of Birmingham*, p.

30). However, with the craze for Birmingham steel jewellery that had begun in 1760 at an end (F. Buckley, 1933, Old English Glass, *Glass* 10:322-323), the number of metal beadmakers began to decline and by mid-century they are no longer listed in the directories. During this same time period the number of glass-beadmakers remained relatively constant; bird's (and doll's?) eyes seem to have been one of their principal products.

Makers of gold and silver beads appear in the directories in the 1870s and are pretty well a constant thereafter. A manufacturer of steel beads appeared briefly in the directory listings in the 1890s, apparently prompting one of the precious metal beadmakers to announce that he could also provide beads of the base metals. Glass beads cease to be mentioned after 1895, suggesting that they were no longer being made or at least not in significant numbers.

Beads of gold, silver, and other metals were the principal products of the Birmingham bead industry in the present century although "crinoid and Galalith* beads and necklets" were apparently also produced around 1925 (*Kelly's Directory*, p. 1036). (*Galalith was a type of black casein plastic.) At least one manufacturer of gold and silver beads was still active in 1973 but has since apparently discontinued production.

While the directories reveal what materials were used to produce beads in Birmingham and when, they are mute when it comes to such questions as what specific types of beads were made, in what quantities, and where were they marketed? Can anyone provide the answers or help flesh out the aforegoing history?

38. SOME COMMENTS ON MULBERRY AND TWISTED SQUARE BEADS, by Karlis Karklins (1987, 11:12-14)

Despite years of research on Dutch beads, the answer to Peter's query, "mulberries and twisted squares–who made them?," remains a big question mark. Actually, both bead types have been found in and around Amsterdam in archaeological contexts that date to 1670-1750, and a few have been found in association with bead manufacturing waste. Unfortunately, it is waste derived from the production of drawn beads, not wound beads. Thus, there is no archaeological evidence for the manufacture of wound beads in Amsterdam. However, this does not necessarily mean that they were never made there; the archaeologist's trowel may yet unearth the evidence.

The fact that there is no record of a glass bead factory in The Netherlands during the 18th century is not relevant as the factories produced drawn beads; the wound mulberry and twisted square beads would have been the products of a cottage industry, with workers scattered all over Amsterdam or some other center. Neither does the absence of mulberry and twisted square beads at such North American Dutch sites as Fort Orange negate a Dutch origin for the beads. Holland ceded New Netherland to England in 1664 and the final Dutch occupation of Fort Orange was in 1674, just at the beginning of the temporal range for the bead types under discussion. In fact, twisted square beads are relatively common in archaeological contexts on the Caribbean island of St. Eustatius which the Dutch retained (personal observation).

Although the Dutch no longer governed New Netherland, they continued to live and trade there. There is solid historical evidence that the Dutch were also supplying beads to the English and French during 18th century (Karklins 1982:113), and it is highly likely that at least some of the beads described by Brain (1979) and Good (1972) were supplied by the Dutch. The question that arises here is: "Were the beads that came from Holland made there, or was Holland just a warehouse for the beads produced by other countries?" Unfortunately, this question will remain unanswerable until we have comparative material from 17th-19th-century bead-production sites elsewhere in Europe, especially Venice.

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39. BEADS FROM THE WRECK OF THE DUTCH EAST INDIAMAN *DE LIEFDE* (1711), by Karlis Karklins (1988, 12:11-17)

Introduction

In October of 1711, the Amsterdam chamber of the Dutch United East India Company or Vereenigde

Oostindische Compagnie (VOC) dispatched the ship *De Liefde* on a trading mission to Batavia, the former capital of the Dutch East Indies on the Island of Java, via the Cape of Good Hope and Ceylon. After taking on the major portion of her heavy cargo and supplies at Texel on the Zuider Zee, the ship proceeded into the North Sea, taking the northern route to the Atlantic. During the winter months, this route was less dangerous than having to sail into the prevailing wind in the English Channel. It also avoided enemy vessels in the Channel as the United Provinces were at war with France at this time in the War of the Spanish Succession. Despite the precautions, faulty navigation caused the ship to run aground not long thereafter and sink off the southern tip of the Out Skerries in Shetland, Scotland, with the loss of all but one crewman (Bax and Martin 1974:82-83).

The wreck site was initially investigated by divers from the minesweeper *HMS Shoulton* in 1964, and excavated in 1966-1968 by John and Peter Brannon of Scientific Surveys, Ltd., Ealing, England. The wreck was further investigated on several occasions by others between 1974 and 1986 (Price and Muckelroy 1977:187; T. Watt: pers. comm.). The excavators recovered a variety of artifacts including several which securely identify the wreck as *De Liefde*: a number of newly-minted coins dated 1711; four VOC-marked swivel-gun breech-blocks; the ship's bronze bell dated either 1700 or 1701 (the year *De Liefde* made her maiden voyage); a lead weight dated 1711; and pewter spoons bearing the A-VOC cipher of the Amsterdam chamber (Bax and Martin 1974:84-88).

The wreck also produced an interesting assortment of glass and brass beads, a representative sample of which was obtained for study from the Shetland Museum in Lerwick. The glass specimens are described below using an expanded version of the Kidd and Kidd (1970) taxonomic system as presented in Karklins (1985). An asterisk (*) in the code denotes bead varieties not recorded by the Kidds; two asterisks (**) denote a previously unrecorded type.

Drawn Glass Beads with Applied Decoration

These beads consist of short segments of a tube that was drawn out from a hollow globe of molten glass. The beads were subsequently decorated with filaments of viscid glass.

IIj(?)*. Tubular; gilded transparent yellowish-brown body decorated with a wavy filament of opaque light gold glass encircling either end (1 specimen; Fig. la), The ends are well-rounded. Diameter: 4.1 mm; Length: 4.2 mm.

Wound Glass Beads

Beads of this sort were formed by winding a strand of molten glass around a metal mandrel until the desired size and shape were achieved. The beads were sometimes pressed with small paddles while the glass was still soft to impart facets.

Wlb*. Globular; opaque black (3 specimens; Fig. lb). The perforation tapers noticeably on some examples. Diameter: 8.2-10.2 mm; Length: 7.7-8.2 mm.

WIIc2. Faceted "Five Sided" beads; transparent light gray (colorless) (5 specimens). Each specimen exhibits eight pressed pentagonal facets; shape ranges from oblate (Fig. lc) to ovate (Fig. ld). The perforations arc slightly tapered. Surfaces are slightly eroded and pitted. Diameter: 9.5-12.2 mm; Length: 9.0-10.6 mm.

WII.** Standard truncated pentagonal bicone (Beck [1928] type XII.C.2.f.); opaque black (the glass is a transparent burgundy on the thinnest edges) (1 specimen). The bead has a pentagonal cross-section, and five trapezoidal facets form either hemisphere (Fig. 1e). The surface is shiny. Diameter: 8.7 mm; Length: 7.2 mm.

WIIIb*. Globular to ovate; opaque black (transparent burgundy on sliver edges) body adorned with a wavy strand of aventurine around the middle and a wavy strand of opaque white glass around either end (3 specimens; Fig. 1f). Generally shiny surfaces. Diameter: 8.6-9.3 mm. Length: 9.7-9.8 mm.

WIIIb*. Globular; transparent ruby body decorated with an opaque white floral spray encircling the equator (2 specimens; Fig. 1g), The surface is slightly eroded. Diameter: 7.7-7.8 mm; Length: 7.0-7.5 mm.

Brass Beads

Ranging from annular (Fig. 1h) to barrel-shaped (Fig. 1i), the 31 brass beads were fashioned from tubing using a lathe that first contoured the surface of each bead and then cut almost all the way through the tube where the ends were to be. When the tube was completely segmented, the individual beads were snapped off, leaving a slight burr at the edge of the perforation. Diameter: 3.2-3.5 mm; Length: 1.5-3.0 mm.

Discussion and Conclusion

Based on an inventory of the beads recovered from *De Liefde* between 1964 and 1986 (courtesy of Tommy Watt,

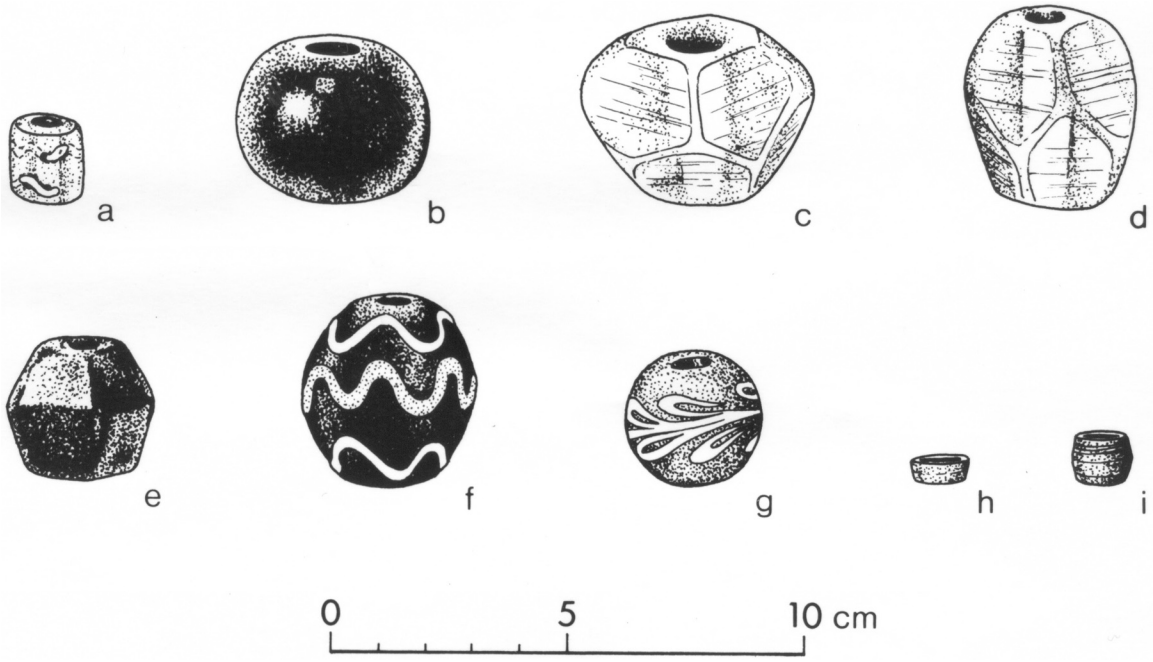

Figure 1. Beads from the wreck of *De Liefde* (drawing: Dorothy Larsen, Environment Canada, Canadian Parks Service, Ottawa).

Shetland Museum), the colorless faceted beads (WIIc2) were the most common (347 specimens), although the bulk appear to have been somewhat smaller than those examined for this study. The brass beads were next in frequency with 67 specimens, followed by the decorated black beads (10 specimens). The other varieties were all represented by one to four beads.

Although it is known that the beads were loaded aboard *De Liefde* in Holland, it is uncertain where they were made. Of the seven recorded varieties, only two (WIb* and WIIc2) have been found in archaeological contexts in and around Amsterdam (Karklins 1974:80), and this is far from conclusive proof of indigenous manufacture. While there is some evidence for a glass-bead industry in The Netherlands after 1698 (Karklins 1983:113), it is likely that the three decorated varieties, IIj(?)* and WIIIb*(a) & (b), were produced in Venice, the renowned center of fancy bead manufacture in the early 18th century (Francis 1979:9). The other glass beads may have been made there as well, though other centers, such as Bohemia and Germany, cannot be ruled out entirely either. The source of the brass beads remains unresolved.

The beads recovered from the wreck of *De Liefde* are noteworthy for a number of reasons. First, they expand our knowledge of what the Dutch were trading into the East Indies, and possibly South Africa and Sri Lanka, during the early 18th century. As the archaeological investigation of Dutch trading forts in Indonesia has apparently yet to be initiated (Miksic 1982:44), and only three other VOC shipwrecks dating to the late 17th and early 18th centuries are known to have produced beads, this knowledge has been extremely sketchy up till now.

The tight dating of the specimens coupled with their diagnostic forms and decorative elements also makes them potentially useful in the preparation and refinement of bead chronologies. In this respect, the faceted light gray and globular black beads fit well into the 1711 time-frame. However, the two decorated specimens are generally attributed to the ca. 1760-ca. 1820 period, at least in North America (personal observation; Quimby 1966:88). Their presence on *De Liefde* reveals that these fancy beads had been in use at least 50 years earlier elsewhere in the world.

And, because the ownership of *De Liefde* is known, as is its point of origin and its destination, the recovered beads will provide a bit more useful information to those attempting to determine bead trade routes, and commercial bead assemblages for the various European trading companies.

Acknowledgements

I would like to thank Dr. Colin Martin of the Scottish Institute of Maritime Studies, St. Andrews, Scotland, for

providing information regarding the beads found on several unpublished VOC wrecks and for putting me in contact with the Shetland Museum. Gratitude is expressed to Mr. Tommy Watt, Assistant Curator of the Shetland Museum, Lerwick, for the kind loan of a sample of *De Liefde* beads and providing an inventory of the beads recovered from the wreck between 1964 and 1986.

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40. EUROPEAN CHICKEN EGG BEADS, by Karlis Karklins (1988, 12:24)

Museums are frequently fascinating places for bead researchers to spend a few hours. You just never know what new material or use you will encounter. Take a recent visit to the Musee de l'Homme in Paris. As I neared the end of the European gallery, I spied a colorful stuffed figure about 4.5 ft. high that had a cloth head and wore a black skirt. The front of the effigy was festooned with eight strands of chicken eggs strung end to end and five strands of ca. l-inch-square pieces of colored cloth. The caption read:

> In Czechoslovakia, this straw figure is called "Smartka" meaning "Death." Its crudely painted face represents a death's head which symbolizes the end of winter. The Sunday before Palm Sunday, young girls carry it in a procession to the river where they drown it.

Does anyone know anything more about these egg beads? Are they also used elsewhere in Europe and in similar ceremonies? Are the eggs ever colored or decorated like Easter eggs? What is their history?

41. THE SUITABILITY OF THE ISCC-NBS CENTROID COLOR CHARTS FOR DETERMINING BEAD COLORS, by Karlis Karklins (1989, 14:8-12)

Researchers interested in comparing bead assemblages from archaeological sites are not infrequently frustrated in their efforts by a lack of adequate descriptions of the recovered specimens. Ever-increasing use of the expanded Kidd and Kidd (1970) classification system (Karklins 1985) has greatly improved the situation but color determination remains a problem. Because the *Color Harmony Manual* (Container Corporation of America 1958) used by the Kidds to identify bead colors is relatively obscure, many individuals have been using the color plates in the Kidds' publication to identify their specimens. This is *not* recommended practice as the illustrations, being reproductions of shaded colored-pencil drawings, are not accurate enough for this purpose, especially in the 1970 French edition and the 1983 reprint in which the colors are substantially different from the 1970 English edition. In addition, the number of recorded bead colors has more than doubled since the Kidds' system was first published so their inventory is far from complete.

Ideally, a bead should be compared directly to the glossy side of the color chips in the *Color Harmony Manual* or the *Munsell Book of Color* (Munsell Color 1976), the relevant colors in which have been correlated to those in the *Manual* (Table 1). Unfortunately, not only are both of these

Table 1. Color Equivalence Chart: Color Harmony Manual/Munsell/ISCC-NBS Centroid Color Charts (Colors Recorded by the Kidds are Italicized).

Munsell		Color Harmony Manual		ISCC-NBS			
Color	Code	Code	Name	No.	Name	Munsell Value	
l0.0Y	8/10	1 la	*Lemon Yellow*	98	brilliant greenish yellow	9.8Y	8/10
l0.0Y	7/5	1 gc	*Citron*	105	grayish greenish yellow	9.0Y	7/4
l0.0Y	5/6	1 le	Olive Yellow	103	dark greenish yellow*	9.4Y	6/6
l0.0Y	4/4	1 ni	Olive	107	moderate olive*	7.6Y	4/5
5.0Y	9/2	2 ba	Pearl	92	yellowish white	4.5Y	9/1
5.0Y	8/8	1-1/2 ga	Sunlight Yellow	83	brilliant yellow	4.4Y	9/9
5.0Y	4/4	2 lg	*Mustard Tan*	---			
2.5Y	9/3	2 ca	*Light Ivory*	89	purplish yellow	4.7Y	9/4
2.5Y	7/8	2 ic	*Light Gold*	87	moderate yellow	3.8Y	7/6
2.5Y	6/8	2 ne	*Mustard Gold*	88	dark yellow	3.9Y	6/6
2.5Y	4/6	2 pi	Mustard Brown	95	moderate olive brown	2.7Y	4/6
2.5Y	2/2	2 pn	*Dark Brown*	96	dark olive brown	2.0Y	2/2
l0.0YR	7/8	3 lc	*Amber*	69	deep orange yellow	8.6YR	6/12
l0.0YR	5/6	3 le	*Cinnamon*	77	moderate yellowish brown*	9.5YR	4/4
l0.0YR	4/l	5 ih	Lead Gray	---			
7.5YR	4/4	4 ng	*Maple*	58	moderate brown*	5.6YR	4/4
5.0YR	6/l2	4 nc	Russet Orange	51	deep orange	4.1YR	5/11
5.0YR	5/1	5 fe	Ashes	63	light brownish gray	7.0YR	5/1
2.5YR	5/10	5 lc	Copper	54	brownish orange**	4.1YR	5/8
2.5YR	4/10	5 pe	Terra Cotta	---			
2.5YR	2/2	7 pn	*Dark Rose Brown*	65	brownish black**	7.8YR	1/1
l0.0R	5/10	6 lc	*Coral*	38	dark reddish orange*	9.3R	4/9
l0.0R	4/8	6 ne	*Redwood*	40	strong reddish brown	0.3YR	3/10
l0.0R	3/8	6 pg	Barn Red	---			
l0.0R	3/2	6 ni	Taupe Brown	47	dark grayish reddish brown*	9.0R	2/2
l0.0R	2/4	6-1/2 pl	Deep Red Brown	44	dark reddish brown	9.6R	1/4
7.5R	4/14	7 pa	*Scarlet*	11	vivid red*	5.0R	4/15
7.5R	3/8	6-1/2 ne	Brick Red	---			
5.0R	8/4	7 ca	Baby Pink	5	moderate pink**	2.6R	7/5
5.0R	7/8	7 ga	*Light Cherry Rose*	2	strong pink*	1.2R	7/8
5.0R	5/l2	7-1/2 la	Light Red	12	strong red	4.0R	4/12
5.0R	3/6	7 ng	Old Wine	16	dark red*	4.0R	3/7
2.5R	3/10	8 pc	*Ruby*	13	deep red*	5.1R	3/10
l0.0RP	8/4	8 ca	Pale Pink	4	light pink**	2.6R	8/4
10.0RP	4/6	8 le	*Rose Wine*	262	grayish purplish red*	7.0RP	4/5
2.5RP	7/4	9 ec	Orchid Mist	253	grayish purplish pink	3.7RP	7/4
l0.0P	4/6	10 le	Heather	242	dark reddish purple**	1.3RP	3/5
7.5P	4/8	11 lc	*Amethyst*	218	strong purple	6.5P	4/9
5.0P	5/4	11 ge	Lilac	228	grayish purple**	8.1P	5/3
7.5PB	4/11	13 la	*Bright Dutch Blue*	196	strong purplish blue	8.0PB	4/11
7.5PB	2/10	12-1/2 pc	Royal Blue	194	vivid purplish blue	7.8PB	2/12
7.5PB	2/7	13 pg	*Bright Navy*	197	deep purplish blue	7.8PB	2/8
7.5PB	2/5	12-1/2 ng	Dark Blue	---			

Table 1. Continued

Munsell Color Code		Color Harmony Manual Code	Color Harmony Manual Name	ISCC-NBS No.	ISCC-NBS Name	ISCC-NBS Munsell Value	
6.25PB	3/12	13 pa	*Ultramarine*	---			
5.0PB	5/7	13-1/2 ic	Copen Blue	---			
5.0PB	3/6	13-1/2 ng	Medium Blue	---			
2.5PB	6/9	14 ia	*Bright Copen Blue*	181	light blue	1.6PB	6/7
2.5PB	5/4	14 ie	*Shadow Blue*	186	grayish blue**	0.2PB	4/3
2.5PB	3/8	14 pc	Deep Blue	179	deep blue	2.8PB	3/8
l0.0B	6/3	15 ge	Mist Blue	185	purplish blue*	0.6PB	6/3
l0.0B	2/4	14 pi	*Dark Navy*	183	dark blue**	2.2PB	2/9
7.5B	8/2	15 ca	*Pale Blue*	184	vivid purplish blue**	1.5PB	8/3
7.5B	6/6	15 ic	Sky Blue	---			
7.5B	6/2	16 ge	Light Gray Blue	---			
7.5B	4/8	15 nc	*Cerulean Blue*	---			
7.5B	4/4	16 lg	Medium Shadow Blue	---			
7.5B	3/3	15 ni	*Dark Shadow Blue*	187	dark grayish blue*	9.2B	3/2
5.0B	8/4	16 ea	*Light Aqua Blue*	171	very light greenish blue	4.0B	8/4
5.0B	6/6	16 ic	*Robin's Egg Blue*	172	light greenish blue**	4.5B	6/5
5.0B	5/7	16 lc	*Bright Blue*	173	moderate greenish blue**	4.7B	4/5
2.5B	7/2	17 ec	Dusty Aqua Blue	---			
2.5B	6/7	17 ia	Bright Aqua Blue	---			
2.5B	6/4	18 gc	*Agua Blue*	172	light greenish blue**	4.5B	6/5
2.5B	5/5	17 le	Medium Turquoise Blue	173	moderate greenish blue	4.7B	5/5
l0.0BG	4/8	17 pa	*Turquoise*	---			
7.5BG	8/4	19 ea	Light Aqua Green	---			
7.5BG	6/8	18 la	Bright Turquoise	---			
7.5BG	6/6	19 ic	Aqua Green	---			
7.5BG	6/3	19 ge	Dusty Aqua Green	---			
5.0BG	8/2	19 ba	Ice Blue	---			
5.0BG	6/3	20 ge	Light Blue Spruce	---			
5.0BG	4/8	20 nc	Turquoise Green	160	strong bluish green	4.6BG	4/8
5.0BG	3/6	20 ng	*Teal Green*	165	dark bluish green	4.9BG	3/5
l0.0G	6/6	21 ic	Light Jade Green	---			
l0.0G	5/10	21 nc	*Emerald Green*	---			
l0.0G	4/5	21 ng	Dark Jade Green	---			
5.0G	5/4	22 ie	*Surf Green*	145	moderate green*	6.3G	4/5
2.5G	9/2	22 ca	Pale Green	---			
2.5G	7/8	22 ia	*Bright Mint Green*	140	brilliant green*	6.2G	7/8
2.5G	5/10	22 nc	Bright Green	139	vivid green	3.2G	5/11
2.5G	3/6	22 pi	Dark Green	146	dark green*	6.6G	3/5
l0.0GY	6/6	23 ic	*Apple Green*	135	light yellowish green*	0.7G	7/5
l0.0GY	5/10	23 pe	Grass Green	131	strong yellowish green	0.4G	5/9
l0.0GY	4/4	23 ni	*Dark Palm Green*	137	dark yellowish green	0.6G	4/5
7.5GY	6/6	24 le	Leaf Green	120	moderate yellow green*	4.8GY	6/5
7.5GY	4/3	24 li	Sage Green	---			
2.5GY	4/4	24-1/2 ni	Olive Green	---			
N	9/0	a	*White*	263	white*	2.5PB	10/0
N	8/0	b	*Oyster White*	264	light gray*	6.7Y	7/0
N	7/0	c	*Light Gray*	---			
N	1/0	p	*Lamp Black*	267	black	N	0.8/0

items difficult to find in libraries or research laboratories, but the *Manual* has been out of print since about 1972 while the high cost of the *Munsell Book of Color* ($640.00 U.S.) precludes its purchase by all but the most dedicated researchers. Individual Munsell color chips are available but at $1.70 each, the 91 recorded colors listed in Table 1 would still cost a hefty $155.00.

Seeking a less expensive alternative, I examined the Centroid Color Charts prepared by the Inter-Society Color Council–National Bureau of Standards (ISCC-NBS) and selling for $38.00 U.S. The 18 charts, each with from 10 to 29, glossy, one-inch-square color chips, exhibit 62 of the 91 recorded bead colors. Thirty of these are exact or near-exact matches, 21 are very close to matching (marked with an asterisk in Table 1), and 11 qualify as marginal matches (a double asterisk in Table 1). The exact Munsell values for each of these Centroid colors is provided in Table 1 so that the reader can see exactly how close the match is for each color.

In that over half of the recorded bead colors are represented in the ISCC-NBS charts, I consider them a useful alternative to the *Color Harmony Manual* and *Munsell Book of Color*, but only if supplemented by Munsell chips for the 29 unmatched colors. At $38 for the charts and around $50 for the required Munsell chips, you can accurately determine the color of practically every bead that you will ever encounter for less than $90.

The set of ISCC-NBS Centroid Color Charts (SRM 2106) may be purchased for $38.00 from the Office of Standard Reference Materials, Room B311, Chemistry Building, National Bureau of Standards, Gaithersburg, MD 20899.

[Editor's note: The price of the *Munsell Book of Color, Glossy Edition* has increased to $945.00 and it is uncertain whether individual color chips are still available.]

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42. ARCHAEOLOGICAL EVIDENCE FOR BEADMAKING IN RIGA, LATVIA, DURING THE 13TH-14TH CENTURIES, by Karlis Karklins (1991, 18:11-13)

Archaeological excavations conducted in the 1970s at a site on Trokšņu (Noise) Street in the old section of Riga, the capital of Latvia, uncovered evidence of glass beadmaking there during the late 13th and 14th centuries (Caune 1983:102-103). Recovered from an area approximately 50 m^2 at the foot of a defense wall, the evidence included: 1,520 small round beads of opaque glass (most of these were deformed and represent manufacturing waste; Fig. 1); 9 intact crucibles; 149 ceramic crucible fragments with glass covering their surfaces; 474 sherds of vessels composed of coarse gravelly clay that had a thick layer of glass adhering to their interior faces; 293 variously sized chunks of glass; and ca. 150 brick fragments that exhibited traces of glass on their surfaces.

The archaeological deposit was composed of a dark, highly organic soil interspersed with charcoal, ash, or burned horizons. The recovered artifacts were concentrated in these lenses.

As none of the excavation units contained any structural remains of a glassworks, it appears that the works were located on the opposite side of Trokšņu Street. Wasters were thrown in an unoccupied area along the defense wall.

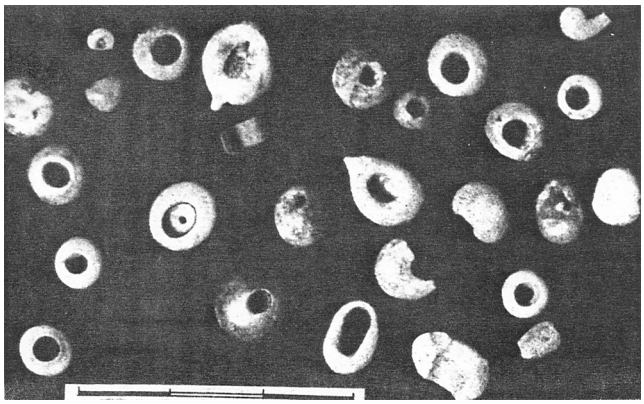

Figure 1. Reject glass beads from the Trokšņu Street glassworks in Riga, Latvia (Caune 1983:100, Fig. 16).

That the furnaces were rebuilt and renovated on a number of occasions is revealed by the presence, at various levels in the archaeological deposits, of many brick fragments with thick deposits of raw glass on their faces. It is believed that the bricks formed the base of the melting furnaces and that during the glassmaking process, molten glass from the crucibles was spilled onto them. During rebuilding, these bricks were discarded as useless.

The glassmaking workshops on Trokšņu Street stood for a long time as evidenced by a concentration of the finds in a ca. 1.5-m-thick layer in the cultural deposit. The recovered artifacts and their stratigraphic contexts indicate that the glassworks were in operation during the late 13th and 14th centuries.

Chemical analysis revealed that the glass produced at the glassworks was primarily composed of lead oxide (PbO) - 59.2%-74.7%, silicon dioxide (SiO_2) - 14.4%-33.87%, and tin dioxide (SnO_2) - 1.04%-8.28%. Because of the high lead content, the majority of the glass objects were yellow in color. Glass of greenish tones was occasionally produced by the addition of up to 1.4% of cuprous oxide (CuO). The glass produced in Riga was, thus, made from an easily melted composition of quartz sand and lead without an alkali additive. Its composition distinguishes it from the typical potash-lime glass of Western Europe. Non-alkali lead glass of similar composition had a broad distribution in Poland during the early Middle Ages, as well as in contemporary Old Russia.

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43. ISCC-NBS CENTROID COLOR CHART UPDATE, by Karlis Karklins (1992, 20:6)

Bead researchers looking for an accessible and inexpensive chart for accurately determining bead colors have been dealt a low blow by the U.S. National Bureau of Standards which has discontinued the ISCC-NBS Centroid Color Chart discussed in *Bead Forum* No. 14. Following up on a note from Jeff Mitchem, a phone call to the NBS confirmed that this useful reference item has been discontinued. When asked if there was an alternative, they referred me to the Munsell Color Company. Readers knowing of another suitable color chart are asked to contact the editor.

44. A VENETIAN LANDMARK CLOSES, by Karlis Karklins (1993, 22:20-21)

It is sad to note the closing of the famous Società Veneziana Conterie at Fondamenta Giustinian 1 on Murano in the lagoon of Venice. The concern was founded in 1898 when 17 competing bead producers merged for their mutual benefit. It was initially known as the Società Veneziana per la industria delle Conterie. It later became the Società Veneziana Conterie e Cristallerie and then simply the Società Veneziana Conterie.

The company principally made drawn embroidery beads (*conterie*) in a rainbow of colors. It is truly mind boggling to contemplate how many thousands of tons of beads were sent abroad in the ninety-odd years that the Società was in operation. In the last few years the company experienced serious financial difficulties. A major problem was competition from countries such as Japan which could sell beads for what it cost the Società to produce them (Dr. C. Chiappetta, president 1987: pers. comm.). To expand its market, the company began to produce small glass pellets for use in atomic reactors.

The demise of the Società Veneziana Conterie marks the end of *conterie* manufacture on Murano. Bead production there is now limited to wound beads in various plain, mosaic, and millefiori forms, as well as chevron beads made from canes supplied by Vetrerie Moretti which is located a short distance from the Società complex.

It is not known what will become of the Società machinery or stock of canes and beads. It would be wonderful if someone could photograph the machinery and get detailed descriptions of it before it disappears. This is something I could not accomplish despite two visits to the factory in the 1980s. In some cases it was because the machinery was in operation; in others I was asked not to photograph certain operations because they were still considered trade secrets. It would also be beneficial if examples of the various sample cards and books that still exist in the Società's warehouses could be salvaged for distribution to researchers and research facilities around the world.

45. PHOTOGRAPHING PATINATED GLASS BEADS, by Karlis Karklins (1994, 25:13)

Good color photographs are an essential complement to written descriptions of beads. An excellent article by Robert K. Liu on how to photograph beads and objects formed of beads appears in the summer 1994 issue of *Ornament* magazine. Short but packed with useful information, this article will greatly help researchers to improve their

photographic results. Unfortunately, where archaeological specimens are involved, the original color of a bead is frequently obscured by a layer of patina, resulting in rather drab photographs, regardless of the photographer's skill. In such cases, it is important to try and reveal a bead's true color.

If the patina is thick, there is little that can be done. However, if it is relatively thin, an application of a high-quality mineral oil will bring out the original color without harming the bead. The best way to apply the oil is with a camel hair brush. Apply the oil sparingly as an excess will cause glare. Keep in mind that the oil will evaporate quite quickly under hot studio lights so, if not using a flash, perform bead layouts and focusing before the oil is applied. If the oil does evaporate, simply apply more. *Never* utilize vegetable oil or lubricating oil as these will leave a sticky, dust-collecting residue that will also stain whatever the bead touches.

Once the photographs have been taken, oil residue should be removed from the beads. To accomplish this, the beads, held in forceps or mounted on a wire loop, should be rinsed in a series of four beakers of petroleum ether 30-60 in a well-ventilated area. Both the mineral oil and ether are inert with glass and, consequently, the procedure described here will not conflict with the desire to preserve the specimens, a major concern to collection's managers and curators.

My thanks to John Stewart, Senior Conservation Scientist, Conservation Division, Parks Canada, Ottawa, Ontario, for his input regarding the procedure described above.

46. AN UNUSUAL MODERN BEAD (?) FROM CHINA, by Karlis Karklins (1996, 28:19-20)

Just when you think you know it all, along comes something to put you in your place. This was the case when Vonda Lee Adorno handed me a large bead at the Third International Bead Conference in Washington, D.C., last November and asked my thoughts on it. The object that sat heavily in my hand was globular, 24 mm in diameter, and weighed 15.5 g. It was coral colored and had been obtained in Beijing in 1994. Part of the bead had broken away, exposing the internal structure (Pl. IB top). The specimen had a wooden core with five lead plugs ca. 6 mm in diameter set 5-11 mm apart in a band that diagonally encircled the bead. The core was covered with a shiny, 1.5- cm-thick layer of a coral-colored material that was difficult to scratch with a pin and was also resistant to burning. The material exhibited a conchoidal fracture and a slightly laminated structure and may be some sort of plastic. The object had a ca. 3-mm-diameter hole through it. The wood looked new and the lead plugs were only slightly oxidized, suggesting that the specimen was of recent manufacture.

So, what is this thing? At first I suspected that the lead had been added to give the bead extra weight to mimic that of coral. But, as Vonda pointed out, the lead actually made the object much heavier than coral. The weight suggests that it did not function as a necklace component but as an attractive weight on something–possibly a curtain pull or something similar. Anyone with any thoughts on this unusual object and its possible use(s) is asked to contact the editor.

47. MORE ON THE "UNUSUAL MODERN BEAD (?) FROM CHINA," by Karlis Karklins (1996, 29:7)

In response to the item on "An Unusual Modern Bead (?) from China" in the April issue, Joan Eppen from California sent in a couple more examples found on a strand of imitation coral beads from Asia. Obtained in the early 1990s, the specimens are clearly imitation-coral beads. They are barrel shaped, measuring 11.8 mm in diameter and 9.5 mm in length, with deeply cracked surfaces. Like their larger counterparts, these have a wooden core as well but, due to their size, only have a single cylindrical lead insert which passes through the core perpendicular to the perforation. The latter has been drilled through both the wooden core and lead insert. As Joan said in her accompanying note: "Someone worked really hard to make these, but why?" Why indeed? It would take a fair bit of time to produce the core, drill it, insert the lead cylinder, then drill the perforation and cover the whole with a layer of coral-colored material. The reason for the lead inserts is clearly to give the beads weight like that of real coral, but since the finished products look like plastic, why go to the bother? Joan further informed me that, according to Paddy Kan who imports these, "they were indeed Chinese, 19th Century, and that the covering was of a kind of tree resin (early plastic?)." However, they just look a little too "fresh" to be that vintage and the identification of the outer layer still needs to be verified. Any plastics experts out there willing to look at one of these beads and give us an opinion?

As it now stands, we know that these items were beads made to imitate coral, probably in China, but we still do not know where or when exactly, by whom and why. Maybe someone can provide more information in the next *Forum*.

48. BEAD RESEARCH DOS AND DON'TS, by Karlis Karklins (1998, 32:10-15)

As ever-increasing numbers of people are drawn to beads, more and more of them want to know more

and more about various aspects of beads and beadwork. These individuals include archaeologists, ethnographers, conservators, and museologists, as well as bead stringers, beadmakers, artisans, and collectors, among others. Some people are content to peruse books and articles on whatever aspect of beads that interests them, while others are driven to boldly go where no researcher has gone before. It is for these brave souls that the following list of some bead research dos and don'ts is intended. Much of this will be old hat to some of you. For the others, I hope that you will find this information of use in your respective endeavors.

First, the Dos:

***DO* become familiar with your subject matter.**

Reading a few popular books and articles on beads and viewing one or two museum displays will not make you an instant bead expert. Before you begin any project, you need to seriously review the relevant literature. The best way to start off is to consult bibliographies. For North American trade beads, there are the two bibliographies compiled by Karklins and Sprague (*A Bibliography of Glass Trade Beads in North America* [1980], followed by the *First Supplement* [1987]). Although admittedly outdated, they still provide relevant references for researchers. Both of these publications are available through the Society of Bead Researchers.

Recent additions to the bead literature worldwide may be found in the "Recent Publications" section of the Society of Bead Researcher's newsletter, *The Bead Forum*, as well as in the extensive "Recent Published Work on Beads" section of the Bead Study Trust's *Newsletter*. The Trust is contemplating the compilation of a comprehensive bead bibliography and I wish them the best of success in this endeavor. Further references to specific subjects may be found simply by perusing the "References Cited" sections of the articles published in the SBR's journal *Beads*. And, of course, there are the resources of the worldwide web.

***DO* take archaeology and ethnology courses.**

Archaeologists and ethnologists go to university for years to be able to properly identify, classify, describe and interpret the objects they study. A person without this training is definitely handicapped and can get into real trouble when it comes to placing beads and beadwork into a sociocultural or historical framework. If you are serious about bead research and plan to work on either archaeological or ethnographical materials, take a few introductory college courses in the relevant fields to at least get you off on the right foot. If you are too busy to do the course work, audit the class. Reading books on the subject is fine, but participating in a class and discussing problems with the professor and the other students can really give you a good foundation for whatever research you are planning to do.

***DO* be careful when interpreting bead material.**

One must be very careful when interpreting archaeological and ethnographic material. For instance, found loose in North American archaeological contexts, seed beads are generally considered to have been used in embroidery but this was not always the case, especially during the early contact period when various groups used them for necklaces and bracelets. Similarly, large beads are classified as necklace beads by many researchers but also served to adorn thongs on various implements as well as medicine bundles, among other things.

The designs that appear on ethnic beadwork can also be problematical. One really needs to thoroughly study the symbolism of the group that produced a particular piece of beadwork to provide a correct interpretation of what the design elements represent. The study should ideally include input from the people whose culture they relate to. Also bear in mind that in some cultures, design elements have different meanings, depending on which sex utilizes them.

***DO* consult the experts.**

Even if you are truly brilliant, you will eventually have questions that seem to be unanswerable. This is the time to stop tearing out your hair and consult an expert. As the officers of the Society of Bead Researchers between them know many researchers who have been studying beads and beadwork around the world, we can tell you who you should contact with a specific question. Most pros will gladly answer questions free of charge. However, if the questions are complex and require research, or if specimens are submitted for identification or interpretation, a fee may be levied, especially by those who operate consulting firms. But what is a small payment compared to premature baldness or ulcers caused by frustrating bead questions?

***DO* use a microscope.**

A binocular microscope is probably one of the handiest things that a bead researcher can possess besides an inquisitive mind. It reveals details indistinct to the unaided eye, and can help to resolve questions regarding how a bead

was made, if it has been flashed, what colors the layers are of small multi-layered beads, and so forth. Some binocular microscopes are quite expensive but there are cheaper versions such as those used by gemologists. They can occasionally be obtained second hand. Numerous good ones are available on eBay. If you cannot afford one, biology and geology labs at universities usually have them and getting permission to use one should not be difficult.

***DO* include good color illustrations in your reports.**

If you are planning to publish your findings, make sure you include good color photographs or drawings which show details. B&W photos, especially out-of-focus ones, just do not suffice. If you do not feel competent enough to get good results, contact a professional photographer, though keep in mind that photographing beads does take special skill and just because a photographer is good at portrait photography does not mean that he or she will do as well on a group of beads. If your photographs are sharp and clear, and the color is accurate, just about anyone can figure out what you have, no matter how poor your descriptions might be.

***DO* join the Society of Bead Researchers.**

The Society of Bead Researchers was formed in 1981 to foster serious research on beads of all materials and periods, and to expedite the dissemination of the resultant knowledge. To facilitate these aims, the Society publishes a semi-annual newsletter, *The Bead Forum*, and an annual journal, *Beads*. If you are seriously interested in beads, you really should be a member. That way you can find out what other researchers are doing and also share your information with them. If we continue to share our knowledge, we will achieve much more than by working as isolated researchers scattered all over the world.

Now for the Don'ts:

***DON'T* believe everything you read or hear.**

There is a lot of misinformation about beads out there–in books, in articles, in talks, on the Web–and weeding out the good from the bad takes a bit of expertise. Until you gain this expertise through long hours of original research, keep an open mind. If something doesn't sound right or if it conflicts with someone else's statements, check it out with others working in the field. If you are working on ground-breaking material, use your common sense.

Researchers are constantly fine-tuning bead chronologies and more accurately determining the place(s) of manufacture for specific bead types. Consequently, books and articles written 20 or more years ago may present information that is quite outdated. This is especially true of such classics as van der Sleen's *A Handbook on Beads* and Horace Beck's *Classification and Nomenclature of Beads and Pendants*. I would, however, still strongly recommend that you read both of these volumes, if for nothing else than to gain an historical perspective on the field of bead research. Unfortunately, what I have said above for older publications is also true of much more recent reports on beads written by individuals who do not fully understand the subject.

As for what you are told, if someone is trying to sell you a bead or a piece of beadwork, especially in the Developing World, he or she will frequently tell you just about anything to make the sale. Other individuals will tell you stories that blend legend with historical fact and tribal pride. This sort of information must not be taken at face value. Ethnographers often spend years living with the people they are studying, familiarizing themselves with their culture, learning their language, and gaining their confidence. You cannot hope to achieve this during a two-hour stop at a market in Ghana or Sarawak, so remember to keep an open mind in this sort of situation and pose your questions as craftily as the dealers formulate their answers.

Also keep in mind that in some cultures, rather than offend a person by having to give a negative response, the person being questioned (and this includes governmental officials and representatives) will tell what we in our culture would consider an outright lie but to them is the polite thing to do. Roderick Sprague encountered this during his stay in China some years back. The misinformation was not given maliciously but to keep from possibly offending the researcher (political correctness strikes again). Taking such an answer at face value could, therefore, have serious implications concerning your findings. In Rick's case, continued questioning of other individuals garnered the correct information.

Finally, remember that some people just like to pull researchers' legs for the heck of it, so beware!

***DON'T* ask questions which can be answered with a yes or no.**

No one wants to look stupid, especially to a foreigner, so rather than appear like an ignoramus and keep saying "I don't know" to your numerous queries about a certain bead or piece of beadwork, given the opportunity, a native

informant will generally jump at the chance to say either "yes" or "no," depending on which response seems most likely to please the person asking the question.

***DON'T* buy archaeological specimens.**

I cannot stress this enough. Purchasing specimens recovered from archaeological contexts, especially those obtained by illicit digging, contributes to the wholesale destruction of archaeological sites all over the world. This is now most prevalent in Mali and Southeast Asia where ancient sites look more like World War I battlefields after the looters have done their work. This has resulted in the loss of truly incredible–and irreplaceable–amounts of scientific data. It is ironic that many collectors who buy such looted beads then turn to archaeologists to get more information about them, information the archaeologists cannot provide because the contexts in which the beads were found have been destroyed.

And sometimes it is not just information that is lost but human dignity as well. The worldwide craving for ancient beads has driven some looters to the ghoulish practice of unearthing recent human burials which were buried with heirloom beads. This has led elderly women in some regions of Southeast Asia to request that their old beads be pulverized before being interred with them upon their death.

As an archaeologist who looks upon beads as repositories of information and not just beautiful objects, my fervent hope is that you will not buy ancient beads and will tell others to do the same. While some come from collections that were amassed by archaeologists and others in the old days through legal means, the majority available today have been illegally plundered from sites that local governments cannot protect because of a lack of proper funding. Let us help these nations protect what remains of their heritage.

[Ed. Note: This article is an updated version prepared in 2009.]

49. AN EARLY 19TH-CENTURY ACCOUNT OF BEADMAKING IN MURANO AND VENICE, by Karlis Karklins and Derek Jordan (1990, 17:5-8)

Introduction

In 1816, two German botanists recorded one of the earliest comprehensive descriptions of the manufacture of drawn glass beads in Murano and Venice (Hoppe and Hornschuch 1818:135-142). An English translation appeared a few years later (Anonymous 1825:120), and this was used almost verbatim by Dionysius Lardner (1832:233-235) in his treatise on the manufacture of porcelain and glass. Unfortunately, the initial English translation is flawed by several errors and inadequately translated terms and descriptions. Furthermore, a few interesting bits of information were deleted while others were added by the translator. As Hoppe and Hornschuch' s record is important to our understanding of how beadmaking technology changed through time, an annotated translation prepared by K. Karklins and Derek Jordan is presented below.

Hoppe and Hornschuch's Account

The initial stages in the production of glass beads on Murano are not very different from those used in the normal production of glass. The melting furnace and even the glass mass are the same, except that a secret colorant is added to the latter. When the glass is in a sufficiently molten state, a quantity of it is taken up on a blowpipe, as is the practice in the normal glass works, and a little air is blown into it to make it hollow. Using a similar instrument, another worker then takes hold of the gather and the two workers then run[1] in opposite directions at great speed, pulling the glass out into a thin tube that can often be 50 feet or more in length.[2] A long walk is provided near the glass oven for this purpose.

Once the tube is cool, it is broken into sections of equal length, sorted, packed into boxes, and sent to Venice for transformation into beads. To obtain tubes for striped beads, a small quantity of differently colored glass is taken from another pot and laid in strips on the initial gather.[3] The whole is then pulled out. Such a gather of glass is also used to produce tubes three feet in length and the thickness of a finger which have a spherical bubble blown in one end. These are used to tie up plants in flowerpots.

When the tubes arrive at the factory in Venice, they are converted into beads in the following manner. A person selects tubes of equal length[4] from those which have been packed in the boxes by color and arranges them in batches of such a size that the tubes lie side by side when held in the hand. This work is usually done by women or children. Another person, a man, takes the batches of tubes and chops them into beads of any desired size. The instrument required for this purpose consists of a sharp iron in the form of a very broad chisel set in a block of wood. The tubes are laid on the cutting edge and, using a similar iron held in the hand, the worker cuts, or rather chops, the tubes into beads while constantly advancing the tubes held in his other hand.[5]

To give these longish beads their proper rounded form, a third person places them in a mixture of ash and sand, and agitates them in this mixture until their holes are filled and thus cannot collapse when heated. A fourth worker then puts the beads into a pan with a very long handle and adds some more of the sand-and-ash mixture. He then places the vessel over a charcoal fire, stirring the contents continuously with an instrument shaped like a hoe with a rounded end[6] until the beads have become rounded. The pan is then removed from the fire and the sand/ash mixture is removed by sieving. The beads themselves are subsequently sorted into uniform sizes by passing them through sieves of different fineness. They are then strung on thread and gathered into hanks or bunches.[7]

The quantity of beads produced in this factory, up to now the only one in the world to perform this sort of work,[8] is incredible. Several hundredweight were packed in casks, awaiting shipment to all parts of the world, especially Spain, the Barbary Coast, etc. But so far they have not made their way to America.[9] The Kaiser, during his recent visit to Venice, also visited this factory and presented the owner with the Order of Merit, a civilian medal.

The travelers, as well as two merchants from Aachen, bought a considerable quantity of beads to take to their relatives back home. They were also given several tube samples and a sample card which exhibited no less than 64 different kinds of beads.

Endnotes

1. Hoppe and Hornschuch use the verb *laufen* which generally means "to run." However, it can also mean "to go" or "to walk" (dialectical). Based on other historical accounts and Karklins' personal observation of the drawing process in Murano, it is likely that a very fast walk is indicated.

2. In the 1825 translation, the length is incorrectly given as 150 feet.

3. The 1825 translation erroneously states that the two glasses are twisted together.

4. The German text specifies *lange* (length), but diameter or "thickness" (as used in the 1825 translation) is doubtless being referred to as the tubes have already been described as being of equal length. The accounts of Bussolin (1847:16) and others support this interpretation.

5. A good portion of the information presented in this paragraph is missing in the 1825 translation. Furthermore, the latter, by using the singular form "pipe," implies that the tubes were chopped up one by one rather than by the handful.

6. The 1825 translation describes this tool (*Hacke*) as "a spatula, resembling a hatchet with a round end." However, *Hacke* also denotes a hoe or mattock. Considering the activity that is being performed, a hoe-shaped tool would seem to make more sense.

7. The term *Bunde* may be translated as bundles, bunches, or hanks. Based on Bussolin (1847:25), the two latter terms would be the most appropriate here.

8-9. These two statements are obviously incorrect. One can only wonder what inspired the second one.

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50. GLASS BEADMAKING IN THE FICHTELGEBIRGE REGION OF BAVARIA IN THE MID-NINETEENTH CENTURY, by Ian Kenyon, Susan Kenyon, Susan Aufreiter, and Ron Hancock (1996, 28:12-19)

In the 19th century, two important centers of European beadmaking were Venice/Murano and northern Bohemia. Yet, at the same time, a significant bead industry also existed in a mountainous region of northern Bavaria (Franconia) called the Fichtelgebirge (Fig. 1). Since details about the Bavarian industry are scarce in the English-language literature, we offer a digest of two contemporary German-

Figure 1. Central Europe with political boundaries as of 1871: ▲ = some 19th-century glass-beadmaking centers; • = cities mentioned in text (drawing: Ian Kenyon).

language accounts below (Lobmeyr 1874:248, 253, 256, 262; Sackur 1861). Note that a German-language article on Fichtelgebirge glass beads was published in 1926, but we have only been able to find a very brief English abstract of this (Hohenberger 1927).

Introduction

Rich in raw materials, the Fichtelgebirge region was one of the early centers of German glassmaking: a glassworks in Bischofsgrün was recorded as early as A.D. 1340 (Weiss 1971:337). By the 19th century, however, the scale of glassmaking had changed in Germany. The large factories needed to supply an ever-growing demand for tableware, bottles, and window glass were becoming concentrated in industrial centers like those in the Rhineland, Saxony, and Silesia.

Even so, Bavaria was still noted for certain glass products: blown mirrors and, from the Fichtelgebirge region, beads. A speciality of the Fichtelgebirge industry was the manufacture of large-sized wound glass beads (*massive Glasperlen*), known as *Paterles*. In addition, some bead houses made a related product–glass-ball buttons (*Kugelknöpfe*). The heart of the Fichtelgebirge bead industry was the village of Oberwarmensteinach. Other factories, no more than 30 km distant, were located in Fichtelberg, Bischofsgrün, Grünberg, and Altenstadt.

Lobmeyr's 1874 survey of the glass industry provides a detailed appendix listing over 300 German glassworks and their products. With but two exceptions in the entire German Reich, only Fichtelgebirge glass houses were reported as making beads. The exceptions were two glassworks in Thuringia, but since their speciality was glass tubing, it is probable that their beads would have been of the drawn or blown types rather than wound as in Bavaria. In view of this concentration of bead factories in northern Bavaria, any glass bead described in the mid-19th century as being from "Germany" or "Bavaria," especially if wound, is likely to have been a product of the Fichtelgebirge industry.

Chronology

The Fichtelgebirge is said to have been a beadmaking center in the 15th and 16th centuries (Kidd 1979:33) with this industry declining after 1700, when many workers moved to Bohemia (Dubin 1987:113). Yet, in contradiction, a late-19th-century article (Anonymous 1884:819) attributes the introduction of beadmaking to Bavaria about 200 years previously (say ca. 1680); and Dillon (1907:292) is even more specific:

> ... that the use of "a little copper pipe fixed over a burning lamp" for making small objects of glass was first taught at Nuremberg by one Abraham Fino, who came from Amsterdam in 1630. The Dutch... had been taught the art by a Venetian.

Whatever the case, by the mid-19th century, a number of bead houses were reported as being long established: Lobmeyr recorded that a factory at Oberwarmensteinach, then owned by Michael Trassl, had been founded in 1756, and further noted that eight other beadworks dated back to the l8th century. By Lobmeyr's time (1874), however, the Fichtelgebirge industry seems to have gone into decline– of the 15 bead houses then in existence, only eight were actually in operation.

Manufacturing Techniques

Most bead factories had one or two furnaces, stoked with the firewood so abundant in the Fichtelgebirge (literally

"spruce mountains"). A furnace contained about 7-8 melting pots (*Schmelztiegel*). In turn, each melting pot supplied molten glass to several working pots (*Arbeitstiegel*) from which the beadmakers drew their glass. At the Michael Trassl beadworks, for example, there were two furnaces, 14 melting pots, and 36 working pots, furnishing molten glass to a total of 80 workers.

Two tools were used in making beads: a pointed iron rod (*Spisse des Eisens*) and a "key" or "wrench" (*Schlüssel*). The rod, or gathering iron, was around three feet long, about 1/2 inch in diameter, and tapered towards the bottom. At the tip or working end of the rod was a precisely centered point. The "key," used in forming beads, was not described, but presumably it must have had a working end shaped something like this: ⊓ or ⊣= . Alternatively, the key may have been an open-faced mold.

The manufacturing technique was a variant of the wound method termed "furnace-winding" by Francis (1983:194) and "winding from the pot" by Neuwirth (1994:267). This differs from the lamp- or wire-winding technique–the "suppialume" process of the Venetians–mentioned by Dillon. Dr. Sackur (1861) described the beadmaking process as follows:

> Each worker has a working-pot before him, kept filled to the brim with glass. He takes a little ball of glass out of the working-pot with the point of the iron, pushes the iron deeper into it, that is, the more deeply the bigger the bead, and turns the little glass ball with great speed around the iron. Then he pulls the iron out and by rocking and pushing from above and below with the "key" gives the soft bead the required shape. Each worker has two irons. As the bead cools on one iron, he turns a new bead on the other iron.... In each workshop, there is also, on the gallery floor, a thin-walled small clay vessel, warmed by the furnace, and which the glass beads are brushed into by gradual cooling of the points [of the gathering irons]. [Translated from the German.]

Hohenberger (1927:A 113-114) gave a similar account of beadmaking in the Fichtelgebirge:

> To-day round wood-heated furnaces were used for beads, having twenty gathering openings in each. Each workman had two tapering gathering irons and eight or ten pearls were made in half a minute. These were allowed to cool on the iron whilst the second iron was used, after which they were shaken into a neighbouring jar.

Sackur attributed the invention of this distinctive way of manufacturing beads to the inhabitants of the Fichtelgebirge, although an anonymous report implies that the Venetians introduced the making of "turned massive beads" to the area (Anonymous 1884:819). Regardless, it seems to have been an adaptation of a technique dating back to the Middle Ages: Benrath (1880:351) noted that in the 12th century, Theophilus described a very similar method, also using a pointed rod, for making glass finger rings (Hawthorne and Smith 1963:73-74). The winding technique is still used in making glass beads in certain parts of the world. For example, Küçükeman (1988) describes and illustrates the gathering irons and variety of shaping tools used by modern-day Turkish beadmakers.

Not all beads were made by the winding technique. In the latter part of the 19th century, there was some manufacture of molded beads, including faceted varieties, apparently under the influence of the Bohemian industry (Peek 1995: pers. comm.). In 1885, J. Trassl of Oberwarmensteinach patented a mold for the mass production of glass beads and buttons (Anonymous 1886). Cane beads may also have been made in the Fichtelgebirge (Peek 1995: pers. comm.).

The Product

After cooling, the beads were threaded on a string or line, which consisted of a hundred beads. While not directly stated, it is likely that the usual bead was round, since variant shapes were specifically noted as oval and ring. Beads varied in size: Lobmeyr reported that at the Schinner works at Grünberg, near Kemnath, the 100-bead strings ranged in weight from 1 *Loth* to 3 *Pfund*; that is, between about 16 g and 1,500 g. Therefore, the beads–based on this weight range (and assuming they were round)–would have varied from roughly 0.5 to 2.0 cm in diameter.

Beads came in a variety of colors including blue, green, black, yellow, and white. While base composition of the glass is not stated, it was possibly lead glass, since Sackur reports that a substantial amount of arsenic was added to the melt to produce opacity in white beads (arsenic has this opacifying effect only in lead-rich glass). If so, this stands in contrast with the contemporaneous Bohemian glass industry where phosphates (bone ash) were used to opacify potash-lime glass (Debette 1843:597-598).

Scale of Production

According to Lobmeyr (1874), a typical bead factory employed about 32 to 36 bead makers who had 12-hour shifts. A good worker could make as many as 5,000 beads a day. For instance, the 40 workers at the Pschörer factory in Fichtelberg produced 960,000 strings of beads per year (i.e., 96 million beads). In 1861, Sackur estimated that the

12 bead houses then operating in the Fichtelgebirge made a total of six million beads a week.

How important was the Fichtelgebirge bead industry compared to that of Venice/Murano? Dr. Sakur stated that a single Bavarian glass house could make 8 to 12 *Centners* (1 *Centner* = 50 kg) of beads per week. At this rate, the 12 factories, if operating 52 weeks a year, could have produced roughly 250,000 to 375,000 kg of glass beads annually. However, if, as suggested by Hohenberger (1927: A 113), the bead houses were mostly shut down from Easter until August while the workers cut firewood, then these production estimates should be reduced by one-third. For the Venetian/Murano bead industry in 1847, Domenico Bussolin reported a total production of over 2 million kg of finished beads, almost ten times that of the Fichtelgebirge (Karklins and Adams 1990:80). But much of the Venetian product consisted of drawn beads. For wound beads only, Bussolin recorded a total output of 320,000 kg; that is, about the same amount as made in the Fichtelgebirge. So, at least in the mid-19th century, the production of wound beads in the Fichtelgebirge region and Venice/Murano was about on par.

The Market

The Fichtelgebirge beads were described by Sackur (1861) as "a near luxury good" and they had a world-wide distribution. According to Lobmeyr, bead factories exported directly to England, America, Egypt, and the Orient. Dealers in Bayreuth, Nuremberg, and Hamburg also marketed Fichtelgebirge products (Fig. 1).

Bavarian-made beads seem to have been important in the African trade. Karklins (1992:52, 54) has shown that certain wound varieties of large ring- and oval-shaped beads used for trade in Central East Africa were reported as coming from Germany. It is likely that these were Fichtelgebirge products, especially as one type was said to have been "made" in Nuremberg–a city from which the northern Bavarian beads were distributed. Similarly, the bead cards of the London merchant Moses Levin, which date to about 1851-1863, contain many varieties of wound beads intended for the African trade (Karklins 1985). Since Levin advertised that his goods came from Venice, Bohemia, and Germany, it is very possible that some varieties of his wound beads were Bavarian.

The Archaeology

Although there have been no archaeological excavations, three production sites dating to the 18th and 19th centuries have been located (Peek 1995: pers. comm.). Even today, the Fichtelgebirge area is heavily wooded, making it difficult to locate sites.

Conclusions

It would be of interest to learn more about the nature of the beads made in the Fichtelgebirge, including the disputed date and origin of this industry. From the few sources that we have consulted, it appears that in the mid-19th century this tiny part of Bavaria was a leading producer of large-sized wound beads having an international market.

Acknowledgements

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51. NEUTRON ACTIVATION ANALYSIS OF SOME 19TH-CENTURY FACETED GLASS TRADE BEADS FROM ONTARIO, CANADA, THAT HAVE CHEMICAL COMPOSITIONS RESEMBLING BOHEMIAN GLASS, by Ian Kenyon, Susan Kenyon, Ron Hancock, and Susan Aufreiter (1995, 27:4-9)

Introduction

Necklace-size faceted beads are widely distributed on 19th-century archaeological sites in North America and elsewhere. These faceted beads are usually made in two different ways. Some (Kidd types If and IIIf; so-called "Russian" beads) are drawn beads, fashioned from segments of six- or seven-sided tubes with ground facets on their corners; others are mold-pressed (or "mandrel-pressed") beads, which also have cut facets.

Glass beads with cut facets are considered to be characteristic of the 19th-century Bohemian glass industry (Ross 1990; Ross and Pflanz 1989). It is fairly certain that mold-pressed beads were made in Bohemia (Ross 1990; Ross and Pflanz 1989; Schubarth 1835:371). Less certain, however, is the origin of faceted drawn beads: Lester Ross (1990:38) states that they "may represent items manufactured in Bohemia, possibly Venice." One way of further assessing the origin of these beads is by considering their chemical compositions. This paper looks at the chemical compositions of 11 faceted beads from six archaeological sites in Ontario and compares them to the composition of Bohemian glass as reported in the 19th-century literature on chemical technology.

Bohemian Glass

By the 19th century, the Bohemian glass industry was known for the high quality of its tableware. Bohemia also had a good reputation for the manufacture of glass chemical apparatus; beads and other baubles were a significant sideline (Henrivaux 1883:312-318).

While in most parts of Europe fine tableware was usually made from lead glass (as in England) or soda glass (as in Italy), Bohemian crystal, in contrast, was potash glass. A typical 19th-century recipe for Bohemian glass calls for 100 parts of pulverized quartz (silica), 32 parts of refined potash (potassium carbonate), 17 parts of slaked lime (calcium hydrate), as well as small amounts of arsenic and manganese (Pelouze and Fremy 1865:890). In fact, the expression "Bohemian glass" came to denote this particular potassium-rich composition, even if not made in Bohemia itself. For example, Henrivaux (1883:318) reports that such "Bohemian glass" was also made in Prussia and Bavaria.

Results and Discussion

To determine their chemical composition, the 11 beads were analyzed by instrumental neutron activation analysis at the SLOWPOKE Reactor Facility, University of Toronto (Table 1). Based on manufacturing technique, the beads can be divided into two series: the first series (A) consists of drawn faceted beads; the second (B) of mold-pressed beads, which also have ground facets. Samples 1 to 9 are colored

Table 1. Selected Elements (in %) for Some 19th-Century Faceted Beads.

No.	Site	Kidd Variety	Ross	K	Ca	Na	Cl	Al
Series A: Faceted Drawn Beads								
1	Cayuga 1	IIIf2	Ir	13.0	5.7	0.5	0.1	0.4
2	Middleport	IIIf2	Ir	12.0	5.7	0.5	0.1	0.4
3	Mohawk Village	IIIf2	Ir	13.0	5.4	0.5	0.1	0.4
4	Croker	IIIf2	Ir	12.0	5.9	0.7	0.2	0.4
5	Fort Frontenac	If*	Ik	12.8	8.0	0.8	0.2	0.3
Series B: Mold-Pressed ("Mandrel-pressed") Faceted Beads								
6	Moose Factory	MPIIa	IVz	11.0	4.9	1.9	0.1	0.5
7	Moose Factory	MPIIa	IVw	13.0	5.2	0.4	0.0	0.4
8	Moose Factory	MPIIa	IVw	11.0	5.6	2.0	0.2	0.4
9	Moose Factory	MPIIa	IVw	5.8	7.0	5.0	0.3	0.4
10	Moose Factory	MPIIa	IVs	13.7	5.9	1.2	0.2	0.4
11	Moose Factory	MPIIa	IVr	7.4	3.4	6.2	0.3	0.2

blue by the addition of between 55 to 430 parts per million of cobalt. Sample 10 is a clear, transparent glass; sample 11 is milky white. For further descriptive details, readers are directed to Ross' (1990) paper on glass beads from Fort Vancouver: the column entitled "Ross" in Table 1 gives the color plate number of corresponding bead varieties in his study. Table 1 also lists the Kidd and Kidd system variety/type numbers (as revised by Karklins [1985]) as well as percentages of the elements potassium (K), calcium (Ca), sodium (Na), chlorine (Cl), and aluminum (Al).

Fig. 1 is a scattergram showing potassium and calcium contents for a variety of potash glasses, including the 11 beads. Information for 19th-century Bohemian glass (tableware and tubing) is taken from contemporary texts on chemical technology (Benrath 1880:28; Dumas 1830:538; Fehling 1878:381; Pelouze and Fremy 1865: 889). While in medieval times potash glass was widely manufactured in northern Europe, this earlier glass was made from poorly refined potash, often rich in other elements, especially lime. Such calcium-rich potash glass is represented in Fig. 1 by some Bohemian tableware dating around A.D. 1600, reported by Hetteš (1963). This early Bohemian glass contains about two to three times more calcium than 19th-century Bohemian glass, and is similar to the average for medieval potash glass given by Sanderson and Hunter (1981). Fig. 1 also shows a SLOWPOKE analysis of 13 early l8th-century wound beads (these results are consistent with

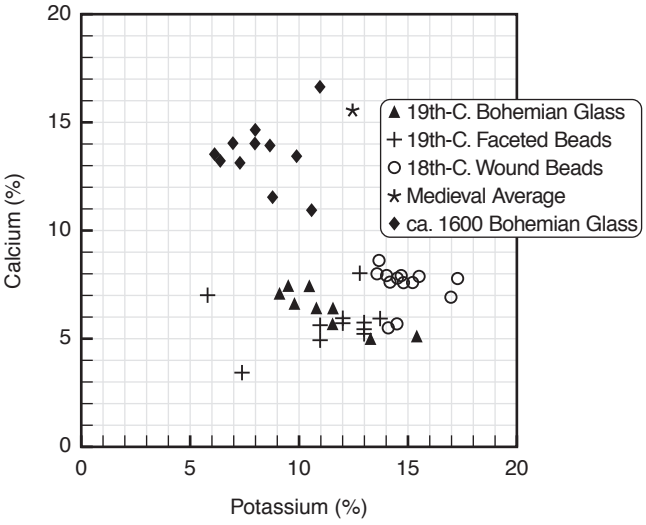

Figure 1. Potassium and calcium contents of some potash glasses.

those reported by Karklins [1983] for similar bead types). The 18th-century wound beads have about the same amount of calcium as 19th-century Bohemian glass but contain slightly more potassium. It is evident from Fig. 1 that all but two of the drawn and mold-pressed faceted beads from Ontario (samples 9 and 11) are made of a potash glass that is very similar in composition to 19th-century Bohemian glass. It is of note that, while almost 250 glass beads dating

from the late 18th through to the early 20th century have been analyzed at the SLOWPOKE Reactor Facility, of this reasonably large sampling, only the faceted beads listed in Table 1 have the potassium-lime composition so typical of Bohemian glass.

There may be slight differences between the drawn and mold-pressed beads (Table 1), although there are too few bead samples to permit firm conclusions. Drawn beads are very consistent in their chemistries; in contrast, the mold-pressed beads, even though all from the same site, are more variable, especially in their sodium content. Two beads (nos. 9 and 11) have nearly equal amounts of potassium and sodium alkalis. Such a mixed alkali composition was sometimes recommended for Bohemian glass because the resulting glass was easier to work (Lock 1881:1067). This property would be especially important for mold-pressed beads since they were largely produced by a cottage industry using primitive equipment. There is another possible source of variability in mold-pressed beads: they were made from glass rods sometimes produced from remelted factory scraps (Schwarz 1886:350). It is unlikely that such waste glass would be very uniform in its chemical composition.

This study, although brief and limited, confirms that the drawn-faceted and mold-pressed beads have chemical compositions similar to the potassium-rich glass characteristic of Bohemia. Such a similarity, however, can not be taken as conclusive proof that the beads are, in fact, from Bohemia since "Bohemian glass," as noted above, was also made elsewhere.

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52. EUROPEAN TRADE BEADS IN SOUTHERN AFRICA, by David Killick (1987, 10:3-9)

Archaeologists in southern Africa have long been interested in imported glass beads as a means of dating archaeological sites. The earliest study of which I am aware is that of Sir Hercules Read, who examined beads from David Randall-McIver's 1905 excavations in Rhodesia (Randall-McIver 1906). The next generation of archaeologists were able to call upon the expertise of Horace Beck, whose bead reports for the important sites of Zimbabwe (Caton-Thompson 1929) and Mapungubwe (Fouché 1937) were models of their kind. But the best efforts of Beck and his successors failed to establish bead studies as a dependable and precise means of dating archaeological sites. The first

radiocarbon dates for southern Africa were released in 1959, and few bead studies of substance have been made since that time. An exception is Claire Davison's massive dissertation on the major- and trace-element chemistry of African beads (Davison 1972), which was a bold (if unsuccessful) attempt to establish the region of manufacture of several major groups of beads recovered from African archaeological sites.

Glass bead assemblages may yet have an important role to play in dating sites of the historic Iron Age in southern Africa. I consider the historic Iron Age to begin in A.D. 1488, when Portuguese ships first rounded the southern tip of Africa and passed into the Indian Ocean. They were followed in turn by Dutch, French, and English traders and colonists, who have bequeathed to us a vast archive of documentary records on their interactions with African peoples.

Unfortunately, the geographical coverage of these documents is limited to the relatively small zone of European influence in present South Africa, along the East African coast, and for a short distance either side of the Zambezi River valley. Eye-witness accounts of the African interior are rare before the 19th century.

It has until recently been impossible to date archaeological sites of the historic Iron Age with adequate precision. There have been major fluctuations of the radiocarbon content of the atmosphere during the last 500 years, and radiocarbon dates in this range will therefore intersect the calibration curves in several places. With conventional radiocarbon dates (standard deviation 50-100 years) the calibrated ages usually merge to give a possible age range of 150-300 years. The very recent arrival of high-precision radiocarbon dating and calibration (standard deviation 10-20 years) promises to provide the chronological framework that has so far been lacking. High-precision dates will still intersect the calibration curve in several places, but the calibrated age ranges will in most cases be discrete. It will therefore be necessary to turn to secondary evidence to decide which of the calibrated age ranges is the correct one. The most useful source of secondary evidence on southern African archaeological sites is European glass trade beads.

Two major obstacles stand in the way of bead researchers in southern Africa. The first is that no common typology has emerged, so that it is difficult or impossible to correlate published bead assemblages. I am currently trying to persuade southern African bead researchers to adopt the Kidd typology (Kidd and Kidd 1970), as modified by Karklins (1982). Many of the bead varieties recovered in southern African sites of the 17th, l8th, and 19th centuries are already included in the Kidd typology, as the same varieties were exported from Europe to North America. The period of peak popularity of a given variety is not necessarily the same in Africa and North America, but Africanists can and should use the North American bead literature to infer the probable life-span of bead varieties.

My impression (from a preliminary study of the published evidence) is that changes in bead variety and relative frequency are roughly contemporary in southern Africa and North America during the 19th century. During the 18th and l7th centuries, new varieties seem to appear later in southern Africa than in North America. An interesting duality is evident in 17th- and 16th-century sites. Bead assemblages from these levels in the Portuguese site of Fort Jesus, on the Kenya coast, have yielded large numbers of European trade beads (Kirkman 1974). Yet the bead assemblages from contemporary Portuguese trading posts in the interior, such as Luanze (ca. 1580-1680) and Dambarare (ca. 1600-1693), are dominated by non-European bead types. The reason for this disparity is given in contemporary Portuguese documents. The inhabitants of the interior regions would not accept European beads in exchange for their gold. The Portuguese were forced to import from India the same types of cloth and beads that their Swahili and Indian predecessors in the interior had employed (Garlake 1969).

There are as yet few independently dated assemblages of glass beads from southern and eastern Africa. A particularly important series of bead assemblages was recovered from Fort Jesus, where they are dated by association with coins and Chinese ceramics. They range in age from the late 16th to the late 19th century. The published analyses of these assemblages are quite inadequate, and a new and more thorough study is required. The same is unfortunately true of most other independently dated bead assemblages in eastern and southern Africa, such as that from the Zulu capital of Mgungundhlovu (1829-1838). The number of independently dated "control" assemblages is, in any case, small, and needs to be augmented by excavation and analysis of sites of known age. Current work on the historical archaeology of Cape Town should provide a number of bead assemblages that can be dated by association with imported coins and ceramics. Several large bead assemblages have recently been excavated from a series of Zulu royal settlements, the ages and duration of which are established by documents.

In 1982 and 1983, I excavated five bead assemblages from the Kasungu National Park in central Malawi, as part of a study of changes in settlement pattern during the 18th and 19th centuries. Three of the assemblages are firmly dated to the period 1860-1900 by specific oral histories, cross-checked with several different informants. Sites IpIc-9 (which produced only 20 beads) and site IoId-2 (2,301 beads) were both abandoned by about 1880; site IpId-1 (691 beads) was occupied until 1897. The common beads of each

of these sites are: drawn transparent scarlet over opaque white to pink large barrels and small "seed" beads (Kidd types IVa*, IVa9; "cornaline d'Aleppo"); small to very small (1.0-2.5 mm) drawn opaque "seed" beads in neutral white (IIa13), light aqua to turquoise (IIa40 ?), bright sky blue (IIa*), pale to vivid pink (IIa*), redwood with a clear outer coat (IIal ?), Dutch blue (IIa*), bright navy (IIa*), and royal blue (IIa*); and drawn short tubular or barrel beads of monochrome opaque white to translucent light grey (variable). Wound beads are very uncommon; among them are a very large barrel of very pale blue glass (WIc3), large annulars of transparent royal blue (WId*), and medium barrels or ellipsoids of transparent scarlet over opaque white or pale pink (WIIIa*). There is a single example of a large barrel bead with a wound transparent scarlet exterior over a drawn core of colorless glass (Karklins class WDI). Mould-pressed beads in opaque white and Dutch blue, with a distinct equatorial ridge (Karklins MPIa*) were recorded only at IpId-l, which is the latest site. There are no twisted, faceted, or inlaid beads at all.

The fourth site, IpIc-2, produced 88 beads. It is not firmly dated, but the bead assemblage is very similar to the three described above, so it is probably of about the same age. The fifth site, IpIc-12, is definitely older. Beads were relatively scarce on this site; the volume of midden deposit excavated was the same as on site IpId-l, but only 18 glass and 1 shell bead were recovered. There is a radiocarbon date, in good association, of 150±40 b.p., which gives a calibrated age at 95% probability of A.D. 1660-1820. There are no other imported goods, but a comparison of the local ceramics with others from Malawi suggests that this is probably a late 18th-century assemblage. The assemblage contains ten drawn tubular beads with a thin outer layer of transparent oyster white over a core of translucent light grey or opaque oyster white glass (IIIa*). The outer layer is usually crazed; they are usually called "crackled whites" in the African bead literature. There are three drawn tubular beads of transparent bright navy (Ia19) or dark navy (Ia20), two tubular beads of opaque redwood over transparent apple green (IIIa3), and three nondescript opaque white monochrome beads. The association of tubular red-on-green, transparent blue and "crackled white" is one that has been often reported in southern Africa. There are no firm dates for any of these assemblages, but they are most probably of the late l8th or early 19th century. There is only one reported assemblage in which drawn red-on-green and scarlet-on-white varieties both occur in substantial numbers; this is the Zulu site of Mgungundhlovu (1829-1838). This suggests that the transition between these important marker varieties in southern Africa is probably about 1830, which is the date given by Sprague (1985) for the first appearance of drawn scarlet-on-white beads in North America.

A simple presence/absence seriation by bead type places these five sites in correct historical order. This suggests to me that the seriation of glass bead assemblages, tied at intervals to high-precision radiocarbon dates, may provide the essential chronological skeleton for regional studies of the historic Iron Age in southern Africa.

Acknowledgements

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53. AN UNUSUAL GILT-DECORATED FACETED GLASS BEAD, by Paul Lawson (1997, 31:12-13)

A blue, octagonal, faceted tubular glass bead (#12,155.1; Fig. 1) was recovered during the Portland State University Archaeology Summer Field School in 1996, at the early-19th-century Chinookan village site of Cathlapotle, near Ridgefield, Washington, USA. The site (45CL1) is in the Ridgefield National Wildlife Refuge and was known as Cathlapotle when Lewis and Clark visited briefly in 1806. It was occupied prehistorically from ca. 1400, and was abandoned initially after epidemics in 1832-1833. The village was probably occupied briefly by Klickitat Indians until 1859, when an Indian Agent removed remaining Indians in the area up the Columbia River.

The bead was found in a storage pit near one wall of a plank house, approximately 1.1 m below grade. It is a translucent blue, octagonal tube with four rows of ground facets, two rows at each end with the facets closest to each end being quite small. It measures 2.5 cm in length and 0.84 cm in diameter, and has a perforation that is 0.28 cm (7/64 in.) wide. Under some lighting conditions, its color is an intense blue. Stating an exact Munsell color is not possible with available chips, but 5BP 4/2 is an approximate value. The glass fluoresces a strong lemon yellow under both short- and long-wave ultraviolet light. Together with a refractive index of 1.51, a specific gravity of 2.44, and a weight of 2.83 g, it is probable that the bead is a lime glass.

A unique feature of this bead is that the long side facets show "shadow" marks where gilt was once applied. This gilt decoration has eroded away (a characteristic also observed on some Ching period Chinese ceramics). Each side had one of two gilt patterns, with each pattern found on alternating sides. The shadow of a gilt band (0.4-0.5 mm in width) is also present on each side, oriented perpendicular to the length of the bead at the mid-point of each side, thus dividing the bead lengthwise into two equal decorative zones.

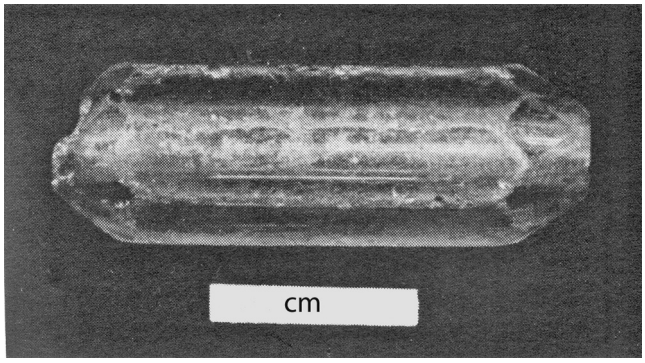

Figure l. The octagonal, faceted tubular glass bead from Cathlapotle.

54. CONSERVATION OF THE DAUGMALE CASTLE-MOUND BEADS, LATVIA, by Jana Lībiete (2000, 36:5-11)

One of the largest collections of beads in Latvia was acquired during the excavation of the Daugmale castle-mound complex. The site is located on the Daugava River not far from the capital city of Riga and in ancient times it was an important craft and trade center. Incorporating the ancient town, harbor, and burial ground, the castle mound is one of the most significant cultural and historical monuments in Latvia, where the most extensive archaeological investigations have been performed.

The occupation of the Daugmale site appears to date back to about 2000 B.C. Excavations there were undertaken over a number of years, both before and after World War II. Archaeological research of the castle mound was started by V. Ginters in 1933, and continued in 1935-1937. After a 30-year hiatus, excavations were resumed by V. Urtāns during 1966-1970, and continued in 1986-1998 under the leadership of G. Zemītis and A. Radiņš. It is important that the organizer of these excavations has been the Latvian History Museum, thereby ensuring not only a high degree of scientific and professional research, but also the preservation, restoration, and conservation of all the recovered antiquities at this museum.

There are about 9,000 beads in the collections of the Department of Archaeology at the museum which need to be restored to preserve them for further study and exhibition. The oldest specimens date back to the 3rd century, but the largest part of the collection dates from the 10th to 12th centuries. The beads originated from a large multinational area extending from Scandinavia in the north to Byzantium in the south, and from Western Europe to Russia in the east. The beads bear witness to significant trade and cultural relations between these nations in the past.

There are 1,541 beads in the Daugmale castle-mound collection and these came from 12 different excavation layers. Five hundred ninety-six of them were examined and restored. Comparing these beads to those found in other archaeological excavations in Latvia revealed that they were remarkably varied. They were classified according to the following attributes: color; size; form (ring-shaped, cylindrical, barrel-shaped, ribbed, and biconical); glass composition; and production technology (wound, poured into a mold, cut from a glass tube, or decorated with gold or silver foil or a colored glass inlay).

The condition of beads recovered from archaeological sites is mainly determined by the nature of the soil in which they reposed and the chemical composition of the glass.

The glass gradually decomposes under the influence of moisture in the ground. In a wet environment, salts and alkali are reduced so the structure of the glass changes. When excavated, the beads are covered with a layer of soil cemented by calcium carbonate and generally have been damaged to some degree. Many specimens display an iridescent layer.

Archaeologically recovered glass beads exhibit different kinds of damage, and several of these are often encountered on the same bead:

1. Deterioration of the surface layer (a crumbling, calcified outer layer in the form of a thin film):

a) Crizzling: This is characterized by tiny cracks that cover the bead (Pl. IB bottom). The crizzling starts in several places on the glass and gradually covers the entire object. Muddy-white plate-like fragments come off the undamaged glass, the surface of which is dull and rough.

b) Delamination/iridescence: Here, a thin onionskin-like film completely covers the bead (Pl. IC top). In this case what appears to be an undamaged bead at the time of excavation develops thin iridescent layers on its surface. The decomposition of the glass had already started while the bead was buried but the rapid dehydration of the glass after excavation accelerated the process, creating the iridescent film.

2. Internal deterioration:

a) Leaching: The whole bead has crumbled (Pl. IC bottom). Soluble sodium (Na) and potassium (K) alkali have been leached out of the glass leaving just the so-called silicon (Si) structure. Such damage is caused by the action of ground water.

b) Infiltration of foreign substances: Damage to the whole body of a bead. There are small bubbles introduced into the glass during the manufacturing process which allow air, water, and dirt to get inside the bead and damage it.

c) Strain-cracking: Star-type cracks (small cracks emanating from a single point) that start from one point and radiate out over the glass causing more and more cracks. They split the glass structure with the result that the bead becomes fragmented.

In order to preserve the beads which suffer from the above maladies, they must be conserved and restored. The Restoration Laboratory of the Latvian History Museum started its work in 1931. In the beginning, a great deal of attention was paid to the restoration of archaeological metal; later also to ceramics. In 1984, restorer A. Mastikova initiated the restoration of glass beads using several different methods. After comparing the results, it was clear that none of the existing methods cleaned the beads completely. This led to the development of a new methodology in cooperation with specialists from the Laboratory of Silicate Technology at the Riga Technical University. After determining the chemical composition of the beads, a restoration program was created in which not only the chemical composition of the glass was taken into consideration, but also the kinds and extent of glass damage. In 1990, the two new methods developed by Dr. I. Vitiņa in co-operation with museum restorers were put into practice, the physical condition of the beads to be restored dictating which method would be used: 1) the "normal" method for relatively well-preserved beads and 2) the "soft" method for heavily damaged beads.

The laboratory procedure is as follows. Dirt, soil, and dust are removed from the surface of the beads with a soft dry brush. They are then washed in an alcohol/water mixture (1:1), after which the beads are visually evaluated under the microscope to determine which of the two methods should be employed.

In the "normal" method, glass beads are boiled in turns in 3% acetic acid and 3% potassium hydroxide (KOH) for 5 minutes each time. The process is repeated until the beads are clean, the final boiling being in acid to neutralize the KOH. To neutralize any further effects of any residual acid and alkali on the glass, the beads are boiled in distilled water which is changed several times until a neutral environment is achieved. The beads are dried by immersing them in ethyl alcohol for an hour (Pls. ID, IIA).

Using the "soft" method (for glass beads that are in bad condition, crumbled, and/or with an elevated lead content), beads are steeped in warm (40-50°C) 3% acetic acid for 5-15 minutes and then neutralized by washing in distilled water until a neutral environment is achieved (Figs. 1-2).

It is preferable that the cleaning be undertaken by certified conservators as the condition of the beads needs to be accurately assessed to determine the degree of deterioration and which method is indicated. The use of either method by untrained individuals may result in the destruction of the beads being cleaned.

As many beads are found in a fragmented state, they need to be glued together. It was very difficult to find the most appropriate material for this purpose. As the beads are small and the fragments are often difficult to keep in position once glued, long-drying glues were not suitable. Acrylic glue (cyanoacrylate resin, a.k.a Crazy Glue) was chosen as it hardens quickly. Keep in mind that this material is not a permanent adhesive so the varnishing process described below is necessary. Before gluing, the fragments are cleaned

Figure 1. Yellow beads before "soft" cleaning (12th-13th centuries).

with acetone. The pieces are then carefully matched under a magnifying glass, a tiny spot of glue is applied to the pieces which are then pressed together.

A protective varnish to seal the surface of the beads was chosen taking into account that it had to preserve the specimens from further deterioration, pollution, and humidity. Nowadays the synthetic's industry offers many products from which a restorer can choose the most appropriate one. The most important features for a varnish are chemical and physical stability, resistance to yellowing and water, good binding properties with glass, and a low drying temperature. Taking into consideration the suggestions of our chemists and the experience of colleagues in other countries, a 7% solution of polyvinylbutyral (PVB; C_2H_5OH) in alcohol was chosen. It creates a colorless transparent layer on the glass and its perviousness to water is low. The restored beads are covered with this varnish using a fine brush, filling all the glass pores. The varnish does not give mechanical strength to the glass; it is reversible and can be easily cleaned. A solution of Paraloid B-72 (polymethyl methacrylate) dissolved in acetone or ethanol usually 2-5% wt./vol. has also been found effective.

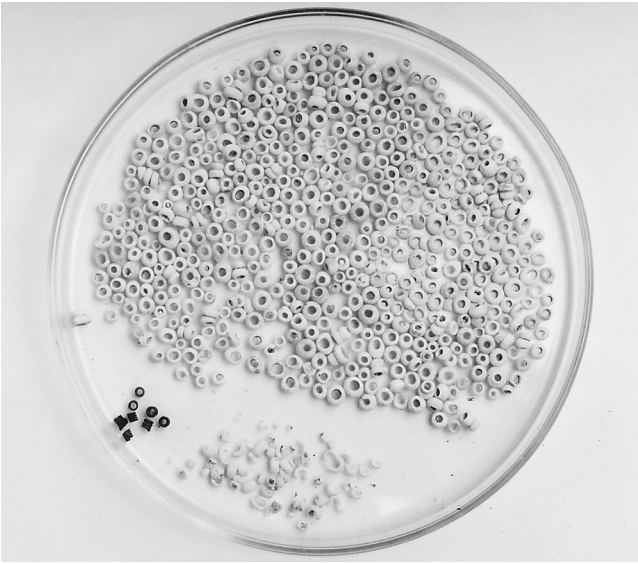

Figure 2. Yellow beads after "soft" cleaning (12th-13th centuries).

The restoration program and methods developed by the staff of the Restoration Center at the Latvian History Museum have proved effective. Repeated examination of the beads restored using the methods outlined above has shown that the process of decomposition has been stopped and there are no further changes in the glass structure. A portion of the restored beads are on exhibit at the museum, while the rest are in storage at the Department of Archaeology. As the museum regularly organizes exhibitions of its archaeological material, all the Daugmale glass beads will eventually be restored. As the restoration of glass beads at the Center continues, so does research aimed at refining techniques and developing new ones. It is hoped that the techniques developed here will be of use to others faced with damaged beads around the world.

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55. HYDROFLUORIC ACID IN BEADWORK RESTORATION: A DEFINITE NO-NO, by Judith A. Logan and Tom Stone (1994, 24:10-12)

In her article "Restoring a Nineteenth-Century Yoruba Headdress: The Case of the Missing Trade Beads" which appeared in the January/February 1994 issue of *Piecework* magazine (pp. 75-77), Mary Jo Meade describes and advocates the use of hydrofluoric acid to alter the color and size of small glass beads for use in restoring ethnographic beadwork. This is a process that may be hazardous to both the user and the object being restored.

Although the article does warn the reader to not try and duplicate the process at home, it cannot be overstated that hydrofluoric acid is extremely dangerous. It must be used in a fumehood, in a laboratory that is fully equipped with showers, the proper acid spill kits, and emergency burn treatment kits. The vapors will penetrate skin and dissolve bone; this can be fatal, or at least lead to a very painful treatment that may involve amputation. Brief exposures to high levels of vapors may cause severe respiratory damage and contact with the eyes may cause blindness. Burns from contact with the vapors may not be felt immediately, and vapors can be absorbed by clothing and held against the skin for several hours before any burns are noticed. Leather that has absorbed the vapors cannot be decontaminated and must be destroyed. Readers should refer to the CRC Press *Handbook of Laboratory Safety*, 3rd edition, A. Keith Furr, editor, 1989, pp. 295-299, for a description of the effect of hydrofluoric acid on human tissue, handling precautions, and treatment of exposure to the acid.

The author does not describe the type of washing neutralization that was used to stop the action of the acid on the beads. Since the beads were subsequently coated with a "commercial glass paint," it is possible that residues of the acid have been sealed in under the paint. What will be the long-term effect on the beads treated this way, and is it possible that they could affect the rest of the headdress, or people who subsequently handle it? I am thinking of the huge surface area that had to be thoroughly cleaned of acid, including the increase in area due to etching of the glass and the difficulty of washing acid residues from the bead perforations.

The use of hydrofluoric acid and the potential long-term residual effect it may have on the beads is one problem. Another is the ethical approach in the manner of the replacement of the beads. There is no evidence of any attempt to differentiate the areas of replacement from the original material. The author states that the work on the headdress was a "restoration" and chose to match the beads as closely as possible with the original and, from an aesthetic point of view, this is understandable. However, it would have been relatively easy to use a very different material to restring the beads so as to provide some sort of evidence that a large part of the headdress had been rebuilt. On the contrary, the author went to the trouble and expense of having "30,000 yards of the thread on which the beads were restrung... custom-milled in North Carolina to match a fragment of the original." Even in the case of a "restoration" there is no need for this sort of exact replication of material which has the potential to mislead anyone studying the headdress in future.

56. THE DETERIORATION OF GLASS BEADS ON ETHNOGRAPHIC OBJECTS, by Sandra Lougheed and Jane Shaw (1985, 7:10-12)

Introduction

Conservators and scientists at the Canadian Conservation Institute, Ottawa, Ontario, have been investigating the deterioration of glass trade beads on Canadian ethnographic objects. These beads are on non-archaeological objects which have been stored in museums for varying amounts of time. Most of the beads examined are suffering from some form of glass disease.

Symptoms of Glass Disease

"Glass disease," a term loosely used to describe deteriorating glass, has a variety of causes and many different symptoms. Often when examining an object only one of the many colors of beads on it will be deteriorating while others remain unaffected. This phenomenon has been observed on a variety of objects and with many different colors of beads. To date, no chemical correlation has been observed between a specific color of glass and its stability. The deterioration relates to the poor quality of a particular batch of glass, not the colorant.

The most obvious symptoms of glass deterioration are cracked and broken beads. The more subtle symptoms include:

1) A crusty deposit on the glass bead or threading material (usually an alkaline carbonate).

2) A fine network of cracks , known as "crizzling," over the entire surface of the bead and only detected under a microscope. (Cracking of this sort occurs on the surface of the glass due to a structurally weak alkali-leached layer.)

3) A sticky or sweaty surface on the glass (usually a highly alkaline solution).

4) Internal cracking.

Symptoms which appear on the substrate (less common):

1) A "bleached image" of the beads on a wool or silk substrate directly below the deteriorating glass beads (a reaction between the highly alkaline glass surface and protein-based material).

2) A substantial darkening of the skin or leather directly in contact with the deteriorating glass beads (a reaction between the highly alkaline glass surface and proteinaceous substrate).

Deterioration of Glass

Several beads were analyzed by atomic absorption spectrophotometry and scanning electron microscopy, and various signs of deterioration were observed. In general the quality of glass was poor–the composition was found to be characteristic of unstable glass. (Glasses which contain an excess of alkali or a deficiency of stabilizer are prone to attack by atmospheric moisture. A glass containing more then 20% alkali and less than 4% lime or other stabilizer, is considered unstable and is prone to attack by water [Brill 1975:121].) Bubbles, inclusions, and glass decomposition of one form or another were detected. Scratches and cracks were also observed which can act to accelerate glass decomposition. Hydration occurs along the cracks which cause the walls to swell and propagate the crack.

In any area accessible to moisture there are two major processes which take place simultaneously at the glass-solution boundary. The first process involves the extraction of ions from the glass and this dominates at a pH of less than 9. The second process involves the dissolution of the siloxane bonds at the glass-solution interface and this process dominates at a pH of greater than 9. In general the removal of silica lags behind the extraction of the alkali ions from the surface, resulting in the formation of a leached layer (Clark 1979:1). This alkali-depleted layer was observed on both the inside and the outside surfaces of several beads and some beads had suffered pitting and glass decomposition where an alkaline solution had accumulated.

The variation in the quality of the glass used to make trade beads was illustrated by one bead which had a composition which changed from region to region. This glass was not mixed and melted properly, and in this case a glassy state may not have been achieved uniformly throughout the bead. Most of the unstable beads analyzed had either high alkali, low lime, or some other imbalance in composition. Some of the glasses were part lead glasses, some were soda-lime glasses, and some were hybrids which contained part potash, part soda, and part lead.

Preventive Conservation

Once beads have deteriorated to the stage that they are cracking and breaking apart, there is little that can be done. However, if the early stages or subtle symptoms of glass disease are detected, a number of preventive conservation methods should be followed:

1) Avoid cleaning unstable glass beads with water. Water accelerates glass deterioration.

2) Provide a rigid support such as a piece of Corex (fluted polypropylene) or acid-free matboard if the object is not self-supporting. This reduces the amount of lateral stress, thus minimizing scratching and breakage.

3) Control the relative humidity by providing RH between 30-40%. This will slow down the deterioration process considerably.

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57. A HISTORIC NOTE ON BEAD USE AMONG THE SEMINOLE INDIANS, by Clay MacCauley (1997, 31:14-15)

The following item is extracted from Clay MacCauley's report on "The Seminole Indians of Florida" which appeared on pp. 469-531 of the *Fifth Annual Report of the Bureau of Ethnology 1883-1884* which was published in Washington, D.C., in 1887:

> My attention was called to the remarkable use of beads among these Indian women, young and old. It seems to be the ambition of the Seminole squaws to gather about their necks as many strings of beads

as can be hung there and as they can carry. They are particular as to the quality of the beads they wear. They are satisfied with nothing meaner than a cut glass bead, about a quarter of an inch or more in length, generally of some shade of blue, and costing (so I was told by a trader at Miami) $1.75 a pound. Sometimes, but not often, one sees beads of an inferior quality worn.

These beads must be burdensome to their wearer. In the Big Cypress Swamp settlement one day, to gratify my curiosity as to how many strings of beads these women can wear. I tried to count those worn by "Young Tiger Tail's" wife, number one, Mo-ki, who had come through the Everglades to visit her relatives. She was the proud wearer of certainly not fewer than two hundred strings of good sized beads. She had six quarts (probably a peck of the beads) gathered about her neck, hanging down her back, down upon her breasts, filling the space under her chin, and covering her neck up to her ears. It was an effort for her to move her head. She, however, was only a little, if any, better off in her possessions than most of the others. Others were about equally burdened. Even girl babies are favored by their proud mammas with a varying quantity of the coveted neck wear. The cumbersome beads are said to be worn by night as well as by day (pp. 487-488).

58. SCOTTISH IRON AGE GLASS BEADS, by Euan W. MacKie (1996, 29:4-7)

Introduction

The latter part of the Iron Age of western Europe–starting about 450 B.C. and lasting until the Roman conquest–is known as the La Tene period. Important features of the period are elaborately decorated metalwork and rich burials under mounds containing dismantled wheeled vehicles. It is usually assumed that this archaeological culture correlates with the historically documented expansion of the tribes north of the Alps known to the Romans as *Celtae* and to the Greeks as *Keltoi*. Independent evidence that Celtic-speaking people were in central and western Europe in ancient times comes from place names found in this area or referred to there in Classical sources, particularly those ending in "dunum," "briga," and "magus." Decorated glass beads and armlets made by native craftsmen became increasingly numerous in later La Terre times, particularly in Gaul (France). After the Roman conquest from about 120 B.C. onwards, the La Tene culture was transformed and gradually disappeared.

A long-standing problem for archaeologists has been: to what extent did this presumably Celtic Iron Age La Tene culture move into the British Isles, the place where "Celtic" traditions survived the longest (in Wales, highland Scotland, and Ireland)? We know that in Iron Age England P-Celtic languages (ancestral to modern Welsh) were widely spoken; place-name and other evidence shows that these Ancient British dialects were also spoken in Scotland and probably in northern Ireland. From about A.D. 500, these languages were supplanted in Scotland by the Q-Celtic language brought by immigrants from Ireland. However, although it is clear that the Iron Age populations of England and southern Scotland were Celtic in the linguistic sense, only a small part of the Continental La Tene culture appears in the British Isles; vehicle burials, for example, are found in only one limited area in Yorkshire.

So one of the questions archaeologists have to try to answer is: how can we tell from mute archaeological evidence–and in the absence of native written records–whether the Iron Age population was mainly indigenous or whether it was substantially influenced by La Tene Celtic immigrants from the continent? The presence of what appear to be exotic artifacts from abroad–including the decorated glass beads–has always been an important factor in these discussions. At present, archaeological theory is reluctant to postulate migrations without overwhelming evidence so most of these "exotic" objects tend now to be interpreted as traded items, or even as independent inventions.

Iron Age Scotland

Similar problems occur in the interpretation of some of the Scottish Iron Age cultures, particularly those which appear about the 1st century B.C. in the maritime far northern and western highland and island zone known as the Atlantic Province. These are distinguished by a new and sophisticated form of circular dry-stone building, with tower-like proportions, known as the *broch*, by large quantities of well-made decorated pottery (in contrast to the contemporary cultures of the mainland) and by many exotic-looking objects which appear in the north for the first time and some of which strongly resemble similar artifacts in southern England and even in Brittany (northwest France). So archaeologists are confronted with the same question: were these dynamic new broch-building cultures purely an indigenous development on the extreme northwest fringe of Europe (brochs are not found anywhere else, for example) or were they brought into being, at least in part, by sea-borne migrants who sailed up the west coast of Britain, perhaps escaping from the Roman conquest? Two kinds of glass beads shed light on this problem.

The Beads

Glass beads of native manufacture are important if one is interested in the light that specialized technologies can throw on the origins of the various components of a prehistoric culture. The tiny yellow ring beads (Guido's [1978] Class 8) provide clear evidence of cultural links of some kind between southern England and Scotland in the late pre-Roman Iron Age (about the 1st centuries B.C. and A.D.) as Mrs. Guido's (1978:Fig. 25) map makes clear. X-Ray fluorescence analysis of the constituents of the opaque yellow glass paste from which these annular beads are made has shown that specimens from southern English sites (like Hunsbury hillfort in Northamptonshire) and from some Scottish brochs (including Leckie in Stirlingshire and Dun Mor Vaul on the island of Tiree in Argyllshire) were most probably made in the same workshop, presumably somewhere in the south (Henderson and Warren 1982). On the other hand, other beads in Scotland are distinctive, and were presumably made in the north.

Guido's Class 10 beads are globular and made of clear glass decorated with an inlaid yellow spiral pattern; the type is known as the "Meare spiral" after the many examples which were found in the Iron Age marsh village at Meare in Somerset (Guido 1978:79). In this case, the technical analyses showed that there are two groups, barely distinguishable to the naked eye, one made in southern England and one at a separate workshop, perhaps in the region of the Culbin sands in Morayshire in northeastern Scotland. The close similarities between the two groups must surely mean that one of them–presumably the Scottish one–was carefully copied from the other, or perhaps even made by a craftsman who had traveled to the north. One of the northern forms came from Leckie broch.

Of course, these examples of southern beads found on Scottish Iron Age sites could simply be the result of trade, but equally they could have been introduced by influential people who could command the services of craftsmen using local materials to produce copies. We can hardly know which is the more likely explanation without more evidence. Yet those archaeologists who keep confidently stating that there are no known links between the Atlantic Province and southern England in the broch-building period are ignoring important evidence.

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59. THE MISNAMING OF "DUTCH" BEADS, by Herman van der Made (1986, 8:11-13)

In *Ornament* 9(2), 1985, is an article by Karlis Karklins on "Early Amsterdam Trade Beads" in which he concludes that on their way along the trade routes of the world, beads from various manufacturing centers became mixed together. This has made it difficult to determine where certain bead types were manufactured. This is especially true of Dutch vs. Venetian beads where artisans from Venice were responsible for initiating the Dutch bead industry. At the present time, the only solution to the problem seems to be chemical analysis of samples from various European manufacturing centers such as Amsterdam, Venice, and Gablonz. While some information is available regarding 17th-18th century Dutch beads, contemporary comparative data are lacking. It is, therefore, impossible to say anything definite at the present time concerning the origin of European trade beads found on archaeological sites of the post-1550 period.

Another aspect that brings even more confusion to the study of bead origins is the misnaming of beads. In West Africa, all old round beads with a blue color are called "Dutch" beads. I am especially referring to variety WIb15 in the Kidd classification system, but other blue beads that differ slightly from the round ones are also called "Dutch" beads.

Recently a case was excavated at Goree, an island off the coast of Senegal. It contained a large number of WId3 blue beads, but with larger perforations than usual. They were sold to the tourists as being "Dutch." However, on the basis of archaeological findings in Holland, I am quite sure that these beads were not manufactured in the Netherlands.

At markets in West Africa, traders frequently offered me WIb15 beads (15 mm - 18 mm) as Dutch beads. It is a well-known bead at these markets and has been traded in enormous quantities. It is, however, quite remarkable that this translucent ultramarine bead is hardly ever found in archaeological excavations and canals in Holland where factory refuse has been encountered. I have only one specimen in my collection which corresponds to the abovementioned bead variety. And I have seen no other examples in The

Netherlands. There is, however, a larger (20 mm-25 mm) blue, but opaque, bead similar to the WIb15 variety which is found more regularly in excavations in Holland and which may be the basis for the "Dutch" appellation for the smaller specimens.

At the market of Bamako in Mali, the famous chevron bead is offered as "Dutch." Although the colors of these beads (i.e., red, white, and blue) correspond to those of the Dutch flag, it is by no means certain that they were manufactured in Holland. In fact, it is much more likely that they were produced in Venice.

In his *Travels in Nubia*, 1819, Burckhard describes the trade in beads in East Africa. There the Italian traders called a white bead coming from the glasshouses in Bohemia as "Contaria d'Olanda" ("Beads of Holland").

What's in a name?

60. BEADS FROM THE IRON AGE GRAVES OF KISSI, NE BURKINA FASO, by Sonja Magnavita[1] (1999, 35:4-11)

The excavation[2] of the cemetery Kissi 3 in NE Burkina Faso revealed Iron Age graves dated to the 6th-7th centuries A.D. Numerous grave goods have been found, for example different kinds of iron weapons, tools, iron and copper jewellery, wood and leatherwork, basketry, and textiles. The materials show evidence of different kinds of trade connections, like local, interregional, and long-distance, even trans-Saharan, contacts. The arguments are based partly on the study of 1,300 beads, found as grave goods and presented here.

The sites of Kissi are situated in the north of Burkina Faso, West Africa, close to the *Mare de Kissi*, a seasonal freshwater lake. Since 1996, archaeological investigations resulted in the location of 25 settlement mounds, about 50 stone structures of different appearance, and six cemeteries with graves marked by stone slabs. All sites are situated in a quite small area of about 4 sq. km. The excavation of different sites indicate human occupation at least between the 1st and 13th centuries A.D. While settlement mounds revealed only a few beads, several thousand have been found in the cemeteries excavated so far. The analysis of the beads from one site (Kissi 3), has been concluded and will be presented here. Since the examinations of the beads of two other cemeteries are still in process, the results will be presented in further publications.

More than 1,300 beads made of different materials have been found in the cemetery of Kissi 3. Of these, 68% are made of **stone**, mostly of quartz (white quartz, rock crystal, and rose quartz) and less of chalcedony (jasper and carnelian). All these raw materials occur within a radius of about 50 km, pointing to a place of production nearby. The stone beads are ground; additionally those made of chalcedony have a faceted and polished surface. Hypothetically, the beads of Kissi might originate from Hanouzigren in SW Niger (Vernet 1996:312ff.), where quartz and chalcedony beads of similar size, shape, and surface treatment were produced in the first millennium A.D. A few carnelian beads have different features. They belong to the "long bicone type" mentioned, for example, by Insoll and Shaw (1997:15), and are multifaceted and clearly thinner than the other stone beads. Previously, their origin has been placed to the Near East, Egypt, or India (Sutton 1991:152ff.; Insoll and Shaw 1997:15), but without further research (for instance, mineralogical analysis), this hypothesis remains unproved.

The second group is represented by **metal** beads with 17% made of iron and less than 1% of a cupric material. While the iron beads could have been produced locally, the cupric beads may come from a Saharan production center (Grébénart 1988).

The third group comprises **drawn glass** beads which make up about 10% of the collection (6% are white oxidized, 3.3% blue translucent, 0.5% green translucent, and 0.5% yellow opaque). Until now, there is no evidence of glass (bead) production in the 6th century A.D. in West Africa. Suggesting an import of glass beads, the nearest origin would be Byzantine North Africa. Preliminary mineralogical analysis carried out on yellow beads points to a hard, white, and translucent glass of high quality with numerous particles of antimony, resulting in the yellow opaque appearance (Prof. G. Brey: pers. comm.).[3] Interesting results are expected by comparison of the composition of the glass beads from Igbo-Ukwu with those of Kissi, which are very similar in size, shape and color (Shaw 1977: 20).

Beads made of **organic materials** and **clay** occurred only in a small percentage: 1% ostrich eggshell, 1% bone, and 1% clay. Local production of these beads is very probable. The clay beads are segmented. This is a specific shape known from many other sites in the region. De Beauchêne (1966:6 f.) mentions similar beads in SW Niger and Insoll (1996:82) affirms the occurrence of such beads and half-products in the Gao region indicating local production.

To classify the beads, three main groups with various subtypes have been used: cylindrical, spherical, and discoid shape.[4] To summarize the results, most of the beads are cylindrical (72%), 23% are discoid, and only about 5% are of a spheroid shape. Shape and raw material clearly correspond:

cylindrical beads are mainly of stone, discoids of glass, and the few spheroids are mostly both of glass and stone. As the shape of the iron beads is not clearly visible without x-ray, only a few could be determined by now. They often belong to the group of cylindrical shape, but discoids also occur. Beads of ostrich eggshell are always of discoid shape while bone, teeth, and clay beads are mostly spheroidal.

The beads have been worn as necklaces (Fig. 1; Pl. IIB top), arranged in one row. The iron beads are an exception as shown by x-ray analysis of the corroded finds indicating compositions in several rows. On the other hand, the oxidation process is a boon because the thread of the beads, made of leather, has been preserved. The use of a similar thread of leather for the other beads might be possible, but cannot be proved.

Since most of the beads are made of quartz and chalcedony, the dominating colors are white and red. As can be seen from complete necklaces, there is a variation in the color achieved by a systematic change of white quartz and red chalcedony beads (Pl. IIB bottom). Where it could be observed, the largest beads–mostly of biconical shape–were placed in front, in the middle of the necklace. The deposition of beads as grave goods apparently was not a question of gender. In fact, most of the jewellery has been found in "warrior graves" 10 and 14, containing swords, daggers, and arrows and were very probably those of men.

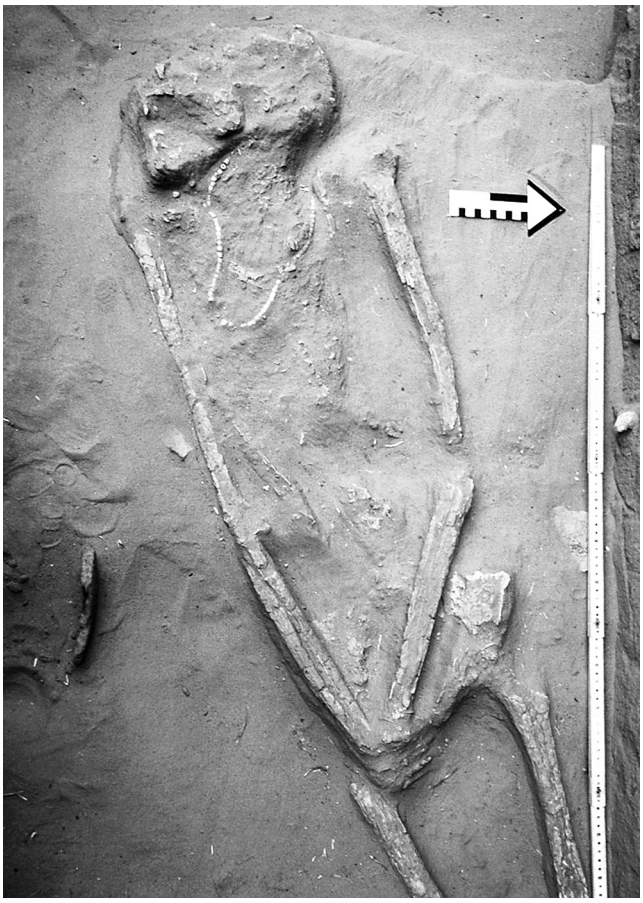

Figure 1. The skeleton in Grave 3 with a necklace of 77 beads of quartz and jasper.

Most beads were found as grave goods, sometimes exclusively. The amount of beads varies extremely from grave to grave. For instance, burial No. 10 wore a necklace consisting of 94 quartz, 41 jasper, 16 glass, and 14 carnelian beads. Another example is Grave No. 14, where an amount of 171 quartz, 37 jasper, 10 carnelian, and 2 glass beads has been found. The beads of these two graves represent more than a third of all beads found during the excavation of a total of 15 preserved graves. The varying amount of beads is highly correlated with other valuables like iron weapons (e.g., swords, daggers, arrows) and different kinds of jewellery made of iron and copper alloys. Graves 10 and 14 have the most grave goods indicating long-distance trade connections and these are also the graves with the most precious beads, assuming that glass and carnelian–because of the fact that they were imported goods–were more precious than other materials. For this reason, it seems likely that beads indicate prosperity and social position in the 6th-7th centuries A.D.

Endnotes

1. J.-W. Goethe Universität, Seminar für Vor- und Frühgeschichte, Archäologie und Archäobotanik Afrikas, Frankfurt/M., German Research Foundation Project "History of Culture and Language in the Natural Environment of the West African Savannah."

2. Excavation and analysis of the material was presented as a M.A. thesis by the author in 1998.

3. Author's note, 8 Sept. 2010: Prof. G. Brey changed his mind shortly after the appearance of this article. In fact, the numerous metallic particles in the glass matrix are lead, not antimony. After these initial, preliminary investigations, further chemical analyses by Robert H. Brill of The Corning Museum of Glass and by another glass bead research team led by Peter Robertshaw followed. It turned out that most of the analyzed glass beads were made of a soda-lime glass, with the soda derived from the ash of halophytic plants. This type of glass was very likely produced in the Middle East, perhaps in Persia. For more information, *see* Magnavita (2009) and Robertshaw et al. (2009).

4. A more detailed report appears in Magnavita (2003).

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61. EARLY SIXTEENTH-CENTURY GLASS BEADS FROM THE TATHAM MOUND, CITRUS COUNTY, FLORIDA, by Jeffrey M. Mitchem (1986, 8:13-16)

The Tatham Mound (8-Ci-203) is an aboriginal sand burial mound located in eastern Citrus County, Florida. Since early 1985, personnel from the Florida State Museum have been conducting excavations at the site. The top stratum of the mound has yielded a large assemblage of early 16th-century European trade material, including iron and silver objects and beads of silver, gold, and glass. The purpose of this paper is to briefly describe the glass beads from the mound.

Table 1 lists the glass beads by type, with classification based on the system devised by Smith and Good (1982). The number of beads recovered is listed for each type, along with a short description and notes. Of the 55 beads recovered, 24 are varieties of Nueva Cadiz Plain (both faceted and unfaceted), nine are varieties of faceted chevrons, nine are small olive-shaped opaque blue beads, six are spherical wound transparent green beads, five are spherical wound navy blue (almost opaque) beads, and one is spherical, but too patinated (or possibly burned) to determine color.

The presence of Nueva Cadiz and faceted chevron varieties indicates that the beads date from the period A.D. 1500-1560 (Smith and Good 1982:11). This would suggest contact with the expeditions of Panfilo de Narvaez (1528) and/or Hernando de Soto (1539), both of whom are believed to have passed through this area. Two other sites in this part of Florida have produced very similar assemblages of glass beads. These are the Weeki Wachee and Ruth Smith mounds (Mitchem and others 1985). The probability that all three sites represent contact with the same expedition is strengthened by the fact that three of the Nueva Cadiz varieties (IIA1d, IIC2a, and IIC2b) and one of the faceted chevron varieties (IVC2d) from Tatham were previously known in North America *only* from the Weeki Wachee and Ruth Smith mounds (Mitchem and others 1983:204; Smith and Good 1982:48-50).

The presence of the spherical beads is surprising, as they are uncommon in sites of this time period (Smith and Good 1982:11). However, their apparent rarity may be due to inadequate samples, because there are very few complete, carefully excavated bead assemblages from early sites in the southeastern United States.

Excavation will continue in the fall of 1986. This work should add to our knowledge of beads from early Spanish contact sites in Florida and adjacent areas.

Table 1. Glass Beads from the Tatham Mound.

Class.	No.	Description	Notes	Provenience
IIA1d (No. 36)	3	Short, tubular, translucent dark navy blue	Nueva Cadiz Plain	Burial no. 31 (F.S. 99); F.S. 100; Burial no. 48 (F.S. 127)
IIA1e (No. 37)	1	Short, tubular, transparent cobalt blue	Nueva Cadiz Plain	Burial no. 31 (F.S. 99)
IIA2a (No. 40)	1	Turquoise blue/thin white/ translucent navy blue	Nueva Cadiz Plain	Burial no. 17 (F.S. 94)
IIA2e (No. 44)	1	Translucent navy blue/thin white/ translucent navy blue	Nueva Cadiz Plain	Burial no. 48 (F.S. 127)
IIA2g (No. 46)	5	Cobalt blue/thin white/ translucent medium blue	Nueva Cadiz Plain	F.S. 64
IIC2- (Unique)	1	Turquoise blue/thin white/ translucent purple	Nueva Cadiz Plain, Faceted	F.S. 90
IIC2a(1) (No. 50)	1	Turquoise blue/thin white/ transparent medium blue	Nueva Cadiz Plain, Faceted	F.S. 90
IIC2a(2) (No. 50)	1	Turquoise blue/thin white/ navy blue	Nueva Cadiz Plain, Faceted	Burial no. 17 (F.S. 94)
IIC2b (No. 51)	1	Turquoise blue/thin white/ colorless	Nueva Cadiz Plain, Faceted	F.S. 100
IIC2g (No. 56)	9	Cobalt blue/thin white/ translucent light blue	Nueva Cadiz Plain, Faceted	Burial no. 27 (F.S. 93)
IVC2a (No. 79)	2	Blue/white/red/white/ translucent green/white/ translucent green	Faceted Chevron	F.S. 64
IVC2d (No. 82)	7	Cobalt blue/white/red/white/ transparent medium blue/ white/transparent medium blue	Faceted Chevron	Burial no. 60 (F.S. 140)
VID1h (No. 108)	10	Olive-shaped, opaque medium blue		F.S. 64; Burial no. 31 (F.S. 99); F.S. 147
----	5	Spherical, navy blue		Burial no. 2 (F.S. 58)
----	1	Spherical (burned or patinated)		Burial no. 2 (F.S. 58)
----	6	Spherical, transparent green		F.S. 64; Burial no. 48 (F.S. 127)

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62. CURRENT RESEARCH ON BEADS AND PENDANTS FROM SAN LUIS DE TALIMALI MISSION, FLORIDA, by Jeffrey M. Mitchem (1991, 18:8-11)

The mission and town of San Luis de Talimali was the Franciscan capital of the Apalachee Province in Florida during the late 17th century. Established in 1656, the site consisted of a large Apalachee Indian village, a Spanish fort, a settlement of Spanish colonists, and a mission church complex (Vernon 1989:1-3). It was destroyed and abandoned in 1704, following raids by British soldiers and Creek Indians (Boyd, Smith, and Griffin 1951:12-19; Hann 1988:264).

The site is located in present-day Tallahassee, and is owned by the State of Florida. An ongoing program of excavation and public interpretation has yielded large numbers of beads and pendants from various contexts, and the site presents a unique opportunity for learning about beads and pendants worn by different segments of the population.

Since 1988, fieldwork has been concentrated in the Spanish village area. Two large trash pits were excavated, and both contained many beads, pendants, and other items of personal adornment. Only one of these features has been analyzed so far, but the results allow some preliminary interpretations to be made.

Among the more than 25,000 artifacts from this pit were over 1,400 items of personal adornment, primarily beads and pendants. This assemblage is valuable for several reasons. First, diagnostic Spanish ceramics from the feature indicate that the pit and its contents date from the late 17th century or after. Second, the location of the feature in the Spanish village suggests that the refuse includes personal adornment items worn by Spanish settlers, as opposed to Apalachee Indians. Third, the diversity and nature of the artifacts suggest that the feature may have been the trash pit of a high-ranking Spanish family. And fourth, some of the rings and jewelry indicate that a Spanish woman (or possibly a *mestiza*, a woman of mixed Spanish and Indian descent) may have been one of the residents of the associated house (McEwan 1990).

The majority of the glass beads are seed beads, and many of these were probably sewn on clothes or other articles. A large proportion of the beads are cornaline d'Aleppo types, consisting of a brick red outer layer over a pale green or blue core. This is interesting because while seed beads are abundant from other areas of the site, cornaline d'Aleppo beads are very rare. This may indicate that these beads were reserved for Spanish use rather than as trade goods for the Apalachees.

A wide variety of glass necklace beads were present in the pit. A few of these may have been rosary beads, but most were probably merely used for decorative purposes. Most of the bead types have been noted from other parts of the site, but the Spanish village has yielded the greatest variety of beads composed of more than one layer, or with striped or faceted surfaces.

In addition to the beads, a number of pendants were encountered. Five of these were teardrop-shaped pendants of glass, and were probably worn as earrings. Earrings of this type were in fashion in Spain during the 17th century (Muller 1972:138). The rest of the pendants were made of lapidary materials, such as jet and rock crystal. It is significant that items made of these materials are virtually absent in the aboriginal areas of the San Luis site.

At least seven of the jet objects were parts of *higa* pendants, distinctive clenched fist-shaped amulets which were very popular among Spaniards, and are still worn hy some Latin peoples today. According to Spanish beliefs, jet had protective powers against the evil eye, and *higa* amulets were used for this purpose (Francis 1979:55; Hildburgh 1906:460-461; Muller 1972:24).

Bead and pendant assemblages from the Apalachee council house, the *convento*, and a small portion of the cemetery inside the church have been analyzed, and they differ significantly from the Spanish village assemblage (Mitchem 1990; Smith 1990). As mentioned before, one difference is in the proportion of glass beads of compound or complex construction, such as the cornaline d'Aleppo type. The Spanish village contains both larger numbers and more varieties of these beads.

Items of jet and rock crystal are also more abundant in the Spanish village area. Only one bead of each material was recovered from areas outside the Spanish village, and neither material was recovered from the limited cemetery excavations.

The tremendous diversity and sheer number of artifacts from the trash pit suggest that the Spanish residents who used the feature were quite affluent. Included in the fill were many broken majolica vessels, as well as a number of silver items. In contemporary Spanish-colonial sites such as St. Augustine, Florida, the assemblage would be interpreted as representing a high-status occupation.

The types of personal-adornment artifacts from the feature suggest that a Spanish woman or *mestiza* was a nearby resident. This inference is based on the small size of several jet and metal finger rings, and the fact that the wearing of rings, jewels, and precious stones was generally considered effeminate by Spaniards at this time (Muller 1972:28).

All of these interpretations must be considered provisional, however, because the differences in personal adornment assemblages from different parts of San Luis could be due to functional differences, such as those from a domestic area versus a cemetery area, or a domestic area versus a public building such as the Apalachee council house. However, initial impressions of the ornate assemblage from the second trash pit in the Spanish village do not appear to contradict the interpretations based on the first feature.

The best opportunity to check interpretations of ethnicity and gender will come with planned excavations in the cemetery beneath the church floor. This research will provide samples from individuals whose sex and ethnic affiliation can be identified. The results can then be compared and combined with data from other mission sites in the Southeast to develop conclusions about the use and function of items of personal adornment among both Spaniards and American Indians at the missions.

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63. PRELIMINARY OBSERVATIONS ON BEADS AND PENDANTS FROM THE APALACHEE VILLAGE AT SAN LUIS DE TALIMALI MISSION, FLORIDA, by Jeffrey M. Mitchem (1993, 22:21-24)

In a previous issue of *The Bead Forum*, I summarized the results of research on items of personal adornment excavated from the presumed settlement of Spanish colonists at the San Luis de Talimali mission site in Tallahassee, Florida (Mitchem 1991c). This mission and town site was the late 17th-century Franciscan capital of the Apalachee Province in northern Florida. Officially established in 1656, the site was occupied until 1704, when it was abandoned due to the threat of imminent attack by British soldiers and their Creek allies (Boyd, Smith, and Griffin 1951:12-19; Hann 1988:264).

San Luis is of special interest to archaeologists because several ethnic groups resided at the site and historical research has yielded many documents pertaining to religious and secular activities there. The State of Florida, with substantial support from the National Endowment for the Humanities, has maintained an ongoing program of archaeological and historical research at the site. Previous excavations have taken place in the fort area, the mission church complex, the Apalachee council house, and the Spanish settlement (McEwan 1991a, 1991b).

In 1992, excavations were conducted in the area presumed to be the Apalachee village. Although analysis of the recovered beads and pendants is not complete, some preliminary observations can be made. One surprise was that the total number of beads recovered was relatively small–only a few hundred. It should be noted, however, that additional beads will be recovered from flotation samples yet to be sorted. Of the personal adornment items examined so far, six pendants and one bead are of cut quartz crystal. I had previously suggested (Mitchem 1991b:312) that jet and crystal items were probably reserved for Spanish use at San Luis, but this hypothesis was shown to be incorrect, at least in terms of crystal.

Of the glass beads from the Apalachee village, quite a few drawn, opaque turquoise-blue beads (called Ichtucknee Plain beads in Florida and Early Blue in northeastern North America) were present, while only three cornaline d'Aleppo beads were recovered. These numbers appear to support hypotheses I had proposed about bead use based on earlier research at San Luis (Mitchem 1991b:312), namely that cornaline d'Aleppo beads appear to be restricted to use by Spaniards while Ichtucknee Plain beads are common in most parts of the site.

A single Punta Rassa Teardrop Pendant was the sole glass pendant recovered in the 1992 excavations. These pendants would be expected to be found in all parts of the site (Mitchem 1991b:312). Two colorless blown-glass beads were found in the Apalachee village, one of which appeared to be coated with red ocher on the interior. Few of these beads have been recovered at San Luis, possibly due to their extreme fragility. The five fragments previously identified from the site were recovered in a large refuse pit (Feature 6) in the presumed Spanish village (Mitchem 1991a).

The Apalachee village excavations yielded no beads of complex construction (multilayered beads with surface decoration such as stripes), and only a single bead of compound construction (blue glass over a colorless core). In contrast, excavations in the Spanish village yielded the greatest number of beads of complex and compound construction (Mitchem 1991a, 1991b:312, 1991c:9).

Most of the remaining beads from the Apalachee village were necklace beads of various shades of blue, with a few purple, yellow, and colorless specimens. The number of seed beads was smaller than would be expected, but the count will increase as processing of flotation samples continues. With the exception of the two blown specimens, all of the beads examined to date are of drawn construction.

Archaeological research at San Luis has demonstrated that patterns of artifact distribution are present at the site and appear to be correlated with the different ethnic groups which occupied various parts of the settlement. Personal adornment items seem to be especially sensitive indicators of these ethnic differences. Ongoing excavations in various parts of the site are continually enlarging the data base, and a typology of beads and pendants from southeastern Franciscan missions is being developed. Continuing work at San Luis should yield data that will allow broader issues to be addressed, including questions concerning gender, status, and symbolism (Mitchem 1991b:312-313). The answers to these questions should provide us with a much clearer picture of the belief systems, interaction patterns, and acculturative processes operating at the missions of La Florida.

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64. INTERPRETATIONS BASED ON PERSONAL ADORNMENT ITEMS FROM THE MISSION SAN LUIS DE TALIMALI CEMETERY, FLORIDA, by Jeffrey M. Mitchem (1995, 26:8-13)

A continuing program of archaeological research and public interpretation has been carried out since the early 1980s at San Luis Archaeological and Historic Site in Tallahassee, Florida. Archaeological research at the site, which is owned by the State of Florida, is under the direction of Bonnie G. McEwan. San Luis de Talimali was the Franciscan capital of the Apalachee Province in Florida from 1656, until its abandonment and destruction in 1704. It served as the religious, military, and administrative headquarters of northwestern Florida. San Luis included a fort, a Spanish residential area, a mission church complex (Fig. 1), and an aboriginal council house. This central part of the site was surrounded by a dispersed village of Christianized Apalachee Indians (McEwan 1991, 1993).

Periodic testing has been conducted in the church location for several years. With the support of the National

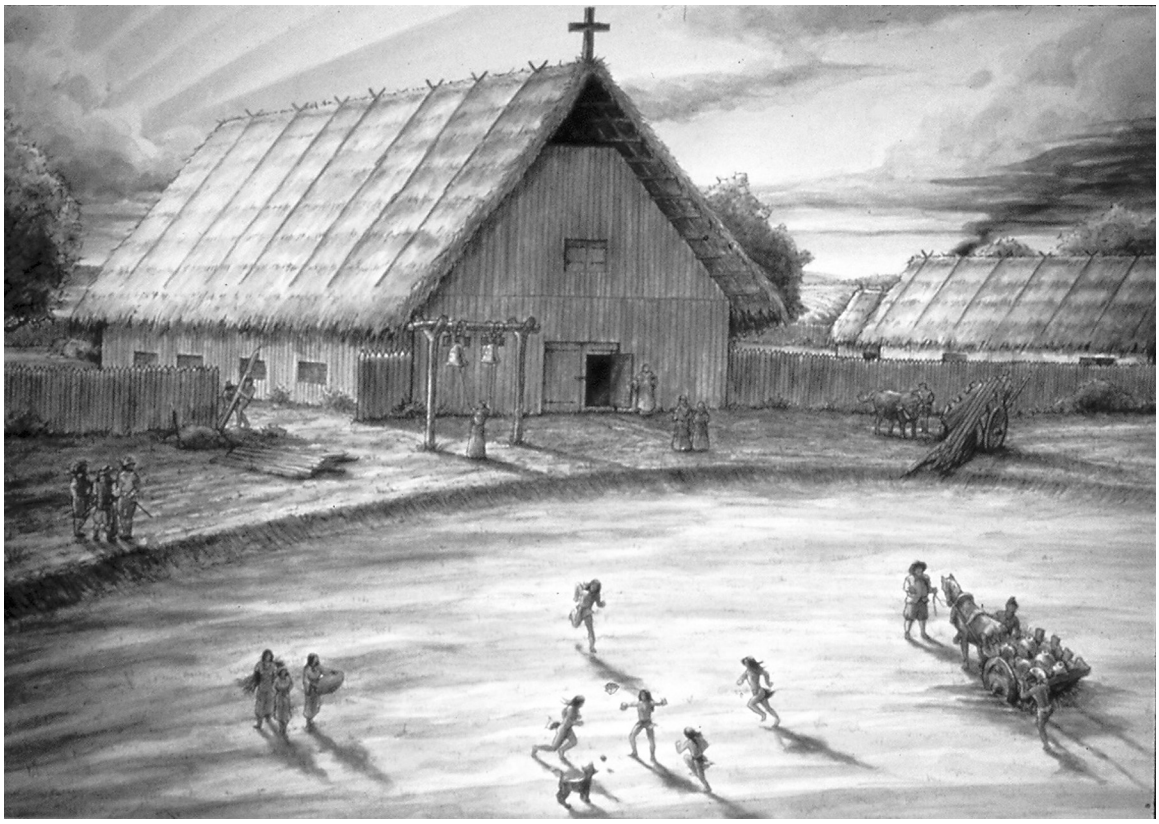

Figure 1. Artist's rendition of the church at San Luis de Talimali, with part of the plaza in the foreground and the *convento*, or friary, in the background. From an original watercolor by John LoCastro (courtesy of the Florida Division of Historical Resources).

Endowment for the Humanities (Grant #RK-20111), extensive excavations are currently in progress, and will continue through 1996. The work has revealed that human burials were interred beneath the floor of the church, with none being found outside as yet. Based on the density of interments encountered thus far, it is estimated that 700 to 900 individuals may be buried within the church. All of the burials have been Christianized Native Americans and were buried in Christian fashion: hands folded or clasped on the chest, wrapped in shrouds or placed in coffins, and interred in burial pits with heads in an easterly direction and bodies extended.

Personal adornment items are the most common artifacts, primarily glass beads and glass or lapidary pendants. Nearly 2,000 of these artifacts have been analyzed so far. Although excavation and analyses are not yet complete, some preliminary observations can be made based on what has been found to date.

The most numerous and elaborate artifacts are associated with burials located near the altar. This pattern has been noted at contemporaneous Franciscan missions, most notably Santa Catalina de Guale in Georgia (Larsen 1990:22; Thomas 1990:384). It has been suggested that social position and/or political authority influenced where a person was buried in the church (Thomas 1988, 1990:384).

A good example of an elaborate artifact found near the altar is a cut crystal cross 7 mm long (Fig. 2). Made from a single piece of quartz, the cross shows little evidence of wear. It was examined by Dr. Charles Tumosa of the Smithsonian Institution Conservation Analytical Laboratory, and his observations suggest that the cross was probably made by a native artisan with access to a metal file (Bonnie McEwan 1995: pers. comm.).

The nine burials in wooden coffins excavated so far were all at the altar end of the church. A single child buried near the altar was accompanied by 659 drawn and wound glass beads; 23 wound, gilded-glass beads with applied glass threads; at least nine glass Punta Rassa Teardrop Pendants (Fig. 3); two San Luis Pendants; a quartzite fragment; three *Busycon* columella beads; and a fragmented brass cross (Mitchem 1992:242-248). In contrast to these elaborate interments, burials at the opposite end of the church (near

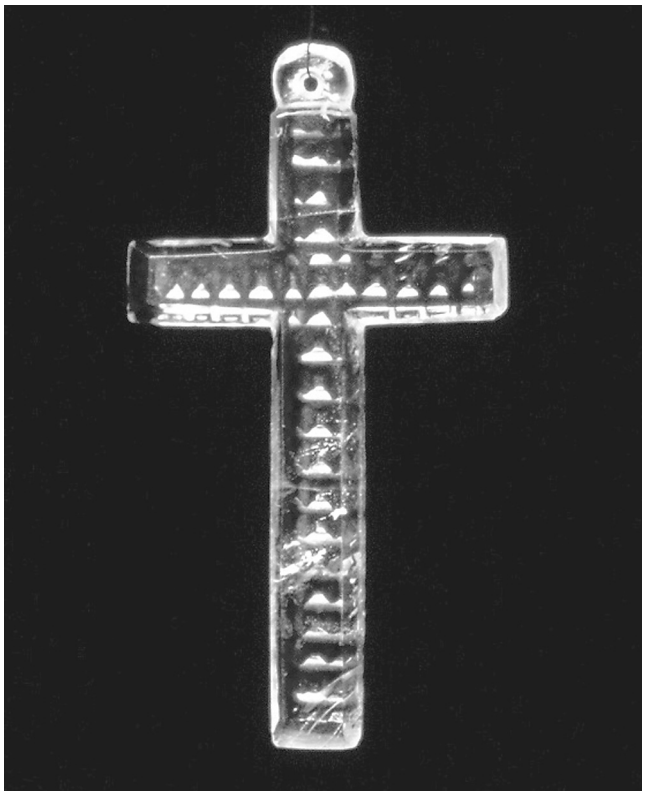

Figure 2. The cut crystal cross from the San Luis cemetery (photo: Charles B. Poe; courtesy of the Florida Division of Historical Resources).

the entrance) were simply placed in burial pits, possibly wrapped in shrouds, but with few accompanying artifacts.

In previous analyses of San Luis adornment objects, it was assumed that small seed beads were primarily used as embroidery beads, sewn to clothing or other items. But the cemetery excavations have revealed that in many cases, seed beads were incorporated into necklaces. Four burials excavated in 1993 had partial strings of beads accompanying them. Two of these appear to be parts of rosaries, based on the sequencing of beads. One had 40 beads (collected in sequence by the excavators), plus an additional 24 beads from the immediate vicinity. Many of the specimens were seed beads, and there were apparently parts of four decades with colorless beads used as spacers (Mitchem 1994).

The second possible rosary fragment consisted of 22 beads, all but one of which were drawn beads of opaque turquoise blue glass. Parts of two decades were represented, composed of the opaque turquoise blue beads commonly called Ichtucknee Plain in Florida. Striped versions of these same beads (possibly paired) functioned as spacers (Mitchem 1994).

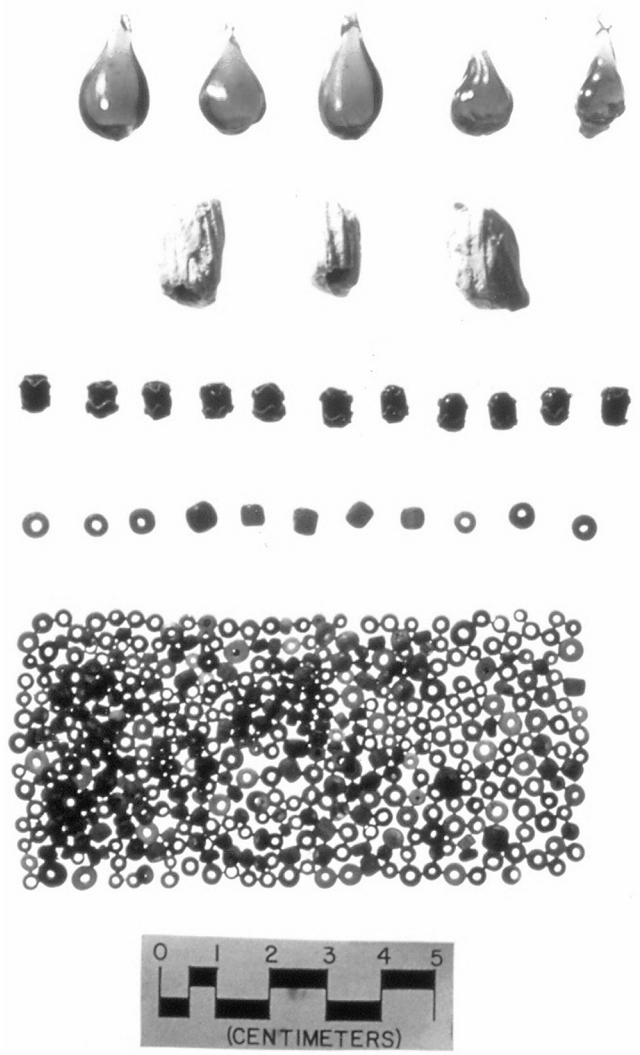

Figure 3. Some of the beads and pendants associated with the burial of a child in the San Luis cemetery. Top row: Punta Rassa Teardrop Pendants. Second row: three shell beads made from *Busycon* columellae. Third row: wound, gilded, burgundy-colored glass beads with applied glass threads. Fourth row: blue glass "pony" beads. Bottom: miscellaneous glass beads of various colors (courtesy of the Florida Division of Historical Resources).

Although there are many examples of beads and pendants being used for Christian religious purposes, many of the personal adornment items buried with people in the San Luis cemetery may merely have been personal possessions with no religious significance–at least not Christian significance. For instance, five jet *higa* pendants (Fig. 4) were recovered from the cemetery fill. These are shaped like a clenched fist with the thumb stuck between the index and middle finger, and were popular among colonial Spaniards who wore them as amulets to protect against the evil eye (Mitchem 1993:407). It is unclear whether the

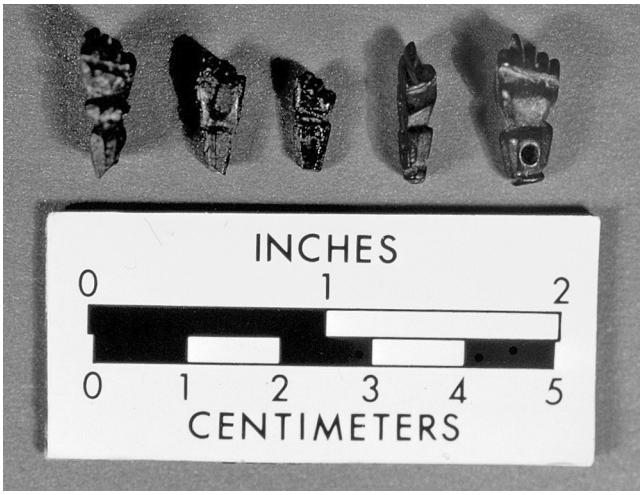

Figure 4. Five jet *higa* pendants from the cemetery at San Luis (photo by author).

Apalachee people at San Luis assigned the same meaning to *higas* as the Spaniards.

A wide variety of beads and pendants have come from the cemetery excavations. Compound beads like chevrons are rare in the assemblage, with most specimens being single-color drawn beads. Two varieties of drawn and molded glass pendants (Punta Rassa Teardrop and San Luis Pendants) have come from the deposits, as well as a few metal objects such as a perforated silver coin.

When the 1995 field season is completed, a detailed analysis of all personal adornment items from the San Luis cemetery will take place with a close examination of mortuary patterning and specific burial associations. This is made difficult by the disturbance of some burials by later interments, but correlating distribution with age and sex categories may reveal patterns that can be compared with data from other Franciscan mission sites. The ultimate aim of this research is to learn more about the impact of Christianity on burial practices and native belief systems at San Luis and contemporaneous missions.

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65. LAND DAYAK BEADS, by Heidi Munan (1991, 19:3-11)

These observations were made during a *Gawai Katang*, the first round of a headhunting festival observed by the Bidayuh Jagoi of southwest Sarawak. Beads were worn by most of the officiating *tuai gawai* (TG = male elders)(cover; Fig. 1) and *dayung baris* (DB = female elders)[1] in attendance. None of the lesser participants or villagers wore beads.

Men's Beads

TG Jiop anak Jami wears a necklace consisting of about one-third beads, one-third boar tusks and bear claws, and one-third hawk bells (Pl. IIC). He wears this string

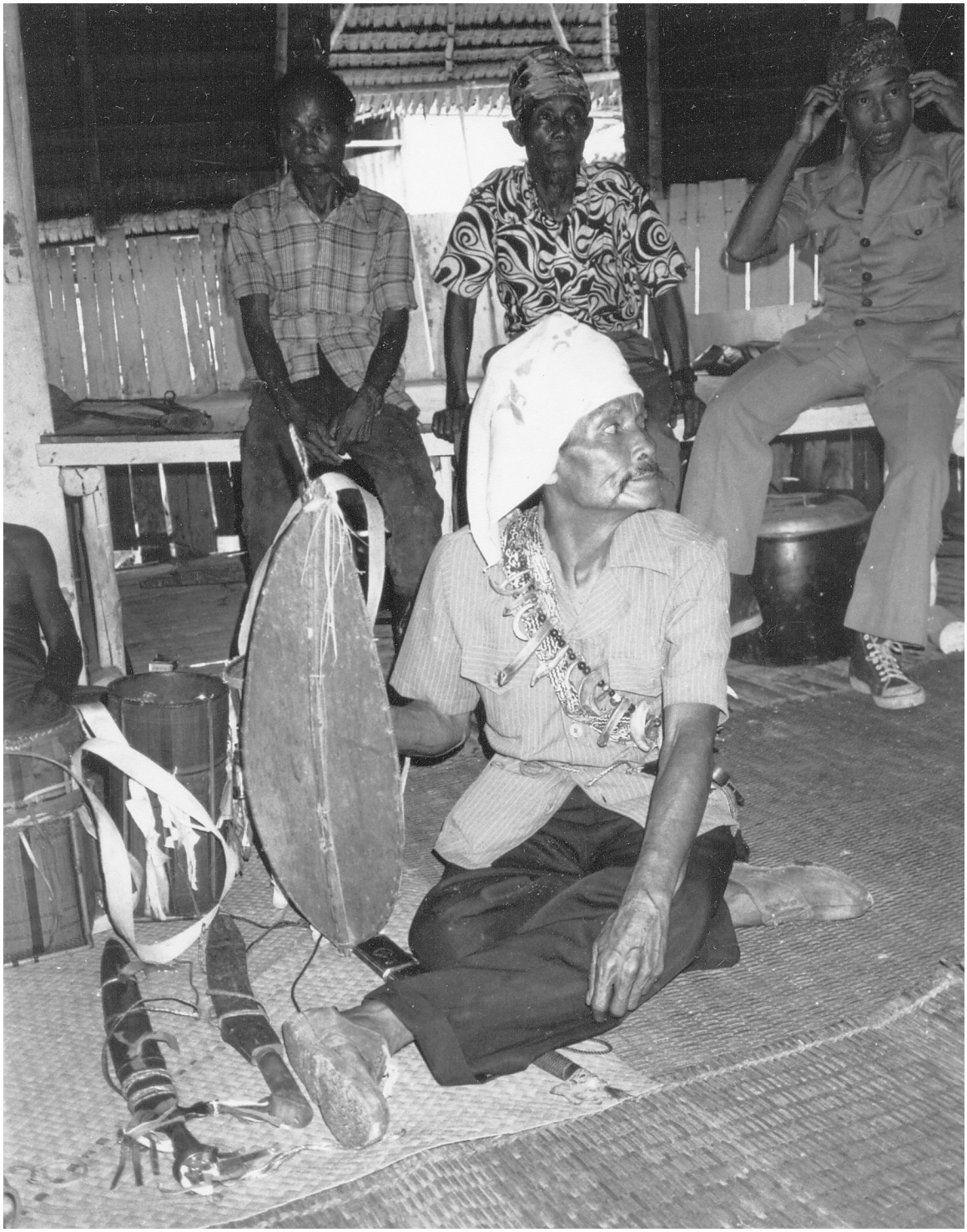

Figure 1. *Tuai gawai* Jongen anak Abun, the chief officiant at the *Gawai Katang*, wearing his necklace (photo: H. Munan).

bandolier-style over one shoulder, over a cloth sash. The beads are blue or green, transparent to translucent, roughly spherical specimens 8-10 mm in diameter; a very few are blue-black tubular ("barrel-shaped"). The spherical beads

could be bought in the Kuching bazaar until about ten to fifteen years ago, and were used to make a protective device consisting of two beads and a small hawk bell tied to a person's wrist with a strip of unbleached calico or a length of string to ward off various kinds of danger and bad luck. The spherical beads are called *likis*;[2] the tubular ones *tolam*.[3] The latter are considered older.

TG Jiop has no clear idea about the origin of these beads except that they are "very old" and come from the ancestors. Beads can occasionally be bought from friends or relatives, but unless they are of impeccable pedigree they cannot be used for magic. TG Jiop does not think beads can/should be worn simply for adornment.

The boar tusks and bear claws on this string of beads increase its power. As TG Jiop got his whole string from an elder relative, none of the trophies are of his own hunting. At the time of this festival, he carried one tusk, ready-drilled, in his pocket; he indicated that he might add it to his string "later, when permission has been given" but he did not elaborate.

Brass bells are an essential component of a necklace. Called *setegah*, the larger ones are considered more venerable, and they have the function of preserving health. The smaller bells, called *grunong*, are cheaper and not quite so powerful.[4]

Many necklaces contain pieces of iron, bone, wood, Chinese medicine jarlets, and similar items. Each of these was added after "permission was given," usually in a dream or trance, or by a powerful omen.

Men and women wear their own beads respectively; TG Jiop wouldn't advise a woman to wear or even touch his string. If she was a *dayung baris* she might get away with it, but the assembled *tuai gawai* did not think it at all probable that one would try. Women, after all, have their own beads which no man would touch.

Beads can be sold, shared, or bequeathed, provided they remain with a person qualified to wear and use them. A lay person would not want or dare to wear beads.

Beads may be re-strung if the need arises; TG Jiop's are strung on nylon fishing line which is considered stronger than the plant fiber of old.

Beads cannot of themselves do magic, but they strengthen the spirit of the wearer and open his eyes to the second sight. Many Bidayuh (and some other Borneo natives) sell, give away, or destroy their beads if they convert to a new religion,[5] usually at the urging of their new spiritual mentors who distrust anything connected with "heathen practices."

There are times when spirits have to be appeased with gifts of beads. Beads are getting scarce nowadays; TG Jiop has heard that occasionally a greedy ghost can be fooled by substitutes. Maize grains may be offered instead of an opaque yellow bead which is getting rare.[6]

Women's Beads

Sepan anak Jamin has been a *dayung baris* since her middle age. The widow recalls that she was often sick, and friends told her that the spirits were calling her. She risked serious illness or death if she disobeyed their prompting.

DB Sepan bought her beads from a neighboring village. She has two different kinds. The first is a string of blue beads, animal teeth, claws, and brass bells, rather like the men's but of lighter materials, which she wears over one shoulder. Not all *dayung baris* have this kind. The second string of beads is standard for a Jagoi *dayung baris*: a multi-strand necklace artistically fashioned of regular blocks of red, black, and white beads. This necklace, called the *pangeh* (Fig. 2; Pl. IID), was bought from another *dayung baris* who had one to spare. Its front consists of rows of coiled brass wire, while the sides are composed of blocks of spherical red, black, and white (in some cases yellow) beads separated by bone, coiled wire, or wood spacers.

The back of the *pangeh* protects the wearer's neck with the most powerful beads: old blue examples including cherry-sized coiled ones, modern ones including plastic and rosary beads, bear claws, small tusks, and rhinoceros beetle pincers.

Several sets of two spherical green or blue beads and a hawk bell each are attached at irregular intervals to the sides of the *pangeh*. These were given to the *dayung baris* when she took part in healing ceremonies. The set was attached to her wrist by the patient's family before the rite started to strengthen her soul for the task ahead. After the cure has been effected, she keeps the beads as part of her fee. Many of these bells mark the successful healer.

DB Sepan agrees with TG Jiop that men's and women's beads are always kept separate. If a man, or any unauthorised person, were to wear her beads, he would be punished by "a slap in the face from the devil."

DB Sepan wears a belt made of five strands of shell discs, called *palus*. These are more for ornament and for enhancing her status than for practical purposes. A *dayung baris* could safely fulfill her function without a *palus* belt, but not without at least some blue beads and brass bells about her person. "You can't see the spirits if you are not

Figure 2. The author's niece wearing a *pangeh*. This is a posed photo; she would neither wear the cotton cap nor the beads "for real."

wearing beads!" DB Sepan explains, "and how can you talk to them if you don't see them?"

Conversely, if a person saw spirits inadvertently, and was not wearing beads, she might find the experience too overwhelming. Beads can strengthen her soul so she can stand her ground and carry out her function as mediatrix between the human and the spirit world successfully.

Endnotes

1. The *tuai gawai* is an official who knows the necessary procedures, chants, etc., for the festivals; he may also be a *dukun* (shamanistic healer). The *dayung baris* is a necessary accessory to the healing rites; she does not usually undertake them on her own.

2. The *likis* beads, or blue, green, amber, or clear glass, are extremely hard to date. Large numbers of them must have been available throughout the Victorian age and well into this century. *See* P. Francis, Jr., on "Peking Glass."

3. For a fuller discussion of blue beads, *see* Munan (1981).

4. This opinion seems to be confined to Bidayuh (Land Dayak) groups (Munan 1981).

5. Mainly Islam and Christianity; or the latter, some groups are more tolerant than others of heathen vestiges.

6. The yellow "doughnut" bead is common throughout the Insulindies (Lamb 1961). It was kiln-baked of glass powder made from imported beads in Tanjong Selor on the East Kalimantan coast, specially for the Central Borneo trade, as recently as the 1930s (Tillema 1938).

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66. BEADS LINK SAN SALVADOR TO A COLUMBUS TRIP, by *The New York Times* (1983, 3:7-8)

NASSAU (Reuters) - Beads and other ancient European-made items found by American archaeologists could be the long-awaited proof that Columbus made his 1492 landing in the New World on the Bahamian island of San Salvador. In a recent report to the Bahamian Government, the archaeologists said that last July they found four green and yellow glass beads, two brass buckles, metal spikes, and a fragment of Spanish crockery mixed with native Arawak Indian pottery and shell beads. Although Indian pottery dating to the ninth century has been dug up along San Salvador's coastline, no European artifacts of the Columbus period were previously

found. The artifacts linked to Columbus were found eight inches beneath the surface, said Charles Hoffman of Northern Arizona University, who helped supervise the excavation. "I knew that if this was where Columbus landed we should unearth some evidence of Spanish contact," Mr. Hoffman said in his report. "Needless to say, the entire crew is elated with the finds." Marvin Smith, an archaeologist of the University of Florida, said he dated the beads from 1490 to 1560. "They are the type of beads Columbus was using, according to his journals," Mr. Smith said in an interview. "It looks very possible that they were his." Columbus's log relates that his crewmen traded beads, buckles, and rings with Indians they met on the island the Indians called "Guanahani," believed to be San Salvador.... (*The New York Times*, September 15, 1983, p. A12)

67. SUMMARY OF AN ARCHAEOLOGICAL RESEARCH MISSION TO EASTERN SENEGAL, by Marie-José Opper (1990, 16:13-15)

A grant from The Bead Society of Los Angeles allowed me to travel to extreme eastern Senegal in February, 1990, in order to co-organize and participate in an archaeological research project in collaboration with the Prehistory and Protohistory Department of the Institut Fondamental d'Afrique Noire (IFAN) headquartered in Dakar, the capital of Senegal.

Several sites were investigated during the 20-day mission. Dating from the neolithic period to the 20th century, they yielded a number of beads, adornments, and fetishes. For the most part, these sites are located in a region that is sparsely inhabited and far from "civilization." The work was often accomplished under very harsh conditions due to the lack of roads or tracks, unavailability of potable water, extremely high daytime temperatures, and the presence of potentially dangerous animals such as "dog-headed" baboons and lions. Confirmed reports of lions attacking cow herds in the area forced the investigators to abandon their outdoor camp on the banks of the Falémé River.

One of the sites yielded a particularly interesting number of artifacts including 23 beads made of bone, shell, carnelian, stone, copper, ceramic, and glass; spindle whorls; a fishnet weight; two complete ceramic bracelets and pieces of others; two zoomorphic ceramic statuettes; a ceramic statuette with a phallic symbol at one extremity and the head of a female at the other (apparently a fertility fetish); and several polished tools including a millstone, pestles, and hand axes. Numerous potsherds were found on the surface. Measuring approximately one kilometer by 400 meters, the site was utilized during the Neolithic period (when it was an important stone-working center) and the subsequent Iron Age.

The beads, along with one bone pendant, were discovered at opposite ends of the site. At locus no. 1, situated at the summit of a small butte, the beads, the bone pendant, and several spindle whorls were found within a 100 m diameter, either on the surface or just below it (not deeper than 1 cm). The protohistoric layer did not go any deeper than 5 cm. Below this, the Neolothic layer did not exceed 10 cm. Mixed material from the different layers was found in the gullies along the butte's slope.

Similarly, at locus no. 2, the Iron-Age layer did not exceed 5 cm in depth and the beads were discovered either on the surface or just below it. A Neolithic layer was not discovered, despite the presence of a polished hematite hand axe and a solitary carnelian bead of Neolithic workmanship. Also discovered at locus no. 2 were the three fetishes, the earthenware bracelets, a fragmentary bronze bead, as well as a splendid polished millstone. The bracelets, the bronze fragment, and one cylindrical blue-glass bead were found near the remains of a stone foundation which was thoroughly investigated by the mission team. Test trenches dug to a depth of 5 cm proved to be sterile. On the surface, however, abundant pottery sherds were found, examples of which are currently being studied at the IFAN laboratories in Dakar.

Unfortunately, the lack of meaningful archaeological layers, frequent brush fires, and the presence of wild animals at the site did not allow for the establishment of precise dating procedures in the field. However, two carnelian beads were found which, unlike the one of Neolithic manufacture, resemble similar beads found in Senegalese tumuli dating to the 11th century.

Six of the eight glass beads found at the site are drawn cylinders displaying a cobalt blue color at first glance. When held up to the light, however, several of these beads appear to be greenish yellow, like the dichroic beads discussed by Davison, Giauque, and Clark (Two Chemical Groups of Dichroic Glass Beads from West Africa, 1971, *Man*, vol. 6, no. 4). At IFAN, similar beads are recorded as having been found at the ruins of the medieval town of Koumbi-Saleh, believed to be the capital of the ancient Ghana Empire, as well as at the Djenne and Gao sites in what is now Mali. A fragment of one of the glass beads found in Senegal will be analyzed to see if it can be attributed to the Medieval period of Arab trade in the area.

The two other glass beads represent different types altogether. One is a small annular form emerald green in color. The other is pyramidal and opaque black. The latter bead was apparently decorated with a single raised spot of opaque white on one side. The two extremities of the

perforation have very different dimensions. Beads of this type have been found at several Medieval sites in West Africa. No glass beads of European manufacture were found at the Senegal site, nor were any discovered within a 5-km radius of the site. However, another drawn cylindrical blue bead similar to those found at locus no. 1 was discovered some 15 km away along with pestles, polished stones, and numerous potsherds.

These sites are located well within the Galam-Bambouk auriferous region. The gold found in the area was the main contributor to the wealth and importance of the empire that existed during the Middle Ages. The presence of the three fetishes indicates the probability of animistic practices in a region that was yet to experience the period of Islamization that took place during the 11th century, after the annihilation of the Ghana Empire by the Almoravides.

The recovered ancient beads were undoubtedly traded for the gold that was (and still is) found in the Falémé River, close to the site. Although the source of these beads is not certain, it is probable that the specimens entered eastern Senegal via the caravan routes that led south from Morocco.

68. PALAU: THE GLASS PALACE, by Marie-José Opper (1991, 19:11-13)

Palau de Vidre is the Catalan name of a small village in southern France where the foothills of the Pyrenees meet the Mediterranean Sea. The village has maintained its original name to this day, some 330 years after the region became a part of France. Before that, the region of Catalonia belonged to the kingdom of Spain. Palau de Vidre translates as "Glass Palace." However, despite documentation showing that numerous and well-known glass factories existed in the area during the Middle Ages, no solid archaeological evidence has yet been discovered.

Glass slag found in stratified archaeological layers attests to the existence of glass factories during the Roman occupation (200 B.C. to A.D. 300), and, in 1983, the local archaeologist, Annie Pezin, found 11 monochrome green and reddish-brown glass beads in the tomb of a small child dating to the third century. Located at chest level, the beads were either part of a necklace or a decorated piece of clothing. The form of most of the beads was irregular-annular (Fig. 1),

Figure 1. The various forms of glass beads from Palau de Vidre, France; approximately life size (black = black, stippled = green, and hatched = red).

with an average diameter of 5 mm and an average thickness of 1 mm. Also found were two green faceted stone beads, one round black stone bead, and a silver ring.

Numerous other glass beads dating from different periods have also been discovered locally at Iberian, Phoenician, and Visigoth sites. Beads have also been found in the Medieval tombs of travelers going to and from Santiago de Compostela, a pilgrimage center in northwest Spain.

Palau de Vidre is situated along the banks of the Tech River, an ideal location for the establishment of glassmaking activities. The Tech furnishes an excellent-quality sand for this purpose, and the plants that grow in the briny marsh area are an abundant and perfect source of material for the fabrication of soda, an important ingredient in the glassmaking process. The neighboring forests provided wood to fuel the factory ovens. Palau was also situated close to major trade routes, as well as to the port at nearby Collioure, from which all the maritime commerce of northern Catalonia arrived and departed. The naval flotilla based at Collioure was both powerful and well known. Important commercial exchanges took place with North African Mediterranean countries including Egypt and Syria, which were the preferred markets for Catalan traders. In return for their merchandise, these traders obtained silk, gold, leather, spices, and slaves. Alice Frothingham (1963) also informs us that "Catalan sea captains trading in the Eastern Mediterranean brought back rare glasses from Alexandria, Beirut and Damascus."

The kings of Aragon took up residence in Collioure and, in 1396, one of the queens accorded the inhabitants the right to receive pirates and corsairs in the port for the purpose of trade. During this time, southern France was also an exporter of glass objects. One of the first indications of this trade concerns the export of a case of glass to Algeria in 1302 (Foy 1989:378). Catalan glass factories were able to perfectly imitate glass fabricated in Damascus and Venice. By the 15th century, Catalonia had become a major glass-producing center. In addition to "tableware," the factories made "beads for rosaries, necklaces and trimming for ladies' gowns" (Frothingham 1963:23). These objects were sold locally by traders of general merchandise and notions who worked at markets or were traveling salesmen.

From its renowned past, Palau has conserved its original name. Today, one of the tourist attractions in the village is a collection of necklaces composed of old beads created hy a local designer and sold in the campground boutique. The necklaces are made using glass beads from mortuary wreaths that have been discarded because they are too damaged to remain on tombs in the village cemetery. This type of beaded wreath was very popular in France from the end of the 19th century to just before the start of World War

II. The motifs were floral designs fabricated with small glass beads from Venice which displayed a wide variety of color nuances ranging from violet and rose to white.

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69. NOTES ON A RARE MELON-SHAPED CHEVRON BEAD, by Marie-José Opper (1997, 30:10-11)

Among a group of very small, old chevron beads acquired at the market in Chinguetti in northeastern Mauritania, and found together at a nearby ancient site, is a rare seven-layered melon-shaped specimen (Fig. 1). John and Ruth Picard (1993:40. no. 265) mention another similar bead, declaring it to be the single unique example so far encountered. The other chevron beads in the group are the same small size and also have seven layers. One is square, and another has a black inner and outer layer, showing similarities to bead number 95 in Smith and Good (1982:43). Three other beads correspond to their no. 79. In addition, there is an eight-layered chevron, with numerous imperfections. These types of small, ancient chevrons are highly prized in Mauritania, as well as northern Morocco.

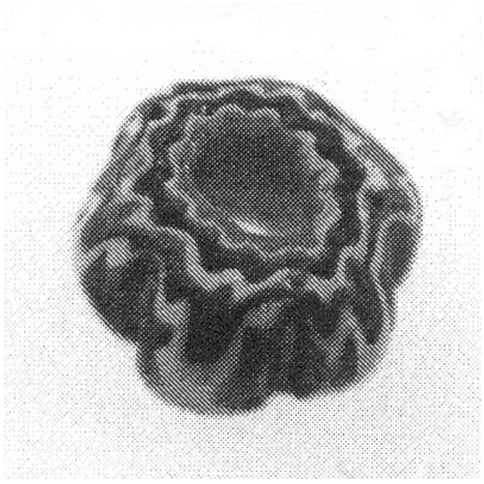

Figure 1. The seven-layered chevron bead from Chinguetti.

Accompanying the chevron beads are three, short, three-layered, squared tubes with faceted corners. These beads, also described by Smith and Good (l982:42. no. 55), have a colorless core, a thin white middle layer, and an ultramarine exterior. There is also a similar bead, but without the facets.

If these beads were exported to the Americas by 16th-century Spanish explorers, how did they come to be found in Mauritania as well? Chinguetti is actually the site of an ancient city that, since the Middle Ages, served as a major relay point for caravans that had just traversed over 1,000 km of harsh desert. This major trans-Saharan route, located just 4 km from the town, linked southern Morocco with the Adrar, a mountainous region located in what is now Algeria and Niger. It is most likely, therefore, that the chevron and tubular beads acquired in Chinguetti were transported there by caravan from Morocco sometime in the 16th century.

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70. RESPONSE TO BUSCH, by Marie-José Opper (1997, 31:1-12)

First, thank you to Mr. Busch for pointing out the error published in "Notes on a Rare Melon-Shaped Chevron Bead" which concerns the location of *l'Adrar des Iforas*, effectively straddling Algeria and Mali. This error of inattention by the author is compounded by the fact that she is native to the region, having roamed the Sahara all the way to Mauritania. Concerning the role of the caravan route from Sidjilmassa to Ghana via *l'Adrar de Mauritanie*, one has merely to consult Mauny (1961:428-434, Figs. 74-76) to confirm its importance.

The extent to which these beads are "highly prized" (please note the word used is prized, not priced), is revealed in such sources as Delarozière (1985:69, 72, 126-127) and Fisher (1987:219), as well as through personal observation. Regarding rarity, so far, only six melon-shaped chevron beads have been documented among the thousands of chevron beads that have been studied to date by various

individuals. Thus, they are certainly not "common" beads (*see* the definition of the word "rare" in any dictionary). The sixth bead, not mentioned in the original article, is described in Smith and Good (1982:40, type VC2c, photo no. 127).

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71. CZECH MOLD-PRESSED BEADS: REQUEST FOR INFORMATION, by Marie-José Opper and Howard Opper (1992, 21:3-4)

The mold-pressed beads in Fig. 1 are from Czechoslovakia, destined for export to Islamic countries. For the most part, they date from the 1930s-1950s, although some are more recent, such as the first two beads in the second row of the illustration. They are either transparent or opaque, with diverse colors depending on the particular models.

The bead with the airplane motif is most unusual, and is actually part of the bead collection of the Institut Fondamental de l'Afrique Noire (IFAN) in Dakar, Senegal.

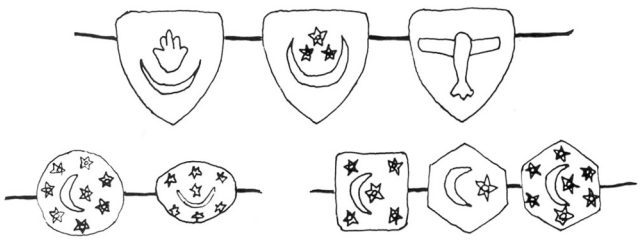

Figure 1. Czech mold-pressed glass beads with airplane and crescent-moon/star motifs (actual size).

It was purchased in 1949 in Senegal, and, to our knowledge, is the only example of this bead to date. The glass is colorless and transparent. Conceivably, this bead may well have been made for export only to Senegal, in honor of Jean Mermoz, a French aviator who was the first to succeed in flying from France to South America in 1930. Mermoz ultimately disappeared somewhere over the Atlantic Ocean near Dakar (Senegal) aboard the seaplane *Southern Cross* in 1936.

We are looking for the following information: Other models of Czech beads containing crescent-moon and star motifs; other models of triangular Czech beads with different motifs; and any other beads with different origins and/or designs containing crescent-moon and star motifs (certain beads of this genre have been found at North American sites dating to the 17th century, as well as in old necklaces with magical properties from Brittany in France).

72. JEWELRY FROM MOOSE DROPPINGS, by *The Ottawa Citizen* (1987, 11:14-15)

Glenburn, Maine (UPI) - An insurance salesman who moonlights stringing necklaces from moose droppings says he is flooded with orders for the unusual jewelry, one of them from a bride who wants them as gifts for her bridesmaids. "They don't look anything like what they really are," said David Bowley, who gathers the moose manure, dries the droppings in an oven, then soaks them in a hardener, lacquers them, and strings the brown nuggets together with colored beads. "I just started showing them to different people, and the ladies and gentlemen alike went bananas over these things," he said Thursday.

An avid hunter and outdoorsman, Bowley said he has seen moose droppings in the woods for years. "I always knew you could make jewelry out of these things," he said. The jewelry has no odor. He made a necklace and matching earrings two months ago for his wife, Ann, who brought them to work. "They came out so nice. Everyone she showed it to wanted a set," Bowley said. "They're quite attractive, really they are."

Bowley now has 200 orders for his Maine Moose Dropping Necklace and Earring sets, for which he charges $22.50 (U.S.) a set. Last weekend, Bowley filled a sack with 40 pounds of moose droppings from a moose yard near his camp in Brownville Junction. He has them drying all over his garage in Glenburn. If a batch of droppings needs a little help drying, Bowley puts them in the oven. Until recently, this procedure was unknown to his wife. "She sprayed the whole oven with oven cleaner," he said. [Extracted from *The Ottawa Citizen*, August 17, 1987, Ottawa, Ontario]

73. WAMPUM PRODUCTION IN NEW NETHERLAND AND COLONIAL NEW YORK, by Elizabeth Peña (1990, 17:8-14)

It is well known that shell beads and pendants were valuable items in proto-historic North America. In the 17th-century, tubular clam or conch-shell beads known as *wampum* or *sewan* served as a medium of exchange between European colonists and Native Americans. Archaeological and ethnohistorical studies have shown that, in the 17th century, coastal Algonquian groups made wampum to trade to Europeans for firearms and other items. The Europeans used these wampum beads to obtain pelts from Native American hunters. Because of wampum's high value to many Native American groups, wampum strings and belts became important as a means of treaty negotiation and ratification. The exchange of wampum governed many transactions between Europeans and Native Americans. Wampum was a "primitive valuable" to Native Americans; that is, it circulated in non-commercial, ritual payments. In trade between Europeans and Native Americans, wampum was "primitive money"–it maintained non-commercial uses while also being used in the marketplace.

The importance of wampum within the European colonial community is less well known. In the 17th century, a severe specie shortage provided the impetus for the Dutch colonists of Beverwyck, or Albany, to use wampum beads as cash (sometimes referred to as "cash money" or "all purpose money") in local transactions. In this case, wampum fulfilled the traditional criteria of money: it served as a medium of exchange, it had a common measure of value, it was a means of accumulating wealth, and a standard of deferred payment. Wampum was certified legal tender, and the colonial court records are filled with references to wampum exchange between colonists, such as the man who, in 1655, avoided military service in the Dutch West India Company by paying another man "the sum of 70 guilders in sewan and a pair of shoes." It is important to note that, unlike New England, the colonists in New Netherland were neither farmers nor pilgrims, but urban merchants and traders. They had long been accustomed to cash transactions.

New Netherland did receive some coins, mainly Spanish pieces-of-eight, from the Dutch properties in the West Indies, but these coins had often been debased or clipped. Despite the fact that tampering with coins was a capital offense in the Netherlands, such behavior was not uncommon. New Netherland's coin problems were compounded by the dominance of the Boston merchants, who demanded coin for trade. The Dutch hoped to discover the source of precious metals in Curaçao, but had no success. By the mid-17th century, New Netherlanders had become accustomed to using a wide variety of monies. For example, an inventory from that period lists shillings, pieces-of-eight and quarter pieces-of-eight, ducatoons, rixdollars and half rixdollars, silver coin, specie, and "one little sack with two Indian bags containing fl. 275 in wampum."

Around this time, wampum lost its legal status in New England, and poor-quality beads were dumped on the New York market. These beads were roughly made and often unpierced. Wampum remained legal tender in New York until the beginning of the 18th century. At this point, coinage seems to have been more plentiful, and the use of wampum as cash seems to have ceased. The market for wampum was, however, inexhaustible, as traders continually expanded the frontier. Wampum remained important in the fur trade and treaty negotiation and ratification.

In 1986, archaeological evidence of colonial wampum production was unearthed in Albany, New York, by Hartgen Archeological Associates at a site known as the KeyCorp site, named for the Key Bank tower that stands on the site today. Albany, the capital of New York state, is situated on the west bank of the Hudson River, some 150 miles north of New York City. Dutch traders and merchants settled here shortly after Henry Hudson's visit in 1609, and in 1624, the Dutch West India company established Fort Orange at this location. The town of Beverwyck grew up just north of the fort, and was officially established in 1652. When the English took control of New Netherland, they renamed the town Albany. Twenty-two years later, Albany received its city charter. When the archaeological evidence for wampum production was brought to light in downtown Albany, it seemed logical to assume that this material dated to the 17th century, when wampum was in local use as legal tender and when Beverwyck/Albany served as a fur-trade hub. An analysis of the materials, however, revealed that this was not the case.

The KeyCorp site marks the 17th-century home of Volkert Jansen Douw, a Dutch settler. In 1683, the Dutch Reformed Church purchased Douw's house for use as an almshouse. Mid- to late-17th-century strata contained both wampum and glass beads (such as blue and white glass trade beads of Kidd variety IIIa12), "cassock buttons," jews harps, copper bell fragments, and 17th-century glass and ceramics. These layers, however, were confined to the south half of the site only.

It was the north half of the site that contained evidence of wampum production in the form of shell debris, partially formed beads, and tools, rather than the finished wampum beads themselves. Production (Fig. 1) involved clipping

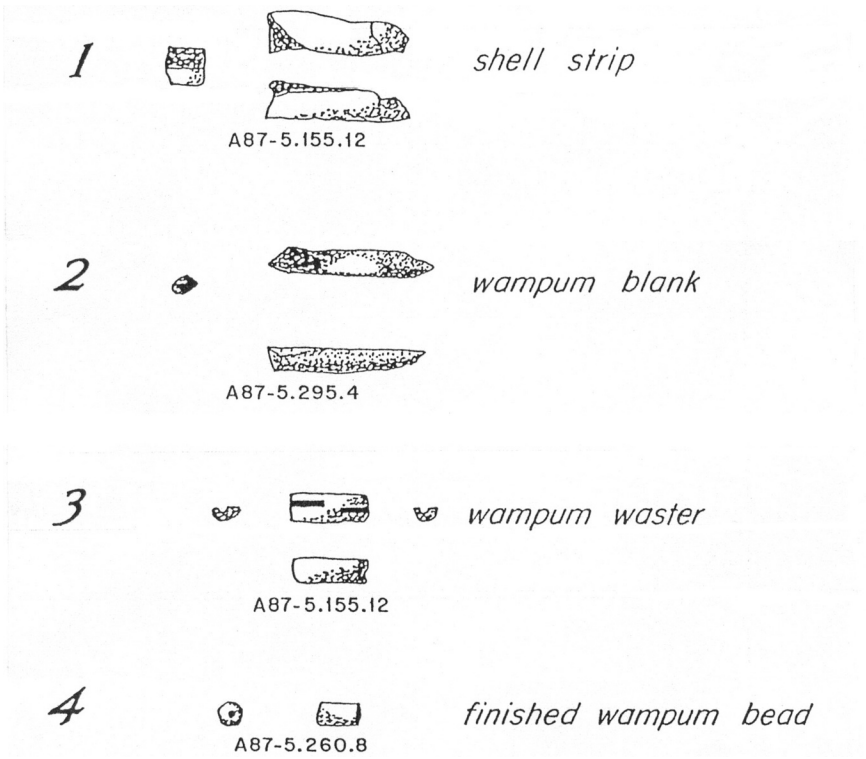

Figure 1. Stages of wampum production. All artifacts are from the KeyCorp site and shown full size.

or hammering clam and conch shells into fragments, then knapping them into strips. The next step required using a whetstone to smooth the shell strips into beadlike cylinders. Next, these wampum blanks were further smoothed and drilled. Finally, the bored beads were smoothed and strung a final time. At the KeyCorp site, the production debris consisted of 568 pieces of cut clam and conch shell, 143 small shell fragments, 133 shell strips, 24 wampum blanks (partially shaped beads), and 35 unfinished beads (beads which had been discarded after partial drilling). The tools associated with these processes are whetstones and iron drills (Fig. 2), which were also found in these KeyCorp contexts. These remnants of the production process were clearly in context with ceramics and other materials dating to the first half of the 18th century. In addition, the wampum-production component contained five coins from the reign of George II, dating to ca. 1730-1755.

The KeyCorp property's last trace in the documentary record is in the Church's 1720 Act of Incorporation. Since we know that the church's almshouse stood here, it would appear that almshouse residents made wampum. This group of people may have included poor people who lived or worked in the almshouse. We know of several rather marginal members of the community who, in the earliest years of the 18th century, rented parts of the almshouse to live in with their families. For example, a Robert Barrett, a British soldier with a Dutch wife and six children, rented part of the almshouse. Barrett turns up in the records performing a variety of small jobs such as city bellman and night watchman. It is possible that people or families in situations similar to Barrett's may have been responsible for the wampum-production debris at the KeyCorp site. It is also noteworthy that the almshouse stood in the first ward of Albany, a quarter characterized by small-time craftsmen working at a variety of trades, such as cordwaining, brickmaking, weaving, and blacksmithing. Wampum production may have fit into this scheme as another part-time, marginal, urban craft.

Wampum production, however, must have involved participants other than the actual producers. While the Hudson River is tidal as far north as Albany, marine shell would still have to be imported from coastal areas. The beads had to be marketed and sold somewhere on the frontier, as they no longer served as locally used legal tender. Perhaps the Dutch Reformed Church acted as overseer to this process. Local entrepreneurs may have played a role: a 1756 document listing houses in Albany suitable for the quartering of British troops mentions Jacobus Hilton, "wampum maker." Hilton's house is described as quite spacious, and is marked by the comment "good house." It would seem that Hilton had attained some measure of economic success, but whether from wampum making or his other profession,

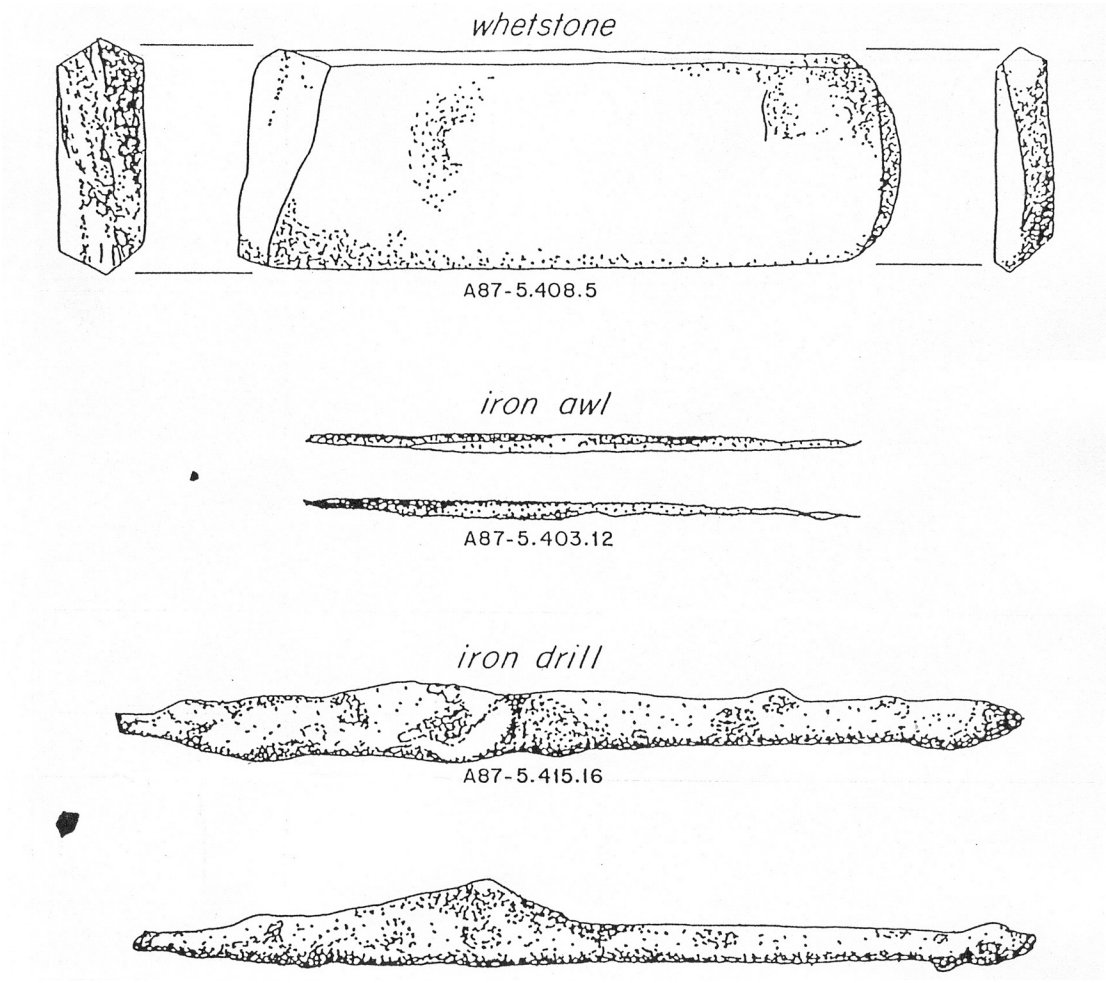

Figure 2. Wampum-production tools from the KeyCorp site (shown full size).

farming, is unclear. Nonetheless, people like Hilton may have participated in Albany's wampum production.

To conclude, the New Netherlanders' adoption of wampum as a substitute for cash during the 17th-century specie shortage illustrates the monetary orientation that was an important feature of Dutch culture and the Dutch colonial experience. The fact that the 18th-century inhabitants of Albany manufactured wampum as a commodity, and considering the organization of production, suggests a distinctly Dutch, capitalistic attitude. Jacobus Hilton, the wampum maker, provides a good example of the persistent "Dutchness" in 18th-century Albany: of English descent, Hilton had a Dutch first name. It is unclear whether his wife, Judith Marten or Maarten, was Dutch or English, but the couple did baptize their children in Albany's Dutch Reformed Church. Hilton represents the quintessential 18th-century Albany resident, whose way of life was shaped by the Dutch cultural and economic ethos that lingered in Albany long after the establishment of English political control.

74. GLASS TRADE BEADS FROM A COUSHATTA INDIAN SITE IN NORTHWESTERN LOUISIANA, by Timothy K. Perttula (1993, 22:13-16)

Trade beads are one of the more common types of European goods on 19th-century Native American sites. The Coushatta (or Koasati) tribe, which had moved from Alabama into Spanish Louisiana in the 1760s, and into the Red River valley of northwestern Louisiana about 1804, obtained a variety of goods in American, Mexican, and Texan trading posts in exchange for pelts, tallow, and bear oil (National Archives 1809-1821: folios 22-23; Winfrey and Day 1966, 2:165). Such goods included blankets, wool hats, needles, calico shawls, vermillion, iron pots, tin cups, ribbon, flax thread, stitching thread, combs, iron knives, gunflints, silver gorgets, corn hoes, hatchets, shears, plates/saucers, brass, silk calico, rifles, cow bells, gloves, powder, lead, scissors, blue stroud, gun locks, butcher knives, linen shirts, wood axes, garters, tobacco, and beads (Perttula 1993).

Study of a sample of about 3,260 trade beads from a 19th-century Coushatta Indian site (16BO 176) in northwestern Louisiana foremost provides an opportunity to understand the Coushatta use of glass beads as trade ornaments. The beads were found in burial context and thus some aspects of their ornamental function could be ascertained. Characterization of the collection also allows us to compare bead colors, sizes, and varieties on this site with those found on other contemporary Native American sites in Louisiana and Indian Territory (Good 1983; Gregory and Webb 1965).

Twenty glass bead varieties were defined in the Coushatta site sample on the basis of color, size, and method of bead manufacture. Of the 20 varieties, 14 were drawn, five were wound, and one was mold-pressed. Specific comparisons with well-dated bead assemblages in Texas, Louisiana, and Oklahoma (Gregory and Webb 1965; Harris and Harris 1967; Watt 1937) and general comparisons with early and mid-19th-century sites in the U.S. (e.g., DeVore 1992; Ross 1990) indicate that the bead varieties primarily date ca. 1820-1840.

Drawn beads account for 97% of the site sample, and these are dominated by beads of simple doughnut and tubular construction (type descriptions CI, SA, T1 and CI, SA, T4 in DeVore [1992]). White, black, and turquoise colors were most popular, but clear, red and blue (a cornaline d'Aleppo variety), blue and brown beads were also present.

Among the 97 wound varieties were burgundy, turquoise, red, and blue-gray beads of medium (4-6 mm in diameter) and large (over 6 mm) size and simple construction. Similar types of wound beads have been identified from 19th-century Wichita, Coushatta, Tunica, Caddo, and Pascagoula-Biloxi sites in Texas and Louisiana.

The single mold-pressed bead variety is represented by seven, large, black, spherical beads with ground facets. Ross (1990:52, Plate IVx) illustrates similar beads from the 1829-1860 Fort Vancouver site in Washington and suggests that they "were probably manufactured in Bohemia... during the first half of the 19th century."

As mentioned above, the glass beads were recovered in burial context (McCrocklin 1990). There were masses of drawn "seed" beads on the head and chest of the individual, large hexagonal and faceted "embroidery" beads on the chest, and a necklace of simple, wound, burgundy beads that were separated from each other by four silver spacers. The seed-bead masses on the chest of the individual were probably sewn into geometric designs on clothing. Those found in a mass on the head may have been attached to a garment such as a turban, scarf, or hat. At the 1840s-1870s Alabama-Coushatta Arthur Patterson site (41SJ67), several thousand seed beads had been sewn to a red hemp or palmetto-woven hat (Hsu 1969).

The beads at both site 16BO176 and Arthur Patterson were dominated by seed beads (between 95-99% of the bead sample). White, black, and blue colors were favored for the seed beads, with burgundy and yellow of secondary popularity. The larger drawn and wound beads from 16BO176 were predominantly blue, burgundy, and clear, while clear, white, and blue were well represented in the larger beads at the Arthur Patterson site.

Accompanying the glass trade beads at the 16BO176 burial were silver discs and silver pendant ornaments on the chest; metal rings, scissors, a thimble, and a jew's harp at the hands and arms; and bottles, a tin cup, a tin pan, and a cast iron kettle at the feet. The use of silver ornaments–mainly hammered from coins–was common among Native Americans of the southeastern U.S. after ca. 1750, as it was generally among many Native Peoples (Karklins 1992). The traditional use of beads and silver as ornaments continued among the Coushatta until at least the early 20th century (Gregory, Cameron, and Jones 1990).

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75. RUSSIAN BEADS AND BEADWORK – 1881, by *Pottery and Glassware Reporter* (1989, 14:14)

[Ed. note: Little is known about the production of beads and beaded ornaments in Imperial Russia. The following item, extracted from the *Pottery and Glassware Reporter* 13(7):24-29 (December 3, 1885), throws some additional light on the subject.]

In the manufacture of small articles or vases from glass, in 1881, 214 kustars [domestic or cottage artisans] in the government of Moscow produced goods valued at 37,000 rubles ($13,500). The nature of this special industry was bead-working, having its origin in the glass or crystal produced in two kustar glass works in the Demetrieff district. The beads, &c., made at these works are confined to eight colors-opal, black, rose, dark red, green, blue, turquoise and amber. In 1881 the output was 4,500 poods (162,000 pounds), valued at 11,625 rubles ($5,625). These beads are purchased by the kustars and strung upon wires and strong twines, such wares finding ready sales among the peasantry at all fairs and bazaars in the interior and eastern provinces of the empire. The annual receipts of two families engaged in the preparation of such articles or wares is about 200 rubles ($100). The weekly labor of an adult bead worker is from 50 copecks to 2 rubles (25 cents to $1), and of a female bead threader from 30 to 50 copecks (15 to 25 cents). These wares, however, are sold at prices commensurate with such remuneration. Thus, 1,000 buttons or studs cost 3 rubles ($1.50); 1,000 necklaces, 2 rubles ($1) and ear rings cost from 5 to 12 rubles (2.50 to $6) per 1,000.

76. HOW BEADS ARE MADE – 1890, by *The Pottery Gazette* (1987, 11:2-8)

It sounds almost incredible, but is nevertheless a fact, that it would take a dozen locomotive engines to transport the weight of glass beads annually purchased by the fair sex.

The best customers of all are the French, and next to them come the Spaniards of Europe and America; while among the German nations it would seem, according to the testimony of Herr Gampe, that the purer the race, the less the fondness for beads. Thus the Yankees show how mixed their blood is, by buying almost as many beads as the French and the Spaniards; the English are not such good customers, but they imported 2,204,241 lbs. in the year 1871; while the Germans stand third on the list, and the Scandinavians last. The latter are, perhaps, too sober minded, and grave to care for such frivolous vanities.

Of the Turks and Hungarians, only the upper classes wear beads at all, as they would be quite out of keeping with the national costumes of the people.

As a rule, the civilised European, no matter what her nationality, buys only the cheaper kinds of glass-beads, and leaves the best and most expensive for the barbarous and semi-barbarous natives of India and Africa. Strings of beads adorn the throat, neck, hair, arms, and ankles of the Hindu and Malay, and often enough form the sole costume of the Ethiopian, and in the interior of Africa they frequently take the place of money as a medium of exchange.

Among the Mongolians, says the writer of this article in *Cassell's Family Magazine*, the Japanese are the only customers, but they are rather good ones, while the Chinese ladies apparently despise beads of all sorts.

Although the Italians do not share the love of beads manifested by the other Latin races, it is from Venice that the whole world, civilised, semi-civilised, and uncivilised, is mainly supplied; the Bohemian manufacturers, energetic as they are, have only just begun to turn their attention to this branch of industry, while the few smaller factories in the Levant are hardly of sufficient importance to require notice.

The largest of the seven large glass-bead factories in Venice and the neighbouring island of Murano belong to a German, named Weberbeck, who employs 500 men and women. In all, some 6,000 persons earn their living by the various processes incidental to bead-making, and a very poor living it is, for the value of the beads made amounts only to some 300,000 l. yearly, which, equally divided among the "hands," would give them but 50 l. apiece and leave nothing for the masters.

The process of bead-making is for the most part remarkably simple, the chief essential being that the glass, which is manipulated in a semi-fluid state, should be so tough and ductile as to allow of its being drawn out like resin or sealing wax, only to a much greater degree of tenuity.

The glass is coloured before it leaves the furnace by chemicals, of which arsenic, saltpetre, antimony, and lead are the principal. It is then ready to be drawn out into tubes [Fig. 1]. One of the glassblowers dips his iron rod into the viscous mass, and taking up a lump about the size of a small melon, first rolls it on an iron plate to round it, and then with a simple tool makes a hollow in it, much like that at the bottom of a wine bottle. Another workman has meantime done the same thing with another lump; the two then press the edges of these glass balls together until they adhere, and the fusion is so complete that the air within cannot escape. They then take up their rods again and walk quickly away in opposite directions to a distance of about a hundred yards, keeping step the while as exactly as if they were marching with a regiment; the red hot glass spins itself off from the two balls as long as any remains, or until it becomes too cool to spin any further; and as the enclosed air spins itself out at the same time, a hollow tube is produced instead of a solid rod of glass, as would otherwise have been the case, and the future bead has received its necessary hole.

These glass tubes are of various sizes, and range from the diameter of a lead-pencil to that of the finest knitting-needle. Those which are to be made into variegated beads are formed in the same way, only that the lumps of glass on being taken from the furnace are dipped into liquid glass of other colours in succession, so that they are encased in skins like those of an onion, and the spinning off of the several coats proceeds with wonderful regularity, without any further assistance from the workman's hand. Often, too, the glass balls have merely little knobs of glass of different colours put upon them, and these appear as fine lines or stripes on the tubes. The sorting of the tubes, which are broken into lengths of about three feet, is a very general home industry in Venice, where the women and girls are constantly to be seen sitting before large baskets full of glass pipes, which look like the quills of a porcupine.

With outspread fingers they feel and weigh these until all are accurately sorted according to their size; they are then made up into bundles and taken back to the factories, where they are put into machines exactly like straw-cutting machines, and are chopped up into the size required.

The next process is to remove all sharp angles, and to accomplish this the beads are first mixed with fine sand, which fills the holes and prevents their closing up again, and they are then very carefully heated in cylinders, which are kept revolving in the furnace until the beads are sufficiently smooth and round.

As far as shape goes, the beads are now ready; they are sorted according to their size by being passed through sieves [Fig. 2], and then those which are to receive an extra polish are put in bags of bran and shaken.

Stringing the beads in skeins is another home industry. The Venetian women, whose occupation it is, hold as many as a dozen steel needles a foot in length, and often as fine as a silk thread, between the fingers of their two hands; and with these they dive into the heap, picking up as many as they can, haphazard.

Herr Gampe reckons that a skilful pair of hands will thread as many as three millions a day.

The manufacture of the beads in which the Indians and Africans take delight is a much more complicated process than that described above, as they are made only at the blow-pipe. Great mechanical skill is required to produce the tasteful spirals and arabesques which they exhibit, and the effects of colour are often wonderfully beautiful and quite in accordance with the fabulous ideas of splendour usually associated with those lands for which they are especially destined; but the process is as little to be described as that of modelling or chasing. In the interior of Africa these beads are often used in making payments in the place of money, and the cunning Arab, who has the trade of the country entirely in his own hands, is quick to take advantage of

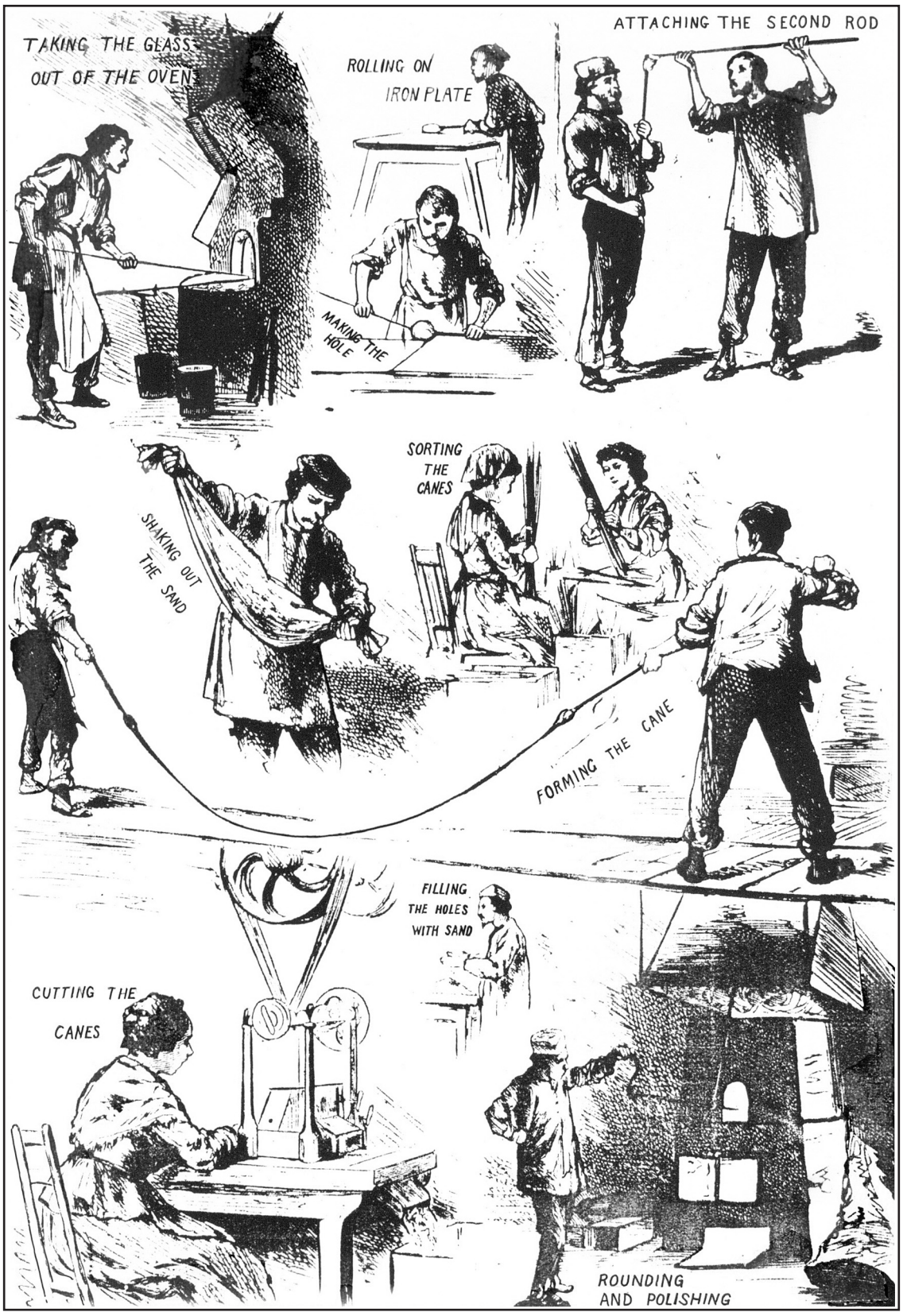

Figure 1. The various steps in drawn-bead production.

Figure 2. Sorting the finished beads.

the pleasure they afford to the simple negress. A string of handsome beads is far more effective and ornamental than a sober silver florin.

Contrary to what we might perhaps have expected, these black, woolly-headed children of nature show a marked dislike to shiny beads–a great proof of good taste, for there is always an unpleasant glare about a shiny surface–and the Venetians are obliged to subject the beads intended for them to a dulling process, to do away with the glitter natural to all glass on cooling.

As before mentioned, the pay of the workpeople employed in this manufacture is miserable. Only the most skilful get even fair wages; and as for the women, they earn barely half a paper franc a day, and are obliged to live on food of the most coarse and scanty description, even the *polenta*, the frugal national dish of Italy, being beyond their means, except on Sundays. During the week they subsist on field-turnips, carrots, &c., which are to be seen in the bye-streets of Venice, cooking in vast heaps at the open fire, and are consumed on the spot by the needy purchasers.

While upon the subject of bead-making we may say a few words about the imitation pearl beads, in the manufacture of which the French excel.

These are chiefly made in the department of the Seine, but a cheap and inferior quality, known as German fish-pearls, are manufactured in Saxony.

The practice of making hollow glass-beads and filling them with pearly varnish was in vogue at an early period among the artists of Murano, but was prohibited by the Venetian Government, because it was considered either fraudulent or dangerous to health on account of the quicksilver used. The art was, however, revived and improved by a French bead-maker named Jaquin, who used the scales of the small fresh-water bleak for making a pearly powder, which had all the lustre of the most beautiful pearls, and was named by him *Essence d'Orient*. He first made his beads of gypsum and covered them with the pearl-powder, but this did not answer, for the powder rubbed off the beads and adhered to the skin of the wearer. After this the beads were made of glass, covered inside with a solution of isinglass and the pearl-essence and filled with wax, which was bored through with a needle; but various improvements have been made in the manufacture since then. In 1834 a French artisan invented an opaline glass of a pearly colour, very heavy and easily fusible, which gave the beads all the different weights and forms found among real pearls. They are now filled with gum instead of wax, by which means a highly transparent effect is produced, and the surface being deadened by the vapour of hydrofluoric acid, their appearance hardly differs from that of real pearls.

Pearl beads are not made by drawing the glass out into tubes as described above, but are blown separately; one workman being able to blow as many as 6,000 of the commoner quality in a day. But if they are required to be very beautiful he can produce only 1,200 or 1,500, which he makes round, pear-shaped, olive-shaped, or flat on one side, as many be desired.

The bleak, whose scales are employed to make the pearl powder, is but four inches long; 4,000 fish yield a pound of scales, and these do not produce four ounces of the essence, which is preserved for use in a solution of sal-ammoniac. This is mixed with dissolved isinglass, and blown into each globule by means of a fine glass pipe, the pearls becoming more beautiful and more valuable the larger the quantity of essence used. Some of the best imitations fetch really good prices.

[Ed. note: Most notable for its illustrations of the various steps in the manufacture of drawn beads, this article from the March 1, 1890, issue of *The Pottery Gazette*, pp. 238-40, was submitted by Olive R. Jones, Material Culture Research, National Historic Parks and Sites Directorate, Ottawa, Ontario.]

77. THE MOHAWK GLASS TRADE BEAD CHRONOLOGY: AN ADDENDUM, by Donald A. Rumrill (1994, 25:11-12)

Response to "The Mohawk Glass Trade Bead Chronology: ca. 1560-1785," which appeared in Volume 3 (1991) of *Beads*, has so far been very positive. Since its publication, the author has continued to seek and examine new collections in order to confirm or help refine the information presented in the report. This work has revealed a few problems with the data presented for the Rice's Woods (Cnj-26) site. The bead collection from this site was the only one that the author did not examine personally, relying instead on two conversations with a primary source for the published information. The author recently had the opportunity to catalogue the Rice's Woods collection with the following results.

There are 32 varieties among the 2,878 glass beads in the collection. Only five of these are chevrons, contrary to the published statement that "a very high proportion" were chevron varieties (Rumrill 1991:11). Over half (1,679 specimens or 58.3%) of the bead collection is composed of small (under 4 mm in diameter), circular IVa12 beads which have a transparent light grey exterior and core, and an opaque bright navy middle layer. As this bead appears blue, as noted by Kidd and Kidd (1970:79), others who have catalogued the Rice's Woods material have identified this bead as varieties IIa41 (robin's egg blue) and IIa46 (shadow blue). Fortunately, the author had excellent lighting and a magnifier, and could, therefore, distinguish the three layers. It is almost impossible to distinguish them otherwise.

The above information has been shared with others researching the Iroquois chronology, and the same misidentification detailed above has been noted after a closer scrutiny of the relevant beads. In all cases, Kidd variety IVa12 appears to date around 1615, and may be considered diagnostic of the early 17th century, along with chevron, gooseberry, and flush-eye varieties.

In light of the above, it may be worthwhile for those involved in Iroquois trade bead research to re-examine their bead collections.

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78. CORNERLESS CUBE STONE BEADS IN EGYPT AND PALESTINE, by Peter W. Schienerl (1985, 7:8-9)

Until quite recently many dealers in Egypt had a stock of old stone beads among their "antiquities." Beads and pendants made of carnelian and probably imported from India (cf. Peter Francis, Jr., "Indian Agate Beads," *The World of Beads Monograph Series* 6) formed the larger part of the stock. The specimens varied considerably in size and shape and will be dealt with separately.

The subject of this note is a stone bead always made of some green material (agate?) and shaped as a cornerless cube. Such beads occurred in comparatively large numbers and many of them showed considerable traces of wear. It should be noted that no other material seems to have been used for cornerless cube beads. One never got any reliable answer concerning the use and provenience of these beads, but their weight makes it difficult to believe that they might have been strung to form complete necklaces.

The photo archive of Edelgard Schienerl, Oldenburg, contains a very important picture. It shows a woman of Bedouin stock who temporarily (1973) stayed in the Fayoum Oasis, about 100 km southwest of Cairo. The woman carries her baby and a green cornerless cube is fastened to the hood of the child. When asked for the reason the mother only referred to its protective virtue against the "Evil Eye," but such an answer is of no great consequence as usually the original (possibly very specific) meaning of amulets has been obscured by now. Nevertheless, the amuletic character of the mysterious green cornerless cube beads has been established and it is obvious that such beads were worn singly.

Further references to the amuletic use of green beads were provided by the excellent study of Tawfiq Canaan: *Aberglaube und Volksmedizin im Lande der Bibel*, Hamburg, 1914. The author states that at the beginning of this century Palestinians used green beads to ward off the dangers originating from *el kabsa*. This word means "pressure," but it seems that *al kabsa* is another expression to describe the ill-doing of the well-known female demon *al-Qarina* (cf. *Ornament*, 1979, 4[2]:33). According to Canaan these green stone beads are termed *harazat al kabsa* or *kabbas* and were worn in Palestine on a cord around the neck. It was obligatory for the mother to wear such a bead during labor and for forty days afterwards. After this period the stone had to be placed in water and the child washed with this liquid.

However, according to another statement, the child received a green stone bead immediately after birth.

Similar traditions are still alive in Jordan, where Birgit Mershen observed that beads of green stone are popular as amuletic devices. In addition to cornerless cubes, she found heart-shaped pendants and oblong beads made of green agate.

In this short note I wanted to stress the fact that beads may be much more to certain people than mere items of personal adornment. But I also hope to secure the help of readers of *The Bead Forum*. As I am preparing a study on these items, I would be grateful for any information or suggestions concerning the age of such beads (are there any from stratified sites?), their origin, distribution, use, and place in local folklore and magical beliefs. It would also be interesting to know if such items are reused by contemporary craftspeople, bead stringers, and other designers of personal jewellery. It goes without saying that no information would be used without the consent of the informer, and the source would be duly stated.

79. TRADE BEADS EXCAVATED FROM A EUROPEAN/KONYAG CONTACT SITE ON KODIAK ISLAND, ALASKA, by Elizabeth G. Shapiro (1988, 13:7-12)

This report is intended to acquaint the reader with the site in question, the placement of the beads in the site, and the types of beads excavated from the site. By reviewing this evidence, it may be possible to trace and compare historic accounts of European intervention on Kodiak Island, while at the same time, develop the beginnings of a chronological sequence of trade beads in southern Alaska. The town of Karluk, Alaska, is located on the northwestern side of Kodiak Island and is separated from the Alaskan mainland by the 25-mi.-long Shelikov Strait (Fig. 1). Two sites at Karluk were chosen for archaeological survey and excavation during the summer of 1984, under the supervision of Dr. Richard Jordan, former Professor of Anthropology at Bryn Mawr College and currently chairman of the Anthropology Department at the University of Alaska, Fairbanks. The second site, consisting of 42 house pits (major portions of which date back to the period of Russian occupation) is known as the village of Nunakakhnak, and will be referred to as the KAR-37 site. The collection of beads excavated from one of these house pits constitutes the data presented herewith.

Briefly, the contact history of Kodiak Island centers on Gregor Shelikov who, in 1784, established the first permanent Russian settlement in Alaska on Kodiak Island at

Figure 1. Map of Kodiak Island showing the locations of mid-19th-century Russian Period settlements including Karluk (arrow) (Knecht and Jordan 1985).

Three Saint's Bay. During the winter of 1785-1786, a party of Russians, Aleuts, and Konyags (the indigenous population), established the first Russian encampment on the Karluk site. In 1786, an *artel*, or trading post, was established by Shelikov at Karluk with trade goods coming from Russia, Britain and later, even America. At its peak, according to accounts from 1804, the village consisted of 34 *barabaras* (sod houses) with a speculative population of 680 natives. The settlement was short-lived, however. In 1821, the Russian population had decreased to a three-person management of the *artel*, which, by the 1840s, had been demoted to an *odinochka*, or one-man post (Knecht and Jordan 1985:20-21). Finally, a chart dated 1849 portrays the site as the remains of a Konyag resettlement project undertaken by the Russian-American Company during 1840-1844. It is believed that the site was abandoned before the late 1880s, as an 1888 map of Karluk Lagoon shows settlement locations only at Old and New Karluk (Knecht and Jordan 1985:21). For a more detailed history of the KAR-37 site, I refer readers to the article by Knecht and Jordan (1985:20).

The structure (no. 1; Fig. 2) which was excavated consists of a "large central room and four adjoining side rooms, at least one of which functioned as a sleeping room" (Knecht and Jordan 1985:22). Preliminary observations

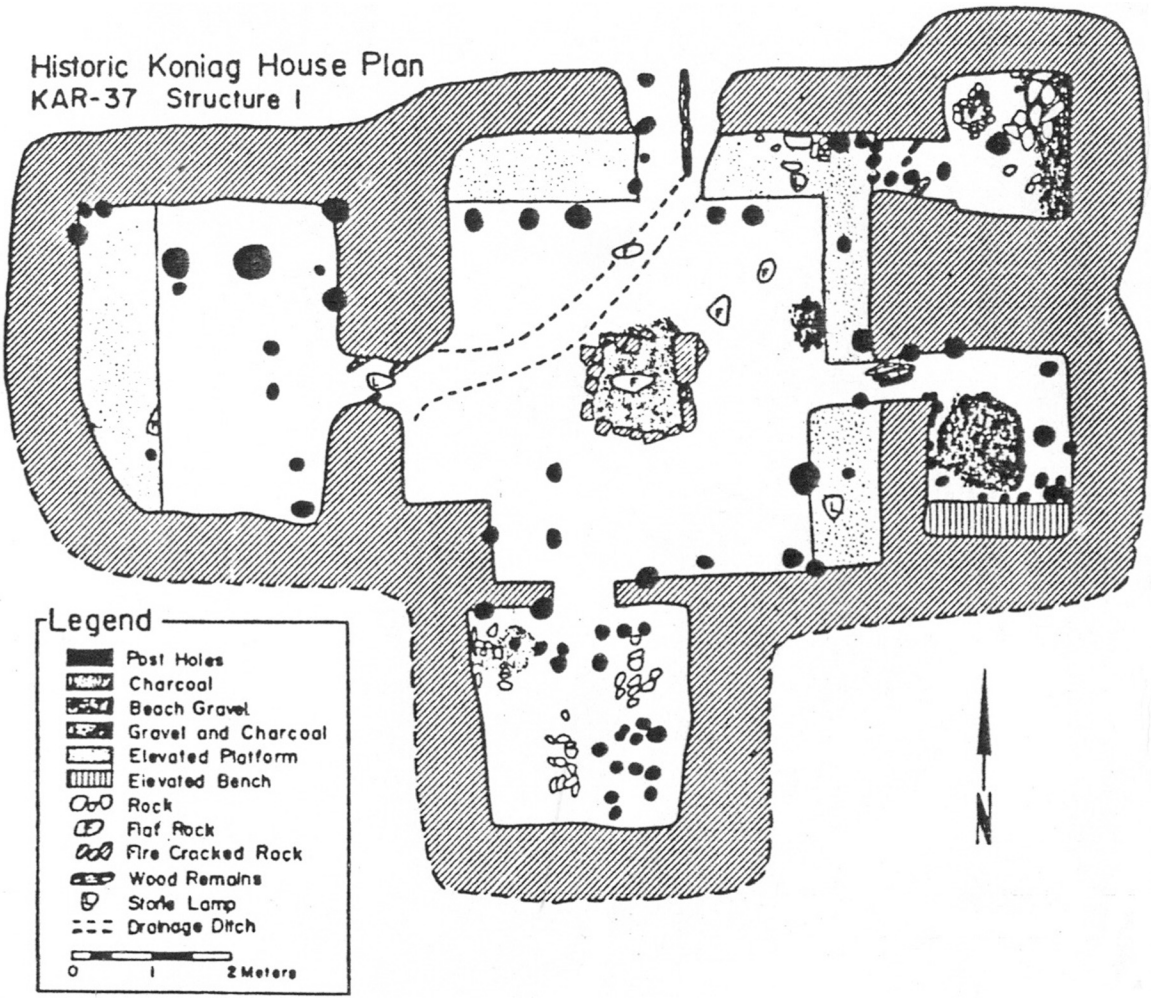

Figure 2. Floor plan of Structure 1 at Karluk (Knecht and Jordan 1985).

have reinforced the notion of the central room as the primary domestic activity area within the structure. Three iron axe heads as well as a traditional lithic assemblage were found in the central room together with almost a third of the trade bead collection. This side-by-side assemblage of traditional and imported goods illustrates the phenomenon of acculturation occurring at this time.

The west side room of Structure 1 has been identified as a *zupan* or sleeping room and contained the majority of the excavated beads. The south side room functioned primarily as a storage room. The two smaller side rooms are identified as sweat baths, and the northeast side room has been tentatively identified as a burial chamber.

It was from this context that the collection of 2,735 trade beads of various types emerged. In order to make sense of the assemblage, I began by adapting the Kidd and Kidd (1970) classification system to a system which would fit my needs. Bead type, size (both diameter and length measured in millimeters), clarity or opacity of the glass, and color (as determined by the *ISCC-NBS Color Charts Illustrated with Centroid Colors*) were categories obtained through the suggested procedure of the Kidds. In addition to these, I added categories of my own such as material code (there were a few beads of natural materials found in the collection), decoration (including swirling, facets, stripes), suspected country of origin, condition, and general comments. Above and beyond the actual bead description were included categories from the original artifact data. Those categories which proved useful for analysis were provenience data (identification of structure and room), quadrant data (northwest, northeast, southwest, southeast, and the north/south and east/west baulks), and layer data (surface, roof sods, floor sods, layer one, and layer two).

Within Structure 1, a good portion (40.7%) of the beads were excavated from the west or sleeping room. This is probably due to a depression near the center of the room where beads may have collected during routine room use.

The central room followed in bead quantity with 35.3%, not significantly different from the west room. The most obvious explanation for the high frequency of beads in the west and central rooms is that while sewing perhaps occurred in the central room, it seems more likely that the *zupan* was used for dressing and undressing, an activity during which it is likely that beads were torn off clothing and not recovered.

Both the northeast and southeast side rooms contain deposits of beads in similar quantities: 260 beads were found in the southeast side room (the sweat bath), while 334 beads were recovered from the northeast side room.

The majority of the beads (90.1%) were found on the floor (the L-2 layer) of the structure. This indicates that the majority of the beads were found in the locations in which they were deposited (whether by accident or on purpose). Only 1.3% of the beads were found on the site surface. The second largest grouping of beads (8.6%) occurred in the sods level (L-1). No beads were found in the floor sods, while only one bead was located in the roof sods. In the west room, 96.2% of the beads were found in the floor sods (L-2), while 3.8% were found elsewhere.

If a general label could be placed on the beads in this collection, it would be "typical Alaskan." Analysis of the collection using Kidd and Kidd (1970) reveals twelve types, most of which belong in two categories: type IIa (a simple tubular drawn bead which has been subjected to reheating), and type IVa (a two-layered compound bead which has been subjected to reheating). Of a total of 2,723 quantifiable beads, 1,033 are type IIa (37.9%) while 1,367 are type IVa (50.2%). Other types represented at the site include type Ia, a simple tubular bead (80 beads; 2.9%); type IIIa, a multi-layered tubular bead (131 beads; 4.8%); and type WIb, a spherical wound bead (48 beads; 1.8%). Bead categories with less than fifteen members (0.6%) include type Ib, a simple striped tube; type If, a faceted tube; type IIb, a reheated drawn bead with stripes; type IIIf, a multi-layered tubular bead with facets; type IVb, a reheated, compound bead with stripes; type WIc, a wound, oblong bead; and type WIIa, a wound and molded "corn" bead.

As for the most common sizes of beads found on the KAR-37 site, medium-sized beads (length and diameter between 3.0 and 4.9 mm) are by far the best represented, at approximately 60-65%. In the case of color frequency, brick red beads (commonly known as "cornaline d'Aleppos") are the most common (37.4%), followed by small turquoise seed and pound beads (20.8%), and white pound beads (17.1%). Blue, black, yellow/orange, purple, green, red/purple, true red, grey, and clear follow in this order. Most of the beads were whole and in fair to good condition with the exception of the wound beads which were larger in size and often weather-worn, chipped, or split.

Typical "named" Alaskan trade beads which are present on the site are the "cornaline d'Aleppo," "Russian" and "Canton" beads. The cornaline d'Aleppo bead, consisting of a brick red outer layer and a light blue (pre-1800) or light green (post-1800) core were found in abundance. Beads with the light green center were far more common than the earlier variety and support the dating of the site (Mille 1975:20; Sorensen 1971:16). The faceted Russian beads were all royal blue, some containing a milky core and some translucent. These beads are attributed to the early to middle 1800s. Fewer than thirty specimens of this type were found, possibly because they had a high value, or perhaps because of the early date of KAR-37. Fifty-five Canton beads (an opaque spherical bead said to come from China) were found at the site. The majority of these were light turquoise or white, although a few were a translucent deep red or green/blue. The suggestion that these beads actually came from China is in dispute. However, many of the wares traded to the natives by both the British and Russians originated in Chinese ports, supporting a Chinese origin. The majority of the remaining beads consist of white and turquoise pound beads.

The best and most descriptive adjective which one could apply to the trade beads from Kodiak Island is "typical." Sites such as the Erskine House, located in Three Saint's Bay on Kodiak Island and occupied from 1793-1867, have produced similar, if less extensive, bead collections (Shinkwin and Andrews 1979). Much work is yet needed before a detailed and accurate dating system can be developed for trade beads in Alaska and other areas where they played major roles in the acculturation process. Trade beads have the potential to be powerful research tools, tracing patterns of trade and trade sources through their various complexities. By pursuing this investigation, it may be possible to prepare chronologies to aid in the study of culture contact and acculturation in southern Alaska in the quickest and most efficient manner.

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80. AN UNUSUAL GLASS BEAD FROM SOUTHERN FLORIDA, by Marvin T. Smith (1983, 2:3-4)

In a recent archaeological report on excavations at Fort Center in southern Florida, William Sears (1982:67) mentions a large twisted chevron bead recovered by vandals during unauthorized excavations in Mound B. I dismissed it as probably being a poor description of a multi-layered Nueva Cadiz Twisted Bead. Later, I was able to view slides of material from Fort Center, and sure enough, there was a bead appearing to be a striped Nueva Cadiz Twisted. When the Florida State Museum acquired the collection from Fort Center, I was able to study the bead first-hand. To my surprise, the original description of the bead was quite accurate. This paper will describe the bead and discuss its significance.

Description

The bead does appear to be a striped Nueva Cadiz Twisted Bead, but closer inspection reveals inner layers molded with teeth typical of chevron beads (Fig. 1). This bead was clearly the product of a master craftsman, who combined many techniques to produce a unique product.

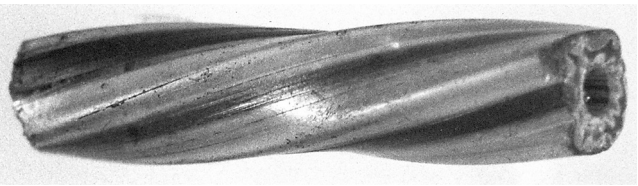

Figure 1. Striped chevron Nueva Cadiz twisted bead.

The craftsman started with a colorless core layer and added white, red, and white layers all molded in the 12-pointed star pattern. Apparently the first 2 layers (colorless and white) were molded in one step, and the next 2 layers were added and the gather molded again. Equally spaced around the outer layer are 2 stripes of brick red glass alternating with 2 stripes of medium blue glass. Next the gather was dipped in colorless glass and molded in a square mold like a Nueva Cadiz bead. The stripes were arranged to be on the flats of the bead. Finally the entire cane was drawn and twisted. The result is a truly magnificent bead.

Classification

This unique bead presents many problems of classification. It cannot fit into the classification scheme presented by Smith and Good (1982) for 16th-century Spanish colonial trade beads. Class V of that scheme is Chevron Beads with Molded Cross-Sections; we split Nueva Cadiz Beads into different classes depending on whether or not they had been twisted. Thus, to remain consistent, the new bead would require its own class (IX) for Chevron Beads with Molded Cross-Sections, Twisted. If this new class were invented, the bead would be Class IX, Series A (untumbled), Type 4 (composite), Variety a.

Similarly, the Kidds' system (1970) does not really allow for this bead, even when the modifications proposed by Karklins (1982) are considered.

Dating

This bead was produced during the first half of the 16th century, since it is closely related to the horizon style of tubular, multi-layered molded cane beads. Other beads found at Fort Center confirm this temporal placement: both faceted Chevron Beads (Smith and Good type IVC2a) and Nueva Cadiz plain (Smith and Good IIA2b) were recovered. Other beads on the site reflect later styles of globular tumbled beads, common in the late 17th century, but it is unlikely that the bead illustrated here belongs with them. Recovery by a trained archaeologist could have cleared up this problem.

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81. EIGHTEENTH-CENTURY CHEVRON BEADS IN THE SOUTHEAST, by Marvin T. Smith (1990, 16:6-9)

In 1976, Fletcher Jolly and Ken Cornett published an article describing chevron beads with a hexagonal cross-section found in surface collections from the Overhill Cherokee town of Great Tellico (40Mr12) in Tennessee (Fig. 1). They carefully describe the beads and suggest that they may date to the 17th century. Both blue and green are listed as exterior colors, and Cornett (pers. comm.) later found an identical bead with a red exterior at another nearby site in Tennessee.

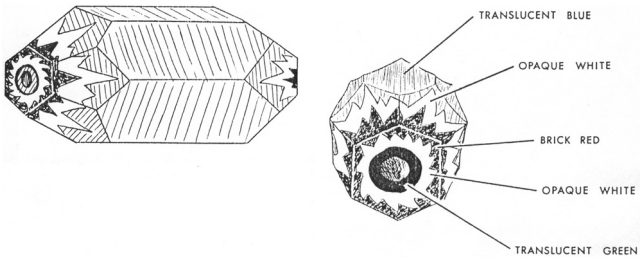

Figure 1. Hexagonal-sectioned chevron bead (Jolly and Cornett 1976:Fig. 2).

These beads differ from 16th-century faceted chevron beads (see Smith 1989; Smith and Good 1982) in many respects: 1) they have a hexagonal cross-section, while 16th-century examples have a round or, very rarely, square cross-section (Smith and Good 1982); 2) they have five layers of glass, while 16th-century chevrons usually have seven; 3) they have no "teeth" on the inner green layer, while 16th-century chevrons do; and 4) the chevrons of the type seen at Great Tellico are much larger than the usual 16th-century type, frequently being over 20 mm long. There has been some confusion in the literature about this hexagonal type of chevron bead (I will use this term in place of the longer but more precise hexagonal cross-section), and now may be the time to clear up some of that confusion.

Jolly and Cornett were unable to find comparable examples in the archaeological literature, except for a related hexagonal chevron in a large collection of beads from several sites in the Lower Tallapoosa River valley reported by Burke (1936; reprinted by G.B. Fenstermaker in 1974). As Jolly and Cornett note, even this hexagonal chevron is different: the Alabama specimen has seven layers (Burke 1974:no. 162). Since their article, additional research has located hexagonal chevron beads at the 18th-century Overhill Cherokee towns of Chota (ca. 1710-1819; Newman 1986:427), Hiwassee Old Town (Fenstermaker 1978), and Toqua (Polhemus 1987:945); the Peachtree Mound site in North Carolina (Mary Ann Thompson collection; see Setzler and Jennings 1941 for details of the site); the site of Fort Moore/Savannah Town in South Carolina (ca. 1680-1770; Story n.d.:types 223, 274); and the site of "Big Town," an 18th-century Chickasaw site in Mississippi (Steve Cook collection). Although some of these sites (Toqua, Hiwassee Old Town, and Peachtree) have earlier components that may represent occupations during the 16th century, most are single component, 18th-century sites. The distributional data strongly suggest that this bead type was traded by Englishmen during the 18th century.

But of much more importance was the eventual excavation of this hexagonal type of chevron bead in a good archaeological context. Green chevrons of this hexagonal type were excavated in an 18th-century Cherokee burial at the Citico site on the Little Tennessee River by James H. Polhemus (Richard Polhemus: pers. comm.). This burial also contained silver earrings of a type first traded during the 18th century. There is no doubt that this five-layered, hexagonal-cross-sectioned chevron bead is an 18th-century type.

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82. SOME OBSERVATIONS ON "FUSTAT BEADS," by Maud Spaer (1993, 22:4-11)

Although the first issue of *Beads* came out in 1989, I encountered it only recently. As a student of ancient beads, I had not expected much of interest. I was pleasantly surprised to read Peter Francis' "Beads of the Early Islamic Period." Certain trailed glass beads, with and without eyes, found at Fustat in Cairo and published by Pinder-Wilson and Scanlon (1987:71, Fig. 22) are among the bead types discussed by Francis (1989:29, Fig. 2b, PI. ID). I, too, found these beads very interesting and, in fact, questioned Prof. Scanlon about them more than a decade ago. My observations differ somewhat from Francis' and I would like to comment on the manufacturing technique, distribution, and time span of these beads.

Manufacturing Technique

The "Fustat Beads" share many characteristics which would justify considering them to be a separate type or class of beads. At the same time, however, they exhibit numerous minor variations. It is best to concentrate on specific examples, especially when discussing manufacturing techniques. Two beads in the Israel Museum collection, one with and one without eyes, suit this purpose.

Bead #1: 77.12.822 Dobkin coll. L 23, D 22, P 6 (Fig. 1). It is possible that this same bead was published by Neuburg (1949:Pl. 32, top center). The bead surface is divided longitudinally into eight fields, each with a diagonal pattern of stripes forming a non-continuous zigzag pattern. The stripes differ in width from field to field, but conform to one repeated pattern in opaque colors: white/ brownish red/yellow/green/yellow/brownish red/white/black (?). At the edges, close to the perforation openings, are some small monochrome areas of translucent grayish-green glass. The striped pattern can be seen inside the perforation, which is quite neat.

I have not had the privilege of examining the broken beads found at Fustat and discussed by Francis (1989:29). Even so, I find a multi-seamed technique of wedge-shaped sections more likely than one of fused cylindrical rods as proposed by Francis. I suggest that a flat, monochrome, grayish-green bar about 6 mm high was completely covered with trails, being left uncovered only at the sides. (A drawing process had certainly taken place previously, but it is difficult to know if the opaque trails were drawn separately or with the translucent glass; the latter seems more likely). The trailed bar, probably first cut from a larger bar, was cut diagonally in alternate directions into wedge-shaped sections. Every second section was turned upside down. Eight wedges were then fused around a rod, resembling the segments of a citrus fruit (Fig. 2). While the glass was still hot on the rod, it was tooled into its final barrel shape, exposing some of the monochrome glass at the edges.

Bead #2: 90.83.375 L 19 D 19 P 4 (Fig. 3). The bead surface appears to be divided into eight fields. Six have a pattern of stripes in white/brownish red/yellow/green/ yellow/brownish red/white, placed on monochrome grayish-green glass which forms an additional, seemingly black, stripe. Three fields have a pattern of three eyes each. The eyes have been cut from a mosaic cane having a black center and white, brownish-red, and yellow rings, and one outer ring of striped green and yellow.

Like Bead # 1, this bead is likely to have been fused from eight, striped, wedge-shaped sections. Two of the three rows of eyes were placed on top of two striped sections, completely covering them, including the monochrome ends. The third row of eyes was put on top of the junction of two striped sections, covering a little of one section and much of the second (Fig. 4).

This bead is formed with somewhat less care than Bead #1, as the stripes do not always form a zigzag pattern. The colors, although arranged in the same way–minus the added black–are more garish. We might be tempted to call this more "typically Islamic."

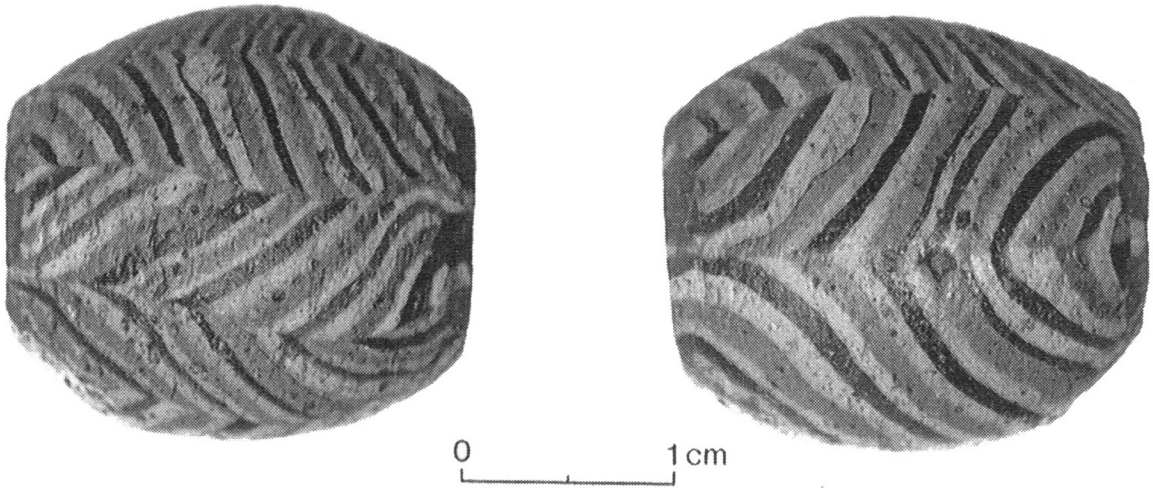

Figure 1. Both sides of "Fustat Bead" #1.

Distribution

Whole necklaces of "Fustat Beads," with and without eyes, appear quite frequently in collections and trade (Numismatic Art 1987:no. 311; Rütti and others 1981: no. 478, top third from left). They are first and foremost found in Egypt. The Fustat finds and the Petrie collection, University College, London (see also Shiah 1946:418, Pl. 4, 85b), demonstrate this fact. There is some evidence indicating that such beads were manufactured at Fustat itself (Pinder-Wilson and Scanlon 1987:71). The distribution is wide and includes Megiddo, Palestine (Lamon and Shipton 1939:Pl. 92, 36–without eyes); Hama, Syria (Riis and Poulsen 1957:68, Fig. 212A–without eyes); Corinth, Greece (Davidson 1952:nos. 2461-2462–without eyes); Torcello (Venice), Italy (Gasparetto et al. 1982:no. 4–with eyes); Yugoslavia (Andrae 1973:174, no. 113–with and without eyes); Austria (Andrae 1973:174, no. 107–without (?) eyes; Russia (Andrae 1973:167, no. 14; 176, no. 141; 177, no. 149–all without eyes (?); and probably also L'vova 1983:94, nos. 24-25–with eyes).

The beads do not belong to the common finds of Scandinavia, and although they are found in various parts

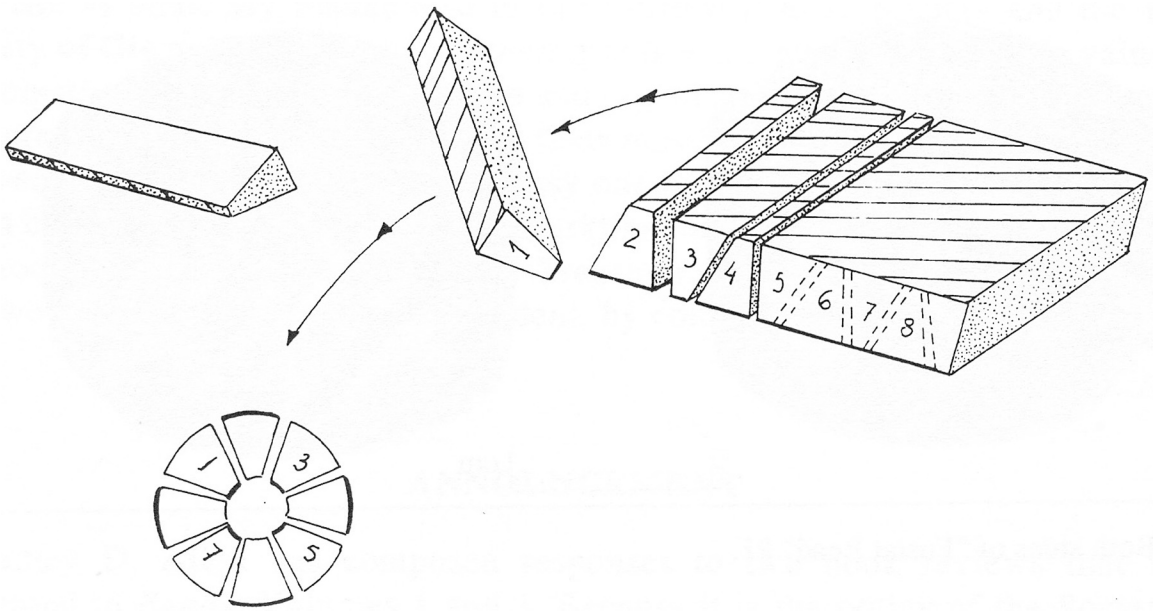

Figure 2. Schematic reconstruction of the probable method of manufacture of "Fustat Bead" #1. A bar covered with diagonal trails on both its upper and lower sides was cut into wedge-shaped sections. Eight such sections were then fused, reminiscent of the wedges of a citrus fruit.

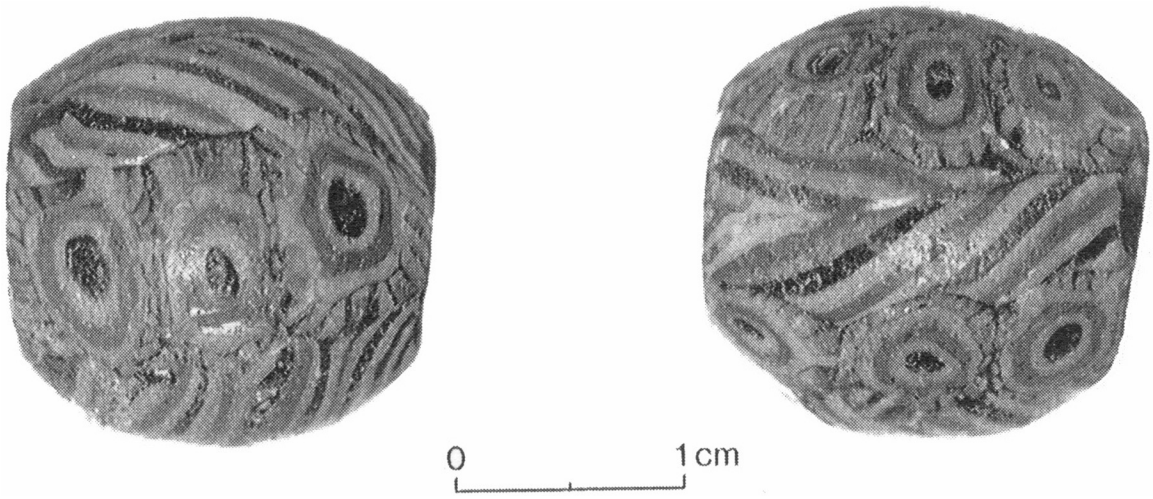

Figure 3. Both sides "Fustat Bead" #2.

of Russia, they do not reach the very north. The negative evidence is best exemplified by the absence of "Fustat Beads" in Callmer's (1977) thorough study of the beads of Scandinavia from A.D. 800-1000. I have personally gone over the Staraja Ladoga material from the 9th-11th centuries (L'vova 1968, 1970) without finding anything resembling the "Fustat Beads." Pinder-Wilson and Scanlon provide a reference to Lamm (1941:Pl. 14) implying that such beads reached Birka, Sweden. However, the "parallels" are "ordinary" mosaic beads and not the type discussed here.

Time Span

The majority of the "Fustat Beads" are from the 9th-10th centuries A.D. Pieces published by Gasparetto et al., Andrae (at least the majority), Pinder-Wilson and Scanlon, and probably also Riis and Poulsen, among others, belong to this period. Gladys Davidson (1952), on the other hand, dates the Corinth beads, similar to Bead #1, to the 5th-7th centuries. It is difficult to determine how well-based this dating is. Scanlon fixed the date of the published Fustat finds at ca. A.D. 900 (Pinder-Wilson and Scanlon 1987). When discussing these pieces, Francis (1989:29) stressed that "investigators should become aware of them as temporal indicators." I quite agree, provided that whenever we discuss "Fustat Beads" in general, we are referring to a time span of between one and two centuries, rather than "a short time around A.D. 900." This conclusion is based on the quantity of beads recovered and their many variations.

Figure 4. The eyes of "Fustat Bead" #2 completely cover sections 1 and 4 and parts of sections 6 and 7.

At most times, beads with and without eyes coexisted, but it is likely that the earliest beads without eyes predate those with eyes. Our Bead #1, which differs in color nuances and quality of workmanship from Bead #2, is likely to belong to the early stages of the 9th-10th-century time range. We must even be open to the possibility that the earliest examples predate this period and that some may have been made in Europe rather than Egypt.

At present, this suggestion is more an expression of caution than a working hypothesis. The caution is based on an awareness that many good northern-European beads of the 9th-10th centuries, such as the "checkerboard" and red-capped millefiori beads (Callmer 1977: bead group G), had precursors in Roman Egypt, but are absent from Islamic Egypt. Some Egyptian beads of the 9th-10th centuries A.D. might well have been inspired by styles which were originally non-Egyptian.

I agree with Francis (1989:29-30) that both drawn and mosaic beads belong among the products of early Islamic Egypt. The eye cane used on Bead #2 is one example of quite good mosaic work, and there are apparently other examples of good-quality mosaic beads found in the Japanese excavations at Fustat.

The beads of the 9th-10th centuries comprise an intriguing chapter in the history of beads. Particularly striking is the quantity and quality of the beads found in northern Europe. Francis' association of "Fustat Beads"

with this region is not unnatural. But the fact that a bead type known to have been made in Egypt did not reach Scandinavia is significant. European researchers have often pointed to Egypt and the eastern Mediterranean as the origin of their superior bead finds without citing sources (e.g., Andrae 1973:156-165).

It is becoming increasingly clear that it would be unrealistic to look for one source, or a very few sources, for the high-quality beads of the 9th-10th centuries. They were made in various parts of Europe, excluding the northernmost parts of the continent, where only fairly simple beads were made, but including areas north and south of the Alps and further to the east. They were also made in various parts of the Levant, in Persia, and further east.

As yet, only a few bead types can be unequivocally associated with any of these regions and the beads of the 9th-10th centuries can be seen as a difficult and largely unsolved puzzle. "Fustat Beads" are among the few pieces which can be fitted into this puzzle with relative certainty.

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83. A POSSIBLE PROSSER T-HOLE BEAD FROM JAPAN, by Roderick Sprague (1986, 8:10-11)

In the fall of 1985, a student from Nagaokakyoshi, Japan, returned to school and presented me with a gift of a necklace made of glass beads. The necklace was given to him by a former student of his and was reported to be from a "tomb." The modern appearance of both the beads and the "original" string would make this provenience very unlikely. However, one type of bead (n = 3 strung, 1 loose) is worthy of comment.

This bead type is opaque white, basically spherical but slightly flattened at the poles, and 12.5 to 15.0 mm in diameter. It has a definite equatorial ridge. The perforation is T-shaped, 12.5 mm long for the cross bore (the cross arm of

the T) and the blind hole is 9 mm deep. The blind hole goes beyond the cross bore and makes an indentation 1.0 mm deep in the wall of the cross bore. The exterior diameter of the blind hole is 3.0 mm while the blind end is 2.0 mm. The cross bore is also tapered but less dramatically going from 2.5 mm to 2.3 mm. The interior measurements are limited to a sample of one which was broken for inspection.

The equatorial ridge is in a plane at a right angle to the cross bore, the two holes being at the poles. The blind hole thus opens upon the equatorial ridge and appears to cut it sharply as if the blind hole had been made after the basic bead form had been made. The larger end of the cross bore is granular and rougher than the rest of the bead. This trait plus the equatorial ridge both indicate the Prosser process of manufacture dating after 1840 (Sprague 1983). It is *speculated* that a normal globular Prosser bead had a blind hole plunged into it after the bead had been compressed but before it was fired. It was glazed and fired after all of the holes had been made because glaze is found equally in all openings.

The beads had been strung with wound beads both clear spherical and tubular blue-green plus claw-like or paisley-shaped beads probably formed from a wound base. My informant described these last beads as *magatama* which translates from the Japanese literally as "carved jewels."

Any other known occurrences of these Prosser T-hole beads might help in defining the geographical and temporal limits of this unusual bead.

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Sprague, Roderick

1983 Tile Bead Manufacturing. In "Proceedings of the 1982 Glass Trade Bead Conference," edited by Charles F. Hayes III. *Rochester Museum and Science Center, Research Records* 16:167-172.

84. MORE ON TILE BEADS, by Roderick Sprague (1988, 13:3-4)

In a recent article, Peter Francis, Jr., has done us all a favor by once and for all showing that the term rocaille bead has no uniform meaning and should be avoided in the bead literature. There are, however, two items in the article that are worthy of further comment.

Francis (1988:17) quotes van der Sleen (1967:114) in part thus: "...straight as a military drum...." While not germane to Francis' discussion, it should be noted that while we may understand what van der Sleen meant, that technically he is incorrect. One of the most consistent traits of tubular tile beads is their slight taper. This taper is a necessary factor to permit the easy removal of the consolidated mass of unfired clay from the cast iron forms in which they are pressed.

A second and more important point is that Francis suggests because tile beads are made of clay it is "a bit difficult to correlate" this with Sprague's (1983:169) observation "that they were made of glass." A review of my observation will show that based on **chemical** analysis, tile beads differ very little from glass beads and thus properly can be included in the study of glass beads. Also the analysis utilized in my work was with a microprobe which gives an analysis of only the surface. A review of the Prosser process shows that the final glazing is very high in quartz and gives what might best be described as a glass glaze to a high temperature fired clay body. There can be absolutely no doubt that the physical nature of glass and Prosser beads/buttons is quite different. Glass has no crystalline structure, hence is often called a semi-liquid, while Prosser products have a very definite and fairly gross crystalline structure, not one at a microscopic level or even finer as is observed in cryptocrystalline stone.

I am in press (Sprague 1989) as expressing concern and dismay that professional historical archaeologists are labeling Prosser buttons as glass buttons rather than ceramic buttons. My position is and has been that anything made by the Prosser process is correctly classified as ceramic but that because of the history of their manufacture, trade, and use and because of their chemical structure and surface appearance that tile beads are more logically studied with glass trade beads than with ceramic beads. In my experience the typical ceramic bead is a large, crudely made clay object of local hand manufacture, not a precise, uniform, mass-produced object.

References Cited

Francis, Peter, Jr.

1988 Rocaille Beads. *Bead Forum* 12:17-21.

Sleen, W.G.N. van der

1967 *A Handbook on Beads*. Musée du Verre, Liège.

Sprague, Roderick

1983 Tile Bead Manufacturing. In "Proceedings of the 1982 Glass Trade Bead Conference," edited by Charles F. Hayes III. *Rochester Museum and Science Center, Research Records* 16:167-172.

1989 Review of "A Study of Five Historic Cemeteries at Choke Canyon Reservoir. Live Oak and McMullen Counties," by Anne A. Fox. *Historical Archaeology* 23(1).

85. A 1937 GOVERNMENT VIEW OF INDIAN BEADWORKING ABILITY, by Roderick Sprague (1993, 22:11-13)

Reproduced below is the complete text of an article entitled "Glass Seed Beads" found in a 1938 issue of the mimeographed publication *The Coeur d'Alene Teepee* (1[3]:3,6). The publication was edited by the Jesuits at DeSmet Mission on the Coeur d'Alene Indian Reservation in northern Idaho from 1938 to 1940, using largely Coeur d'Alene Indian writing and labor. The article was reprinted from a "memorandum on beads prepared recently by the Education Division of the Indian Service [later the Bureau of Indian Affairs], principally for schools." Since this article was published in January of 1938, it is assumed that the memo was produced in 1937.

One historically interesting thing is the attitude concerning the relative evaluation of Czechoslovakian and Italian beads. Even more important is the low opinion held by the white bureaucrats concerning the ability of American Indian children to do beadwork with "facet cut" and translucent beads. While faceted beads do tend to cut the thread, modern Indian bead workers are at a loss to explain the attitude toward translucent beads expressed in the instructions. Additionally, the knowledge of beads would appear faulty with statements such as the one suggesting that all dealers use the same size designations.

For those who might want to see the original, greater success will be found in searching for a bound reprint edition produced in 1981 by Serento Press, Plummer, Idaho. This edition was completely retyped and can be found in many area libraries. The reprint pages are 30 and 33. The 1981 edition was used for this work, thus the errors indicated by [sic] could have been introduced in the original memo, the original published form, or the reprint. The published memo reads:

The office of the [Indian Arts and Crafts] Board sent us the following memorandum on beads prepared recently by the Education Division of the Indian Service, principally for schools. Our bead classes will attempt to follow these regulations.

Glass Seed Beads

The best glass beads at present are imported from Czechoslovakia, but this country produces different qualities and importers bring in different qualities. Because of this it is impossible to say beads should only be purchased from one dealer.

Requisite of Good Beads

A. Evenness of color.

B. Even size.

SIZES: Apparently all dealers use the same system in designating size of beads. Sizes 16/0 [sic] and 3/0 are suggested as best suited for fine work. A complete color range can be had in either while in size 4/0 only a limited color range seems available. Size 0 seems a little too large for good work, though here too a full color range is available.

COLORS: About 30 different colors and shades are available in the opaque glass beads.

REQUIREMENTS IN ORDERING: A slight deviation in size, thickness, color and polish cannot be avoided. If here, however, there should be more than the smallest variation in any hank, that hank should be returned. Upon receiving an order, every hank should be inspected.

Italian beads are considerably cheaper than good Czechoslovakian beads, but are not so satisfactory. No Italian bead should be accepted as a substitute for a Czechoslovakian bead.

To be satisfactory beads must be made out of colored glass. No dyed bead is to be ordered or accepted.

No facet cut beads are to be used in the schools.

No translucent (the glassy one [sic]) beads are to be used in the schools. Both of these two last types of beads, it is true, are found in good old beadwork, but their successful use in designs is perhaps beyond the capacity of school pupils. (SEE PAGE 33).

Cont. It should be remembered that the numbers used by different dealers to designate colors differ according to different dealers. In ordering by number rather than by sample, one must be careful to use the number system of the dealer to whom the order is sent.

SAMPLE CARDS: These cards are expensive. It is suggested that care be used to preserve those you have or those you may obtain.

SUBJECT INDEX

This index is by no means exhaustive but will, nevertheless, allow the reader to access a wide range of subject matter. The numbers after each heading are those of the relevant articles.

BOOK REVIEWS

African Beads: Jewels of a Continent.

Evelyn Simak and Carl Dreibelbis. Africa Direct, 2300 Krameria St., Denver, CO 80207. 2010. 216 pp., 163 color figs. ISBN: 978-0-9816267-2-7. $69.95 (hard cover).

African Beads: Jewels of a Continent is a magnificent showcase of African beads. The beads are presented as if they are in front of the very eyes of the reader and one can reach out and touch them. The book entices and one cannot help reading until the last page. The quality of the publication and the colorful beads urge the reader to read on and never leave the book.

African Beads is the most recent publication (2010) by Africa Direct and is a comprehensive work on beads made in Africa. The book gives due credit to African craftsmen and women and promotes the economic value of beads. In the final analysis, the book has documented African beads in a way that most Africanist historians have wished to see.

The book approaches the subject on both the macro and micro level. At the macro level the history of African trade from antiquity to the present day is covered. In terms of manufacture, the history of African clay-work and blacksmithing are included, as well as glass beadmaking. At the micro level, reference is made to specific countries; e.g., silver in Ethiopia, and the famous beadmaking centers such as Mauritania for Kiffa beads and Ghana for Ashanti powdered-glass beads.

The book's key thematic areas address what beads are made of:

- Bones, teeth, claws, shells, stone, and plant materials in particular when presenting early indigenous beadmaking technology;

- Amber, clay, wood, and glass; and

- Precious and base metals, such as gold, silver, brass, copper, aluminum, and nickel.

The artistic significance of bead colors is one of the many interesting topics. The book identifies three colors (white, red, and black) which are basic to the continent and attributes a generalized cultural meaning to them. This helps us to understand why and how certain bead colors are utilized.

The authors' extensive collections of beads from all the different regions of Africa were used in the preparation of the book. As a result, we see excellent assemblages and photographs of beads that have been surface collected, recovered from archaeological sites, or attained through purchase. All the photographs are provided with informative captions and many of the photographs are full-page views.

The authors' background in photography and the collection of African beads have provided the right combination for the creation of a successful publication. They have produced a marvelous book with beautiful, different, and special kinds of photographs and accounts. However, dwelling more on legends about beads, which Africa is rich in, and including an African as either a co-author or editor would have added more value to the book.

The bibliography has two categories: African-Made Beads and African Beads. The references are complete and include both primary and secondary sources but few of them were printed on the African continent. A glossary would have helped the cultural outsider or bead novice to better understand the themes of the book.

African Beads: Jewels of a Continent is mainly descriptive due to its wide coverage (the entirety of Africa) and less analytical, though not without sophistication. The book has a special style and approach that sets a new standard to be followed by professionals and amateurs when collecting and writing about beads. Although the price makes the book unaffordable by many Africans, it is recommended for purchase by African academic and public libraries.

The book categorically refutes the belief held by some that beads made in Africa are less attractive and interesting than those produced in Europe. Furthermore, the book is indispensable for those wishing to have a comprehensive knowledge of African beads.

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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 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.
   d. Quaternary Headings are to be in regular (not bold) upper and lower case letters.

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.
   b. Black and white photographs must be submitted as glossy 5x7 or 8xl0 in. prints, or as high-resolution (300 dpi or higher) scans or digital images (.jpg or .tif files).
   c. Color illustrations will be considered if of sufficiently high quality to warrant the high cost of reproduction. They should be submitted in the form of 35mm slides, 4x5 in. prints or transparencies, or high-resolution (300 dpi or higher) scans or digital images (.jpg or .tif files).
   d. Figure and plate numbers are to be penciled lightly on the backs of drawings and photographs, and on the mounts of color slides. Electronic image file numbers must be appended to all captions.
   e. Photographs of objects, and maps, site plans, etc., should include a metric or metric/inch scale.
   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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8. If review remarks are such that substantial changes are required before a manuscript is acceptable for publication, the revised paper will be re-reviewed by the original reviewer prior to its final acceptance.

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.

10. Each author or set of co-authors will receive six complimentary copies of the journal. Book reviewers will receive one copy.

Plate IA. *Pumtek:* **Top:** Selection of spheroidal and barrel-shaped pumtek beads. **Bottom:** Diamond-tabular pumtek bead showing the grain of the opalized wood (photos: J.D. Allen and Patrick Craig).

Plate IB. Top: *Imitation coral:* The internal structure of the unusual Chinese bead (photo: Vonda Lee Adorno). **Bottom:** *Daugmale:* Beads with crizzled surfaces.

Plate IC. *Daugmale:* **Top:** Beads showing delamination/iridescence (10th-13th centuries). **Bottom:** Beads with a thick weathered crust which comes off in plate-like pieces.

Plate ID. *Daugmale:* **Top:** Beads before "normal" cleaning (10th-13th centuries). **Bottom:** Beads after "normal" cleaning.

Plate IIA. *Daugmale:* **Top:** Beads before "normal" cleaning (10th-13th centuries). **Bottom:** Beads after "normal" cleaning.

Plate IIB. *Kissi:* **Top:** The Grave 3 burial with a necklace of 77 quartz and jasper beads. **Bottom:** Anterior part of the Grave 10 necklace after removing the skeleton.

Plate IIC. *Land Dayak:* The necklace of *Tuai gawai* Jiop anak Jami. It is composed of glass beads, boar tusks, bear claws, and hawk bells (photo: H. Munan).

Plate IID. *Land Dayak: Pangeh;* when worn, the powerful part–the beads and old Chinese coins across the back of the neck–are not visible (photo: H. Munan).