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Cover. *Annam: Kim Khanh* Great Class; awarded by Emperor Khai Dinh (1916-1925); gold; 82 mm x 48 mm (courtesy: André Hüsken).

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KARLIS KARKLINS, editor

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ANNAMESE ORDERS: PRECIOUS METAL, TASSELS, AND BEADS

John Sylvester, Jr.

Over the centuries, beads have been used for myriad purposes but a seemingly unique application is their use as components of several types of Annamese orders. Now known as Vietnam, the State of Annam issued a number of civil awards during the late 19th and early 20th centuries. Four of these—khanh, boi, tien, and bai—were made of precious materials and incorporated bead strands and tassels in their composition. The khanh was reinstated as the second-ranking civil order of the Republic of Vietnam in 1957.

INTRODUCTION

Annam, properly known as Dainam, and now called Vietnam, was unified under the Nguyen dynasty in 1802. It attracted the colonial ambitions of the French, then engaged in imperial rivalry with Britain in Asia and elsewhere. In 1847, the first clash took place, as the French mounted an expedition to punish the Court at Hue over the persecution of Christian missionaries and converts. In 1862, the French returned to begin seizing the south of Vietnam, called Cochinchina by westerners. Spurred on by ambitious young naval officers, France was later to take the northern area of Tonkin. In 1883, France forced the Court at Hue to sign a convention which effectively ended the independence of Annam. The Emperors remained in the Imperial Palace with titular authority over the country and some actual authority over the central coastal area.

The Nguyen court was based, as with most formal aspects of Vietnam, on a Chinese imperial model. There were five classes of nobility and nine degrees of civil and military ranks of a mandarin, who earned their entry by passing an exam in the Confucian classics.

Like all Europeans of the 19th century, the French were fascinated by the bestowal of decorations and

medals. In Annam they found a system of awards in use by the Court at Hue that could be transposed, if somewhat awkwardly, into the Western context. Jules Silvestre (1903:65), the Director of Native Affairs in Cochinchina and a student of numismatics, wrote that the Annamese awards “belong to the class of emblematic jewels,” and, as such, resembled Western orders more than medals. They were awarded as symbols of the Emperor’s pleasure for the virtue of mandarins or for the meritorious service of civil and military servants of the Throne. Silvestre (1903:65) noted that they were “also awarded, and perhaps with greater frequency, to the rich man who has given large sums to the Imperial Treasury.”

THE PRINCIPAL AWARDS

There were four principal awards: the *khanh*, *boi*, *tien*, and *bai* (Dang Ngoc Oanh 1915; Sylvester 1986; Sylvester and Hüsken 2001). The *khanh* (Figs. 1-3; cover, Pl. IA), usually of gold, although for the Emperor and princes perhaps of jade, was shaped like the stone gongs called *khanh*, which had a ceremonial character and pleasing sound. They were decorated with curlicues or dragons and inscribed in Chinese characters that originally had an auspicious meaning pertinent to the recipient, but later just indicated one of the four grades of the *khanh*. The *boi* was the equivalent award for women, oblong or hourglass shaped and with a design of curlicues or phoenixes and Chinese characters. Both the *khanh* and *boi* were worn from a red or, in mourning, green cord around the neck and decorated with tassels or beads hanging from the lower edge.

The *tien* (Pl. IB) was a lesser award, but still, depending on the degree, of prestige. They were in gold and silver, and occasionally in bronze for



Figure 1. *Khanh* of the Special Class, repoussé gold, ca. 1930; 86 mm x 50 mm (photo: J. Sylvester, Jr.).

recipients of lesser rank. The *tien* were in the form of coins, with many patterns, often with a square hole in the center like Chinese cash, and decorated with auspicious symbols and Chinese characters. Decorations awarded for merit in China, as sometimes elsewhere, developed out of the bestowal of coins of honor. Some examples of *tien* were actually used as currency, but when received as an award would be either strung through the central hole or punctured to be mounted on a cord for wear around the neck. When worn in such fashion they also usually had tassels hanging below.

The *bai* were an insignia of rank or position, but had an honorary character, and some in silver were awards for bravery by soldiers. The *bai* were in gold for the Imperial family and the highest mandarins, sometimes decorated with pearls and beads of red coral (Pl. IC). Most for the mandarins were in ivory (Fig. 2). In earlier times they were of other materials, such as ebony and horn, for soldiers and lesser servants of the court. The *bai* were usually rectangular with a suspension piece at the top that looks roughly like a fleur-de-lis. Those for men did not have tassels, and were worn suspended from a button at the top right of the long tunic. Some *bai* for women of the court were more hourglass shaped or oblong, and were equipped with tassels. The *bai* were inscribed with the person's position or name, and were a visible ID card that allowed the wearer entry into the palace and informed the public of the person's position.

The tassels on the earlier awards were usually suspended from an elaborate knot with long strands of three colors, usually green, yellow, and red. For higher ranking persons, the tassels might be suspended from red-coral beads. Later on, the use of small glass beads came into fashion. A typical example might have the knot replaced by a beaded design in the auspicious shape of a bat (Fig. 1; Pls. IA, IB) composed of red, yellow, and light blue or other-colored beads. Suspended from this would be three or four multi-strand beaded tassels, each topped by a large bead of real or imitation red coral and ending in small orange tufts of yarn. The fringe created by the tassels displays four or five differently colored horizontal bands. There could be considerable variety; for instance, the upper design in one example being replaced by a woven dragon's face.

Under President Ngo Dinh Diem, the Republic of Vietnam revived the *khanh* in 1957, as the second-ranking civil order of the state. There were some American recipients of this most unusual order. In gilt, it maintained the same shape as those of the Court at Hue, but the design was changed to one of a scholar's scroll, five stalks of bamboo (the symbol of President Diem's First Republic), and dragons. It was in four classes, the Special Class being suspended from a Western-style orange sash, while the other three were worn on a cord around the neck. Each of the latter were differentiated by size and the color of the small tufts of yarn at the bottom of the tassels. Like



Figure 2. A mandarin, believed to be a medical doctor in Hanoi, with family and friends around the early 1920s. He wears a *khanh* around his neck and an ivory *bai* at the top right of his tunic, both in the usual fashion. His other awards include the Order of the Dragon of Annam, the Laotian Order of the Million Elephants and White Parasol, the Cambodian Royal Order of Monisraphon, the Cambodian Royal Order, and four French Indochina medals (collection of J. Sylvester, Jr.).



Figure 3. A group of senior Annamese officials wearing their robes and decorations, which include several *khanhs*, ca. 1920 (collection of J. Sylvester, Jr.).

those of the later Imperial awards, the tassels were composed of beads arranged in horizontal bands. The bands were successively purple, yellow, orange, green, and silver, with each band being separated from its neighbor by a single row of white beads next to a single row of purple beads.

CONCLUSION

The awards discussed above are uncommon and are eagerly sought by collectors of Asian medals. Like all orders, decorations, and medals, they are reflections of history, and testament to the merit, valor, and vanity of man.

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John Sylvester, Jr.

STONE BEADS AND SEALSTONES FROM THE MYCENAEAN THOLOS TOMB AT NICHORIA, GREECE

Nancy C. Wilkie

Stone beads and engraved sealstones are among the most common grave goods that accompany Mycenaean burials. At Nichoria in the southwestern Peloponnese of Greece, a tholos tomb, presumably the burial place of the local elite at the site, had been plundered more than once in antiquity before being investigated by archaeologists. Nonetheless, it produced numerous stone beads of rock crystal, amethyst, carnelian, agate, and "steatite." Eleven sealstones, most of which were heirlooms when placed in the tomb, were also found among the disturbed burial offerings.

INTRODUCTION

Beads of all types are well known from a variety of Mycenaean (i.e., Late Bronze Age, ca. 1650-1100 B.C.) contexts on the mainland of Greece, although they most commonly appear as grave goods in chamber and tholos tombs. At the site known today as Nichoria (Fig. 1), a tholos tomb, whose beehive-shaped dome had collapsed in antiquity (Figs. 2-4), contained the remains of at least 16 individuals, presumably members of the ruling elite. Numerous grave goods accompanied the burials, including an assortment of stone beads and seals, most of which represent types found elsewhere on the Greek mainland and the island of Crete, although a few are unique.

As is the case with most Mycenaean tombs (Taylour 1990:81), the Nichoria tholos was repeatedly plundered in antiquity. This was done mainly by family members as they prepared the tomb for new burials at various times during its nearly 200-year history (ca. 1375-1200 B.C.), and finally by looters shortly after the last burial was put in place. Although the objects overlooked by the ancient looters provide only a glimpse of the wealth amassed by the local elite who were buried in the tomb, they demonstrate that even a

provincial site such as Nichoria was well within the mainstream of Mycenaean culture and had extensive contacts, either directly or indirectly, with sites elsewhere on the Greek mainland and in the wider Aegean area. The stone seals and beads, in particular, are likely to have been acquired through trade or "gift" exchange with centers on the Greek mainland or Crete where workshops for their manufacture have been identified. Some of the materials, however, such as the amethyst, carnelian, and agate, must have been imported from distant lands; e.g., Egypt and possibly even India (Hughes-Brock 1998:256-257).

SEALSTONES

Among the most impressive grave goods from the Nichoria tholos are 11 stone bead-seals of agate and carnelian. Either lentoid or amygdaloid in shape, they were pierced to be worn around the neck or wrist, and many, in fact, show signs of wear around their perforations. The seals can be dated on stylistic grounds, and it appears that the majority were engraved well before the tomb was constructed early in the Late Helladic IIIA2 period, ca. 1375 B.C. (Late Helladic is yet another name by which the Late Bronze Age on the Greek mainland is commonly known). Thus, as was often the case with sealstones, these items were already heirlooms by the time they were deposited in the tomb.

The earliest among them is the so-called "talismanic" seal (Pl. ID top) found with the remains of four secondary burials in a shallow cist at the north end of the tomb chamber (Fig. 3, Pit 4). This carnelian amygdaloid, like most talismanic seals, is simply engraved with circular elements made by a tubular

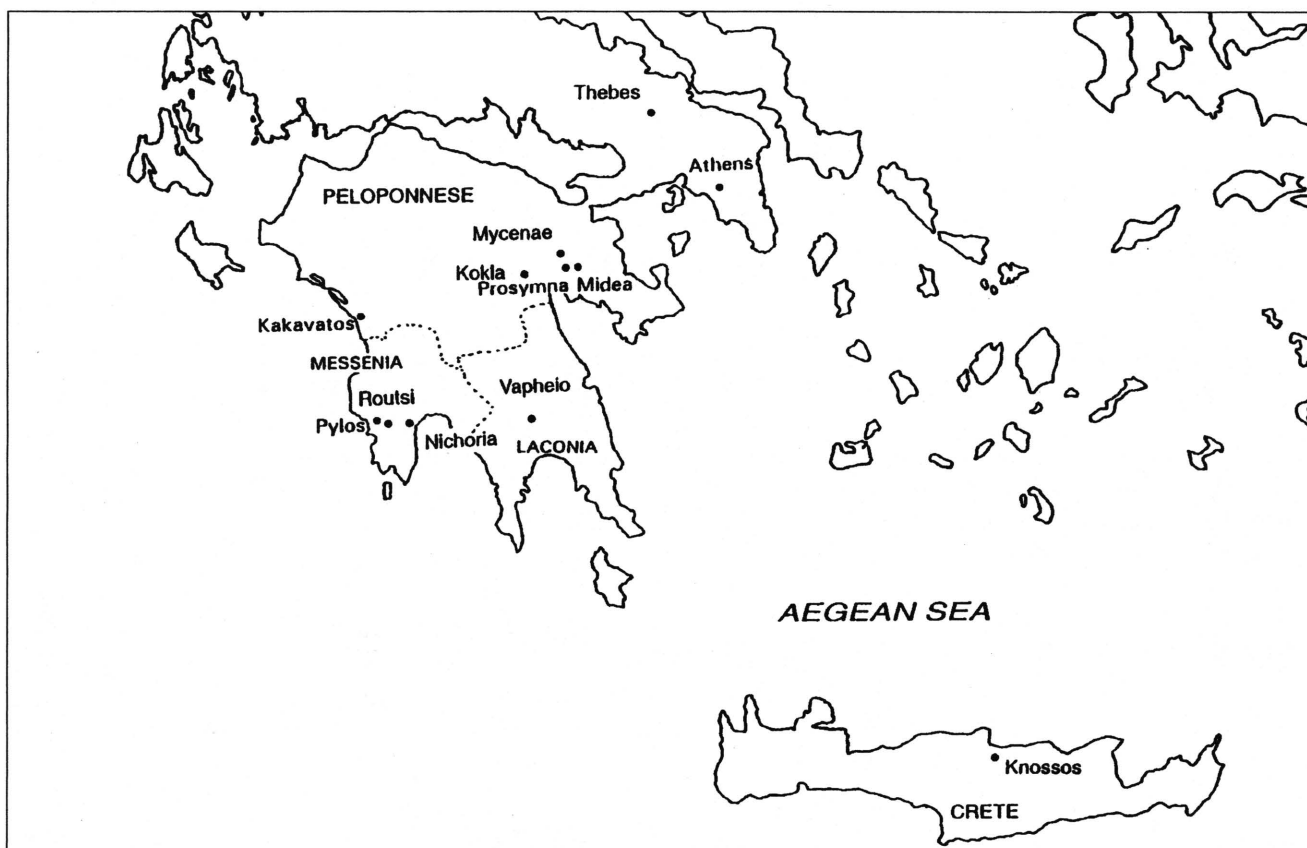


Figure 1. Map of Greece and Crete showing sites mentioned in the text (drawing: Bryan Carlson).

drill and straight lines cut by a saw or wheel. The main motif, one of the most popular on talismanic seals, is that called “foreparts of fish” (Kenna 1969:Plate 8). A cross-rosette pattern fills the central area. There is no iconographic parallel for this seal, which is to be expected since the exact repetition of talismanic motifs, especially specific combinations of them, is very rare.

Talismanic seals seem to have originated in Crete where they were made from Middle Minoan III (i.e., Middle Bronze III on Crete) until the time of the Late Minoan IB destructions, ca. 1750-1450 B.C. (Betts 1974:312; Onassoglou 1985:194). The seal from the Nichoria tholos is probably one of the latest to be engraved. Even more importantly, it comes from one of the latest Mycenaean contexts for seals with talismanic motifs.

Noting that few impressions are known from talismanic seals, Kenna (1969) suggested that their function was magical and that the motifs engraved on

them were responsible for their magical efficacy. Boardman (1970:43, 1972), however, has pointed out that the use of talismanic seals to make impressions was more common than Kenna either recognized or admitted, so that their use as talismans or amulets is open to question.

Another possibility is that talismanic seals carried meaning, either phonetically or in broad symbolic concepts due to the combination of motifs engraved on them (Onassoglou 1985); but this idea has not been widely accepted. In any event, the talismanic seal from the Nichoria tholos seems to have been highly valued since it, unlike most of the other seals from the tholos, was set in gold caps, adding to the seal’s aesthetic appeal and serving to protect its perforation from wear.

Also among the remains of the secondary burials in Pit 4 were four large agate lentoids (Pls. ID bottom, IIA, IIB top) of similar size and material. Two depict a lion attacking a bull and two show a pair of recumbent



Figure 2. The Nichoria tholos after excavation, looking northeast (photo: Nancy Wilkie).

bulls, both common Mycenaean and Minoan motifs. Despite their similar motifs, these seals were probably not produced in the same workshop or, at any rate, not engraved by the same artist, since they exhibit different stylistic and technical qualities.

The earliest seal in this group (Pl. ID bottom) has been dated to the Late Helladic IIA period, ca. 1500 B.C. (Younger 1978:294, 1984:48), and so may have been engraved as much as a century before the tomb was constructed. It shows a bull in a seated position, with its legs drawn up beneath it and its head tilted back. The lion stands on the back of the bull, attacking its exposed throat from behind. A second seal (Pl. IIA top) displays the more common version of this motif, with the bull shown in a flying gallop and the lion attacking at the center of its back. The lion is depicted with large frontal eyes, made with a tubular drill, and an elongated tongue. It, like the other pair of agate lentoids from the cist, was probably made in the mid-15th century B.C. (Younger 1985a:66, 68).

Although similar to seals engraved with the common motif of recumbent bulls from tombs at Mycenae, Thebes, and Vapheio (Fig. 1), one of the seals from Nichoria with this motif is unusual in that it depicts the bull in the foreground in profile, yet its horns are full front (Pl. IIA bottom). The other (Pl. IIB top) shows the profiled bull in the more normal fashion with its horns also in profile. Technically, the former sealstone is also unusual in its “curious use of three dots for the front of the mouth” and in the outline around its circular eye socket (Younger 1985a:65).

The similarities in size, shape, material, and motif among these four seals suggest that they were acquired by a single individual who may have valued them as gems rather than as seals. The collecting of sealstones seems to have been a peculiarly Mycenaean—as opposed to Minoan—habit, as evidence from other mainland tombs suggests. The largest group of sealstones accompanying a single burial was uncovered in the tholos tomb at Vapheio in Laconia (Fig. 1) where 12 sealstones were found beside each

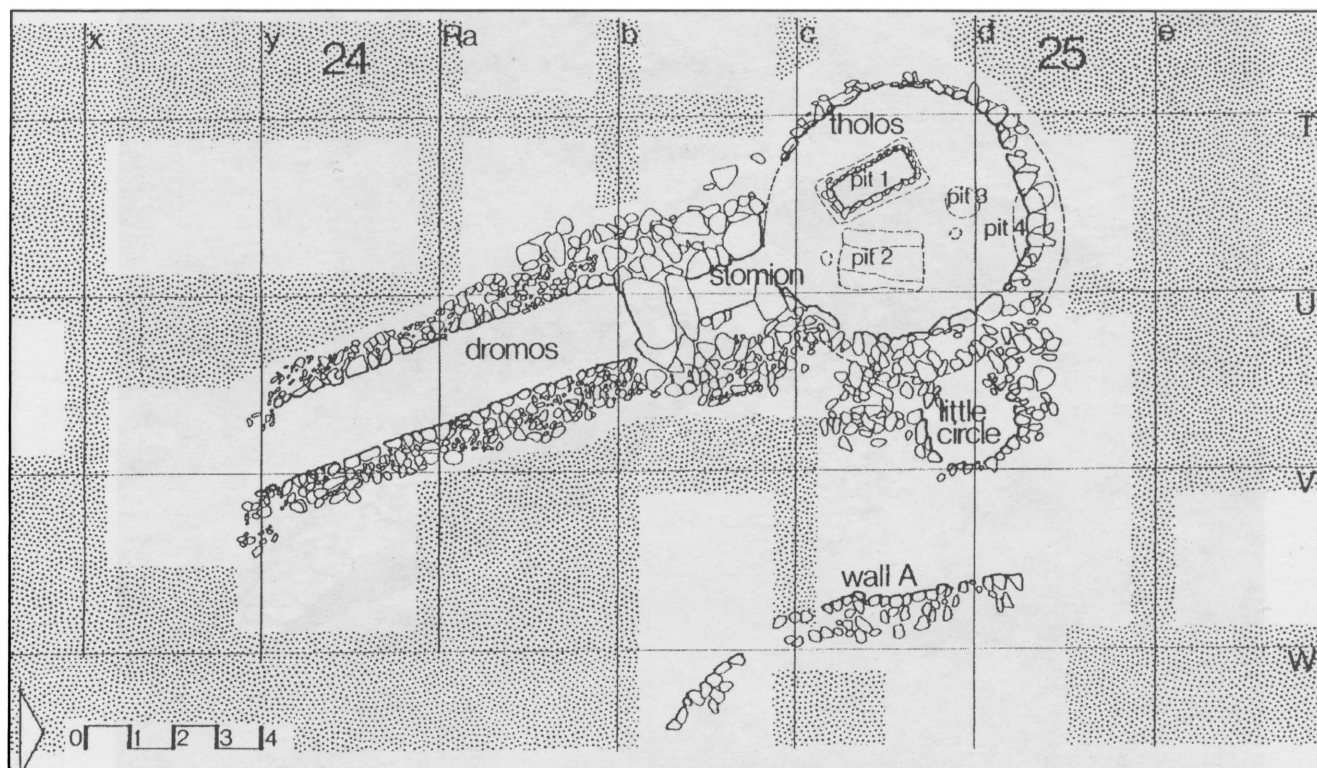


Figure 3. Plan view of the tholos (drawing: Bryan Carlson).

hand (Tsountas 1889:147; Younger 1973b). Likewise, the deceased in Tholos Tomb 2 at Routsis in Messenia (Fig. 1) held 12 sealstones in his hands (Marinatos 1957a, 1957b), and a silver cup on the breast of the individual in the Midea tholos (Fig. 1) contained six lentoid seals and four bronze rings (Persson 1931:32-33). Although Boardman (1970:56) sees such collecting as a matter of display more than of connoisseurship among the Mycenaeans, Ingo Pini (1990:pers. comm.) does not agree, suggesting instead that an individual may have owned, and presumably used, more than one sealstone during his or her lifetime.

The final seal from Pit 4 is a carnelian amygdaloid that depicts two water birds (Pl. IIB bottom) and has a faceted back. It is engraved in what has been called the developed Cut Style (Betts and Younger 1982; Boardman 1970:48; Younger 1985b:283-284) in which only straight cuts or grooves are utilized, so that curved lines and rounded edges result simply from the convex shape of the stone. Seals of this style were made in Crete in the period prior to the Late Minoan IIIA destruction of the palace at Knossos, ca. 1375 B.C. (Younger 1985b:283).

Also in the Cut Style are a small carnelian lentoid (Pl. IIC top) and a somewhat larger agate lentoid (Pl. IIC bottom), both of which depict a griffin with outstretched wing. Despite their similar motifs, the two seals may not have belonged to the same individual since one came from the fill of one of the shaft graves cut into the floor of the tomb chamber (Fig. 3, Pit 1), while the other was among the disturbed deposits strewn across the floor of the tomb. Furthermore, the two seals exhibit differences in workmanship. On the larger seal, tubular drill marks depict the eye and hooves of the griffin. They also decorate the wing of the griffin and the plant fill in the foreground. The seal from Pit 1, on the other hand, shows only limited use of the drill on the griffin's eye.

A common Mycenaean and Minoan motif, the griffin is thought to have functioned as a protective genius due to its association with thrones, columns, and altars (Dessenne 1957; Tamvaki 1974). A similar function has been attributed to the so-called Minoan genius depicted on the agate amygdaloid (Pl. IID top) found in the disturbed fill of the other shaft grave (Fig. 3, Pit 2) cut into the tomb chamber's floor. Younger (1986:131) has assigned this seal to his "Spectacle-

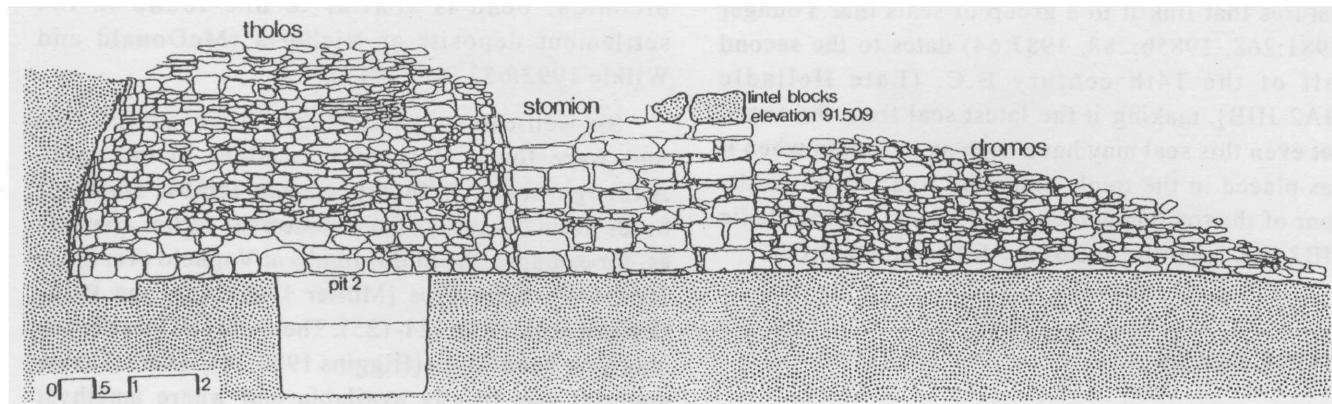


Figure 4. Section through the tholos (drawing: Bryan Carlson).

Eye Group” which he dates to Late Minoan/Late Helladic IIIA1.

The genius is depicted in the usual fashion with the head of an ass, a pinched-in “wasp” waist and fringe along its back. It stands upright, holding a single-handled libation jug in its paws. The column before which it stands may represent the deity for whom the libation was intended. Unlike many of the motifs on Mycenaean and Minoan sealstones, depictions of the Minoan genius do not have a standard form (Crouwel 1970; Gill 1964, 1970; Stürmer 1985; Van Straten 1969). The combination of genius, jug, and pillar as depicted on this seal thus has no exact parallel.

The most unusual sealstone from the Nichoria tholos is the carnelian lentoid that depicts the full-face portrait of a beardless male (Pl. IID bottom). It has been claimed to be “so different from any Bronze Age seal hitherto known that, had it appeared in a private collection or come onto the market without authentic provenience or history, it would most certainly have been widely condemned as a forgery” (Betts 1981:17, *see also* 1980:23).

Only one other portrait gem has been recovered from a mainland Mycenaean context: the much earlier miniature amethyst lentoid from Grave Gamma of Grave Circle B at Mycenae (Mylonas 1972:Plate 60b; Sakellariou 1965:Number 5). It depicts a bearded man in profile, with long hair hanging over the back of his neck and onto his forehead. Opinions vary as to whether or not this seal should be regarded as a

portrait, although Boardman’s (1973:117) view that the concept of true portraiture was a late development in Greek art, and one that was unknown to artists of the Late Bronze Age, seems to prevail.

The portrait seal is the only one from the tholos that shows a great deal of wear, with one large and several small chips along the edge. Because it is pierced along the horizontal axis of the design rather than vertically as is most common, this seal may have been worn around the neck of its owner rather than on the wrist in the more usual fashion (Younger 1977:146-149). Perhaps it was strung in a necklace with the unusual rock crystal ring and “beetle” beads (Pl. IIIA top) that were found in close proximity to it among the disturbed deposits in the northwestern quadrant of the tomb chamber’s floor (*see below*). Necklaces incorporating sealstones along with other types of beads are not unknown from Mycenaean contexts. For example, according to Tsountas (1889:146), the cist in the Vapheio tholos contained a necklace made up of 80 amethyst beads and two sealstones.

Due to the lack of parallels, the date of manufacture of the portrait seal from Nichoria is uncertain. However, the simple bold lines of the hair and the lack of elaboration with the tubular drill suggest that it should be associated with seals like those made in the Cut Style described above.

The final sealstone from the Nichoria tholos is a small carnelian lentoid depicting two goats (Pl. IIIA top) that was found in the disturbed fill of Pit 2 (Fig. 3).

The petite size and dainty style of this seal are notable features that link it to a group of seals that Younger (1981:268, 1985b:288, 1987:64) dates to the second half of the 14th century B.C. (Late Helladic IIIA2-IIIB), making it the latest seal from the tomb. Yet even this seal may have been an heirloom when it was placed in the tomb, since the final burial on the floor of the tomb chamber was made in Late Helladic IIIB2 (i.e., near the end of the 13th century B.C.).

STONE BEADS

Although beads of rock crystal are well known from Mycenaean and Minoan contexts, the shapes of those from the Nichoria tholos are unusual (Pl. IIIA bottom). There are no known parallels for the ring-shaped beads, and "beetle-shaped" beads only occur in glass with gold foil coverings (Haussoullier 1878:221-222). Although unworked pieces of rock crystal have been found in workshops at Thebes (Demacopoulou 1974:169, 173, Fig. 7; Keramopoulos 1930:35-36, Figs. 3-4), the material is more common in Crete. This, combined with the Minoan penchant for creating unusual pieces of jewelry (Hughes-Brock 1989:pers. comm.), makes it likely that both the ring and "beetle" beads are of Cretan manufacture. Because all of the rock-crystal beads were found lying near one another among the disturbed deposits on the tomb chamber's floor, it is likely that they were originally strung together in a single necklace.

Of the 38 roughly cut, spherical beads made of carnelian (Pl. IIIB top), all but one were recovered from the disturbed fill of Pit 2. They too probably thus once formed a single strand. The poor workmanship exhibited by these beads is most noticeable in the ridges that remain around their equators. In addition, the quality of the stone is poor, unlike that of the considerably smaller, well-cut spherical carnelian bead found in Pit 4. This difference in workmanship may reflect a difference in date, since Blegen (1937:288) observed that at Prosymna, the more roughly cut spherical carnelian beads are typical of Late Helladic III, while the better-worked beads are somewhat earlier.

Two additional carnelian beads were also recovered: a biconical specimen from the tomb chamber's floor, and a well-carved amygdaloid from

Pit 2. Both shapes are well known, and in fact the biconical bead is similar to one found in the settlement deposits at Nichoria (McDonald and Wilkie 1992:652, No. 2017).

Six well-carved spherical amethyst beads (Pl. IIIB top) were found at various locations in the tomb. Although common in Mycenaean tombs, amethyst beads normally derive from somewhat earlier contexts as, for example, the tholos tombs at Vapheio (Tsountas 1889:144), Kakovatos (Müller 1909:295), and Pylos (Blegen et al. 1973:124-125). The source of these beads may have been Egypt (Higgins 1980:36), where the raw material was locally available and where amethyst beads were popular during Middle and New Kingdoms.

The large, carefully carved and polished prismatic agate (Pl. IIIB bottom) found in Pit 4 is unusual in that none of its three circular faces, set off by shallow grooves, is engraved. Three-sided agate prisms are normally found as bead-seals in Mycenaean contexts where they have been dated as late as Late Helladic IIIA1, ca. 1400 B.C. (Younger 1973a:172). The bead is mounted on a hollow bronze shaft which has a gold cap with gold granules surrounding the perforation at its preserved end. Remains of plant fiber were found in the perforation.

STEATITE "CONULI"

Also among the grave goods from the Nichoria tholos are three stone objects that may or may not have served as beads. In the literature, these objects are often said to be made of steatite and/or serpentine, yet the two materials are quite different in composition and hardness. Since the conuli from the tholos were not examined by a geologist, they, like all of the other stone conuli from the settlement, have been labeled "steatite" as a matter of convenience.

Suggestions for the use to which such conuli might have been put range from loomweights, spindle whorls, buttons, and beads to dress weights (Iakovidis 1977). While those from the Nichoria tholos are typical of the shanked variety, which began in Late Helladic IIIA2 and was common from Late Helladic IIIB on (Iakovidis 1977:113), nothing can be said about the way in which these particular objects were used since they come from disturbed contexts within the tomb.

Their use as spindle whorls has been rejected by Carington Smith (1992:685) because their holes are too small to have accommodated a spindle. In fact, of the approximately 90 steatite conuli from the settlement deposits at Nichoria, only 10 or 11 have large enough holes and sufficient weight to have functioned as spindle whorls.

Evidence from tombs elsewhere in Greece provides suggestions as to how the steatite conuli may have been used. For example, Tsountas (1897:174) proposed that the 160 conuli found in a single tomb at Mycenae might have been buttons, yet there is no evidence that Mycenaeans wore clothing suitable for such large and heavy buttons. Instead, it has been pointed out that similar objects were used as beads at Tell el Amarna, an Egyptian site contemporary with the Late Bronze Age of Greece and Crete (Pendlebury 1937-38:54). Carington Smith (1992:686), however, points out that the sheer weight of such beads makes this suggestion improbable, at least for the group of 160 conuli from Mycenae. Furthermore, no Mycenaean burials have been found with a mass of steatite conuli arranged in such a way as to imply that they once formed a necklace.

Instead, Carington Smith agrees with Iakovidis' (1977) suggestion that at least some of these objects were used as hem weights for dresses. This idea is supported by the discovery of 11 conuli around the legs of the deceased in Tomb 16 at Perati near Athens (Iakovidis 1980:78), and their depiction around the hem of the dress of one of the women on the fresco from Room 31 of the Cult Center at Mycenae (Rehak 1992:Plate XIIa).

A single conulus, on the other hand, might have had many uses. For example, steatite conuli found in association with bronze points in tombs on Crete may have belonged to hairpins (Hood, Huxley, and Sandars 1958-59: 246, 251), a use also proposed for glass-paste conuli found in conjunction with glass-paste pins (Dimopoulou-Rethemiotaki and Rethemiotakis 1978:104-106).

Finally, conuli may have been attached as weights to the ends of belts, in the manner depicted in a fresco from Akrotiri on Santorini (Marinatos 1972:40). Such an interpretation is supported by evidence from two burials in the Athenian Agora where a single conulus in one instance and three in another were found near the waists of the skeletons (Immerwahr 1971: 220-221).

CONCLUSION

Because all of the burials in the Nichoria tholos were disturbed in antiquity, it has not been possible to determine exactly how particular beads or sealstones were used. Nor can they be associated with particular individuals. Both males and females, ranging in age from young adults to those 50-60 years of age, are represented among the various skeletal remains (Wilkie 1992:256, Table 5-9), and stone beads similar to those from the Nichoria tholos are found with both male and female burials elsewhere in Mycenaean Greece and Minoan Crete.

In Mycenaean and Minoan art, it is women more often than men who are shown wearing bracelets and necklaces, some of which incorporate sealstones along with other types of beads (Younger 1977:147-149, 1992:272-273). Because the women who wear sealstones often appear to be involved in some sort of ritual, Younger (1992:276) has proposed that they were priestesses. Although this suggestion is intriguing, the disturbed state of the burials in the Nichoria tholos makes such an interpretation for any of the remains found there mere conjecture. (For a recent summary of the evidence concerning the use of Mycenaean beads, *see* Hughes-Brock 1998.)

The inclusion of grave goods among the skeletal remains of the four secondary burials in Pit 4 is a peculiarity of the Nichoria tholos that is worth noting. Because all the items are quite small, their incorporation in the pit fill was probably unintentional. They easily could have been overlooked by those responsible for reburying the fragmentary remains of the four individuals found in Pit 4.

A slightly different situation pertained in the Kokla tholos (Fig. 1), where a few objects of gold, silver, ivory, bronze, glass paste, and stone were recovered, but there was no trace of human skeletal material (Demacopoulou 1990). Perhaps the relatives of the deceased overlooked some of the smaller grave goods while clearing the tomb for a new burial, which was subsequently never interred. Years later, these reclaimed objects may have found their way into another tomb, this time as heirlooms, as happened with most—if not all—of the sealstones and at least some of the other beads from the Nichoria tholos.

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IDENTIFYING SOURCES OF PREHISTORIC TURQUOISE IN NORTH AMERICA: PROBLEMS AND IMPLICATIONS FOR INTERPRETING SOCIAL ORGANIZATION

Frances Joan Mathien

Well-made turquoise beads are rare at North American archaeological sites, and the prehistoric sources of turquoise are limited. Mining the turquoise, manufacturing the bead, and using it as part of a bracelet or necklace involve numerous human interactions to transport the raw material from its source to the place where it is finally found in an archaeological context. Accurate identification of turquoise sources affects our interpretation of prehistoric behavior and is the focus of this paper.

THE IMPORTANCE OF TURQUOISE BEADS

Tiny turquoise beads (Pl. IIIC top) found in many archaeological sites provide clues for the reconstruction of human behavior over long time periods and across large geographical spaces. This presentation outlines the use of turquoise by people in Central Mexico and the southwestern United States from the time of Christ to the present in order to determine what trade links may have existed among the various culture groups. The emphasis will be on Chaco Canyon, located in the approximate center of the San Juan Basin of northwestern New Mexico (Fig. 1).

Between 1896 and 1899, the Hyde Exploring Expedition, with George Pepper as the field archaeologist, worked at Pueblo Bonito, the largest site in Chaco Canyon (Fig. 2). Among the rooms he excavated were several in the approximate center of the site which, based on architectural style, were among the oldest. In these rooms were collections of unusual objects; e.g., digging sticks and cylindrical jars which had never before been seen in such numbers. Room 33 contained numerous burials, two of which were beneath wooden boards. These two males were

accompanied by thousands of marine shells, turquoise beads, and turquoise pendants; the beads alone numbered around 15,000 (Pepper 1909:222-225). Such remarkable wealth has not been seen again during the nearly 100 years of excavation in Chaco Canyon, and it provides evidence for considering Chaco as an important center between A.D. 950 and 1150.

Knowledge of turquoise sources was limited in the late 1800s. Blake (1858), who was one of the earliest mineralogists to explore the newly acquired territory

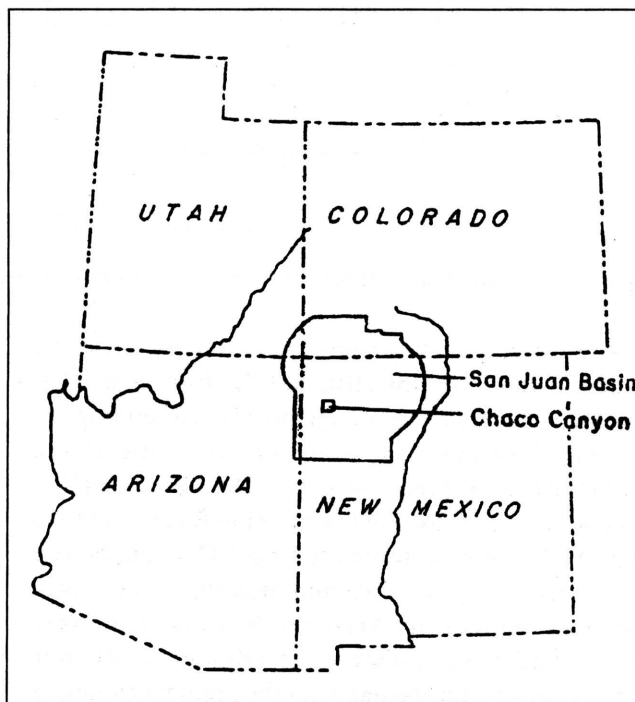


Figure 1. The location of Chaco Canyon and the San Juan Basin in northwestern New Mexico (drawing: Jerry L. Livingston).

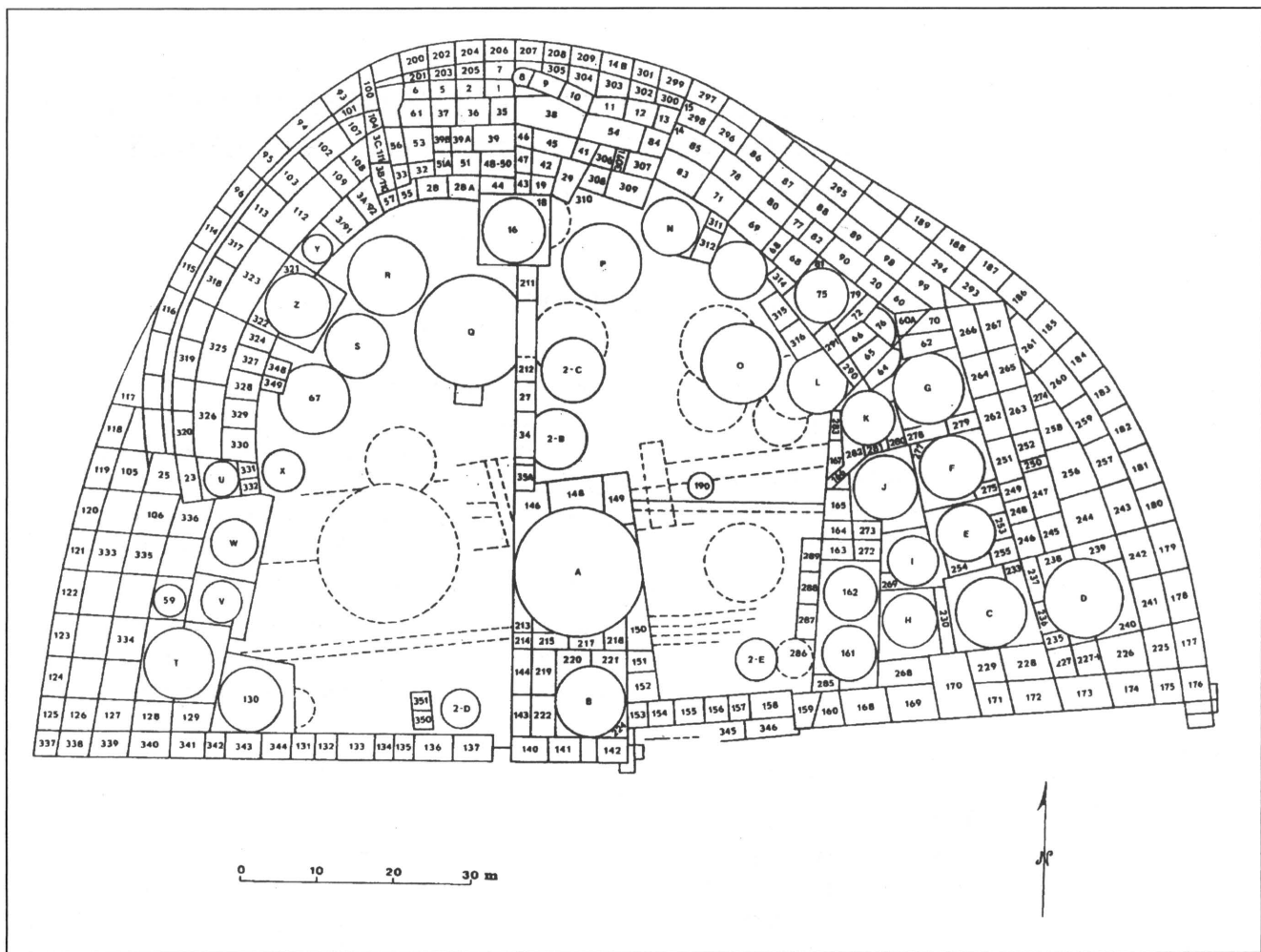


Figure 2. Ground plan of Pueblo Bonito (Lekson 1984:Figure 4.17.)

of New Mexico, described Mount Chalchihuitl, located in the Cerrillos Hills not far from Santa Fe, New Mexico. Here was a huge prehistoric mining pit (Fig. 3), as well as stone tools (Pl. IIIC bottom) and other evidence of prehistoric use. The Cerrillos Hills are approximately 200 km from Pueblo Bonito, and are the nearest turquoise source to Chaco Canyon. By the time Pepper excavated Pueblo Bonito, a few other turquoise sources in Arizona, Nevada, and New Mexico had been documented (Blake 1899), but Cerrillos was by far the one with the greatest evidence of prehistoric use. Because of the similarity in color between the artifacts recovered at Pueblo Bonito (Pl. IIID) and the turquoise samples from the Cerrillos Hills (Pl. IVA), Pepper (1909) suggested that the people at Pueblo Bonito probably obtained their turquoise from that location.

This link between Chaco Canyon and the Cerrillos turquoise mines is still a major topic of discussion. Today, however, there is considerably more information concerning where turquoise artifacts have been recovered. Turquoise has been found at archaeological sites as far south as Guatemala, but it appears in greater quantities in central and northern Mexico and the American Southwest. Because it is a mineral that usually occurs only in arid regions, it has been suggested that major trade networks between central Mexico and Chaco Canyon were established in order to provide turquoise for Mesoamerican consumption. The models provided by Di Peso (1968a, 1968b), Kelley and Kelley (1975), and Weigand (1994; Weigand and Harbottle 1992:84; Weigand, Harbottle, and Sayre 1977) postulate trade networks among various groups. Some archaeologists (e.g.,

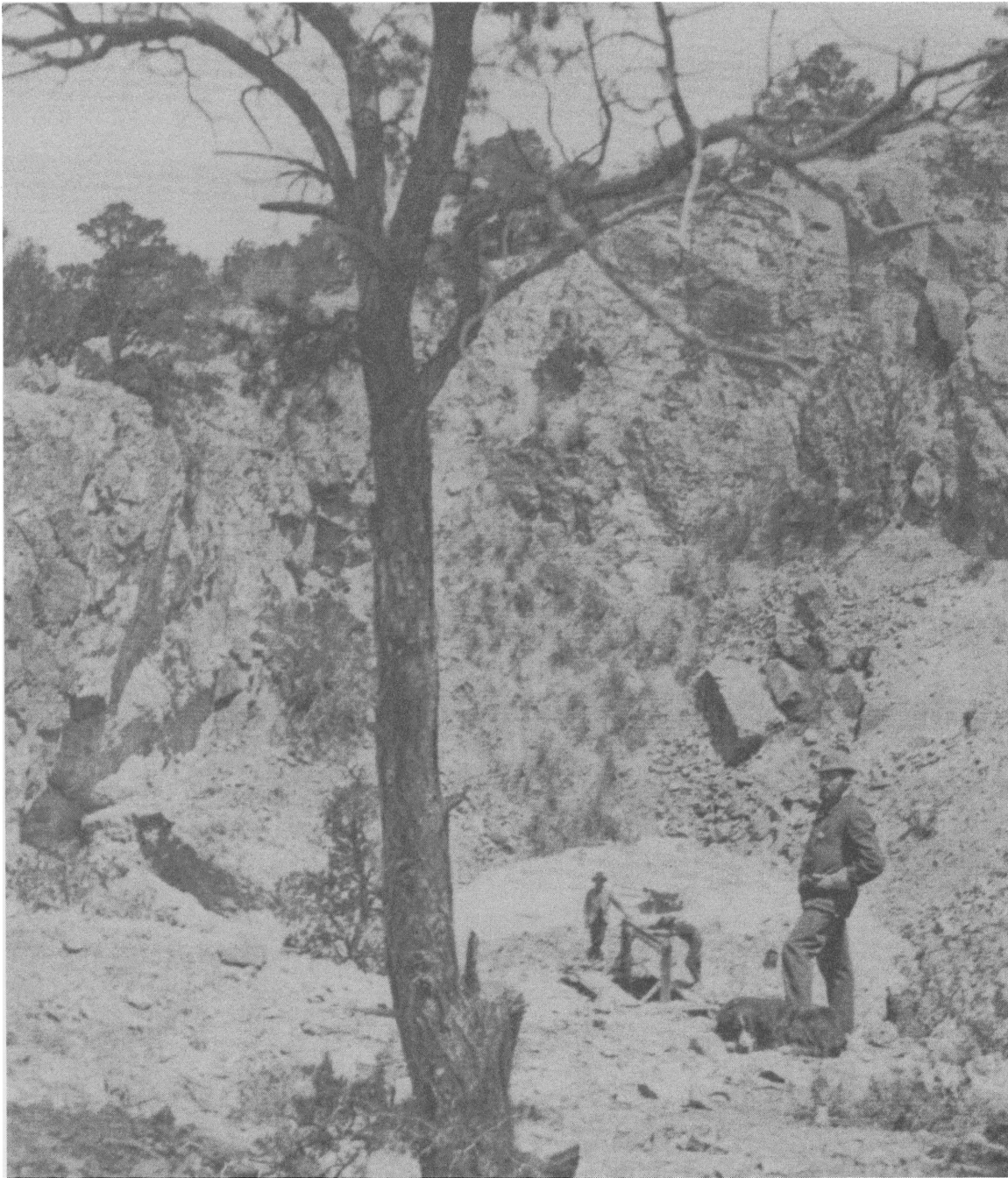


Figure 3. An 1879 photograph of a prehistoric turquoise mining pit at Mount Chalchihuitl in the Cerrillos Mining District, New Mexico. The miners are placing an exploratory shaft in the bottom of the pit (photo: Bennett & Brown; courtesy New Mexico Bureau of Mines, Socorro).

Mathien 1981a, 1986) suggest that the method of transporting turquoise between these two distant areas may have been only loosely structured. It still remains, however, to be determined whether turquoise, or any

other material or artifact, reflects actual influences of one group of people in Mesoamerica on others in the Southwest (Lister 1978:240; Mathien and McGuire 1986; McGuire 1980).

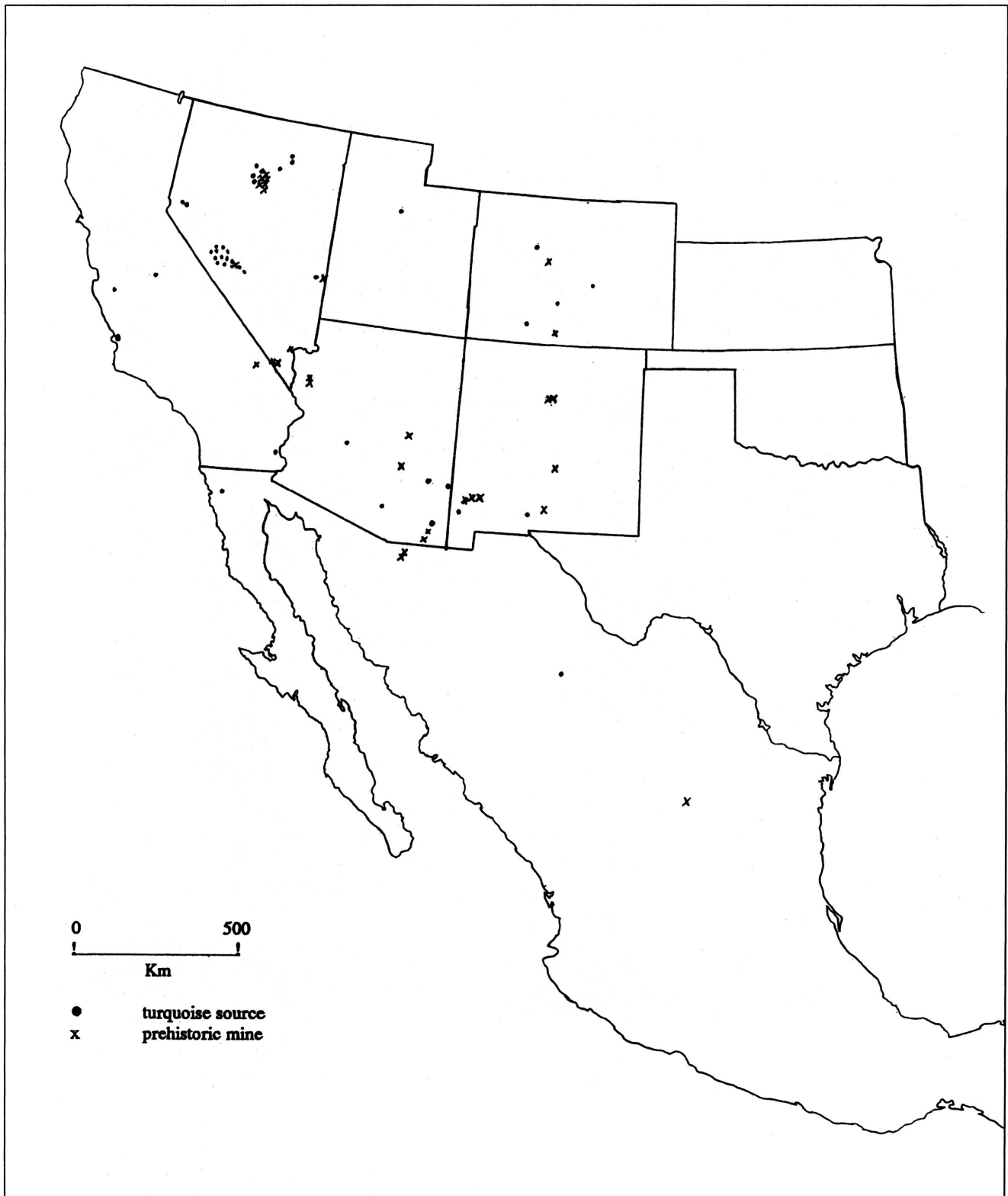


Figure 4. The locations of known turquoise sources in the American Southwest and northern Mexico (all drawings by F.J. Mathien).

TYING TURQUOISE ARTIFACTS TO TURQUOISE SOURCES

To understand turquoise trade networks, characterization of source areas and the comparison of artifacts with source materials is a basic step. Chemical turquoise is found in approximately ten states in the United States and five in Mexico (Fig. 4). The larger turquoise deposits are located in New Mexico, Arizona, California, and Nevada, with lesser deposits in the surrounding states of Colorado, Utah, Texas, Baja California, Sonora, Chihuahua, Coahila, and Zacatecas (Anthony, Williams, and Bideaux 1982; Galbraith and Brennan 1959; Morrissey 1968; Northrop 1959, 1975; Panczner 1987; Pemberton 1983; Pogue 1915; Sigleo 1970; Weigand and Harbottle 1992). Some of the deeper deposits known today were not discovered until copper mines reached some depth. Because prehistoric tools have been recovered from many of these mines, we can conclude that pre-Columbian populations had knowledge of numerous turquoise sources.

Unfortunately, correlating artifacts with specific sources is not a simple matter. Pepper chose to visually assess the color of the stone and its matrix. But appearance is deceiving. Color in a single vein of turquoise will vary. Some colors fade on exposure and use. Leaching and weathering of veins that are closer to the surface versus those lying deeper in the earth also affect color. In addition, we do not know what has happened to artifacts that have lain in the ground for many years. Based on surveys in the Cerrillos Hills, the color of the turquoise from the mines located there is so variable that most specimens from other sources cannot be distinguished from it visually (Pl. IVA).

Such local variability in turquoise is not unexpected. Numerous wet chemical analyses of turquoise from the United States, Mexico, and other countries have resulted in a number of formulae for turquoise (Northrop 1975). Although mineralogists understand the basic chemical elements and the range of variation to be expected in each, they have not fully documented the total composition of turquoise because it picks up numerous chemical elements from the host rock during the formation process (Sigleo 1970).

Recent improvements in analytical technology have provided some information regarding trace

element content in turquoise, and larger collections of source material have made it possible to examine artifacts, compare them with the source samples, and suggest possible source areas for them. These studies are not definitive, but preliminary work suggests that they could prove useful. Appendix A reviews the analytical methods used to date and notes problems with each.

A pioneering study by Anne Sigleo (1970) used arc emission spectrography to analyze turquoise from three sites in Chaco Canyon. One artifact from Bc 57 was linked to a mine in Mineral Park, Arizona, while another from the same provenience had some similarity to a mining sample from Cripple Creek, Colorado. An artifact from Chetro Ketl and one from Bc 58 were slightly similar to samples from Crescent Peak, Nevada (Fig. 5). Based on these data, it may be inferred that people living in Chaco Canyon obtained their turquoise from three mines in three different locations. One artifact from Casamero, a Chaco-related community structure, was also similar to source material from Mineral Park. An artifact from another nearby site did not resemble any of the mining specimens. Both Mineral Park and Crescent Peak exhibit considerable evidence of prehistoric use and these areas, as well as Cripple Creek, have been known for many years. They can be considered possible sources of prehistoric turquoise for the Chacoans around A.D. 1000-1150.

Other artifacts that Sigleo analyzed came from slightly later archaeological sites near Zia Pueblo, New Mexico. One may have come from the Cerrillos Hills, another from Mine No. 8 in Nevada (Fig. 6). While the first correlation may be relevant because the dating of the site and the sherds found around the Cerrillos Hills fall within the same time range (A.D. 1200-1600), the latter does not because Mine No. 8 was not opened until the 1900s. Based on this evidence, Sigleo (1970:75) concluded that her results were intriguing but not definitive.

Sigleo also used neutron activation to test turquoise artifacts from two archaeological sites. Thirteen of the objects were prehistoric turquoise beads from Snaketown, Arizona (Sigleo 1975). The beads came from the fill of House 8, which dates from A.D. 500-700. Not only could these beads be linked to the Himalaya group of mines (Fig. 7) near Halloran Springs, California, where there is considerable

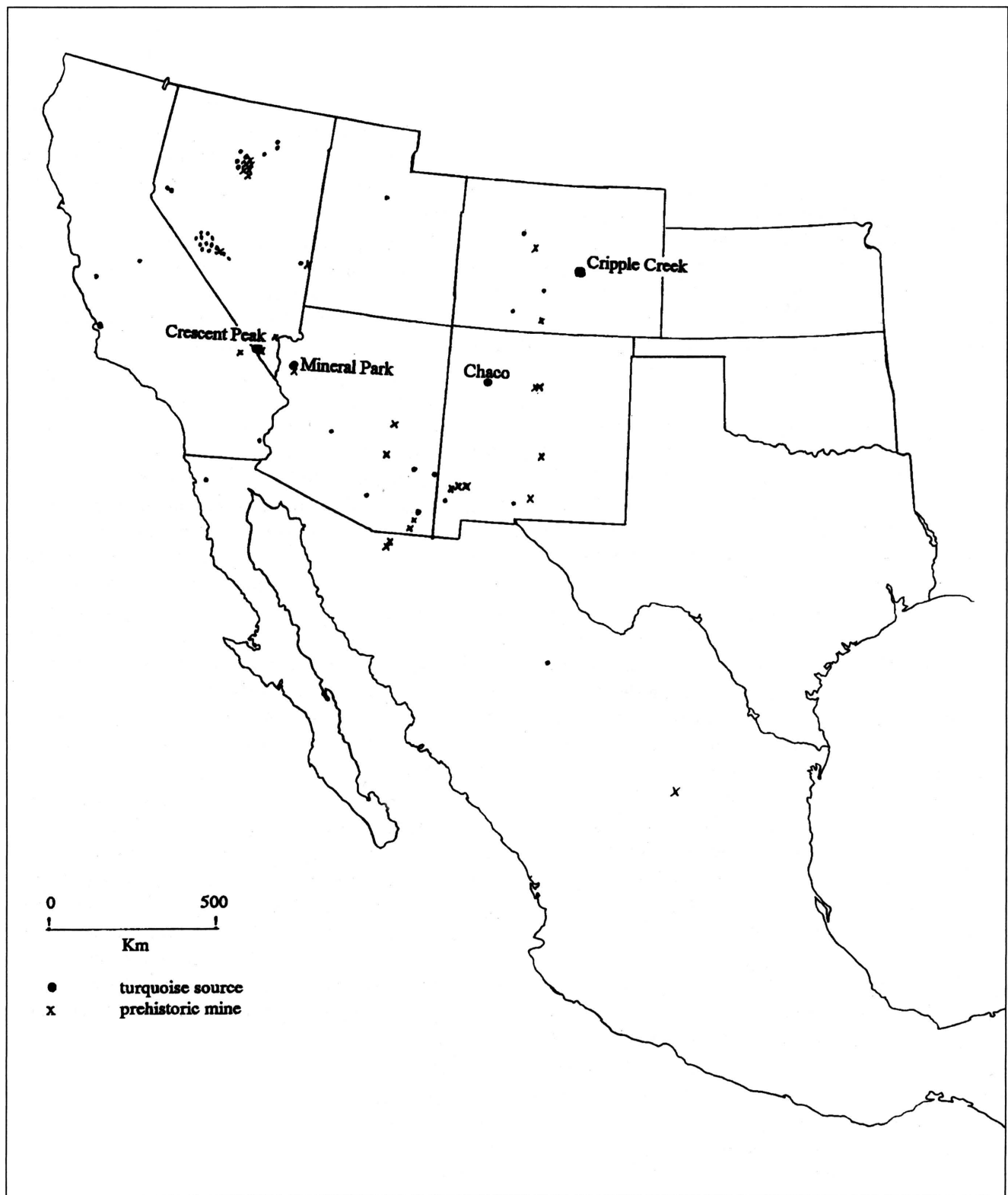


Figure 5. The location of Chaco Canyon in relation to possible sources identified by Sigleo (1970).

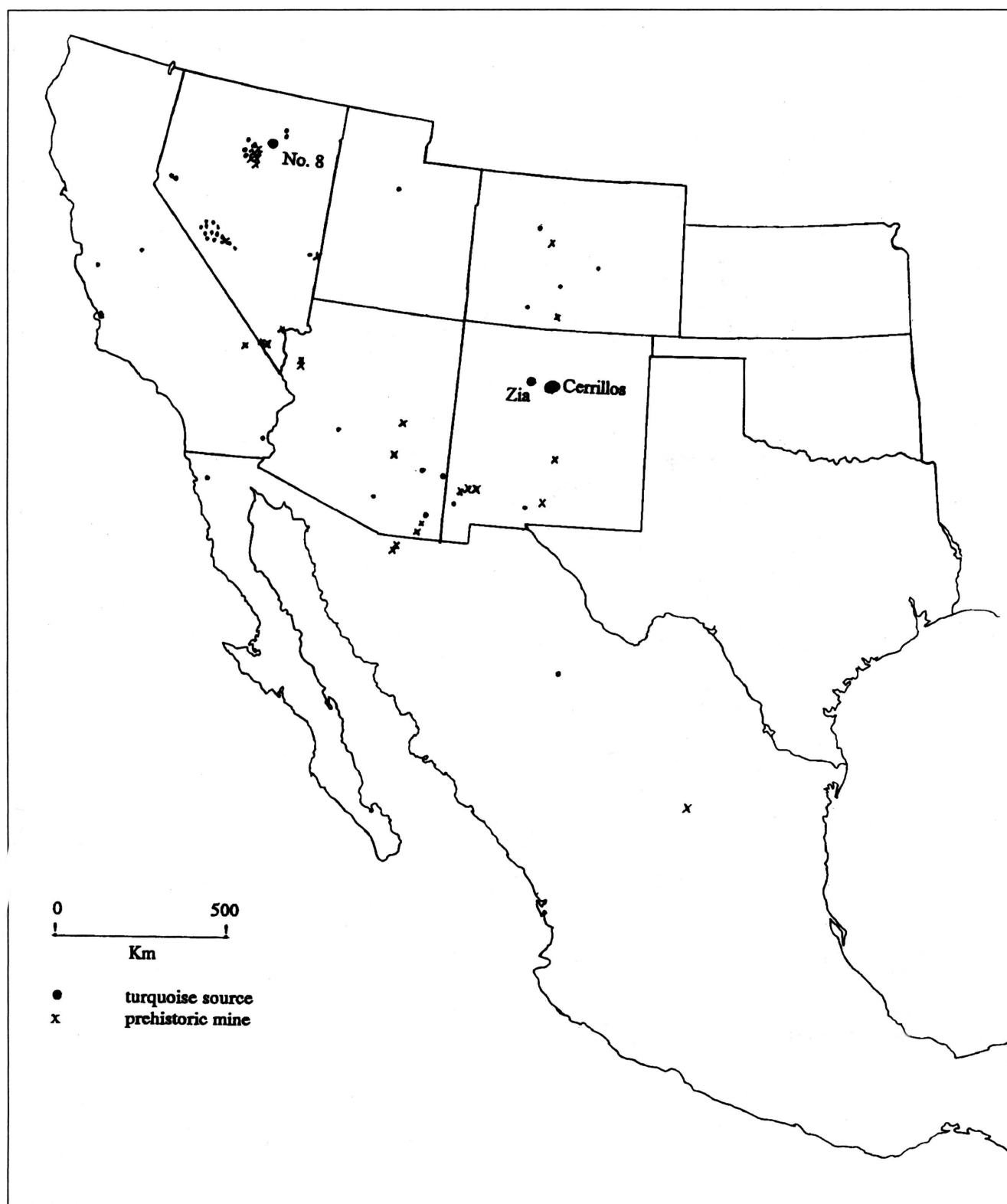


Figure 6. The location of Zia Pueblo, New Mexico, in relation to possible sources of turquoise from nearby small sites as identified by Sigleo (1970).

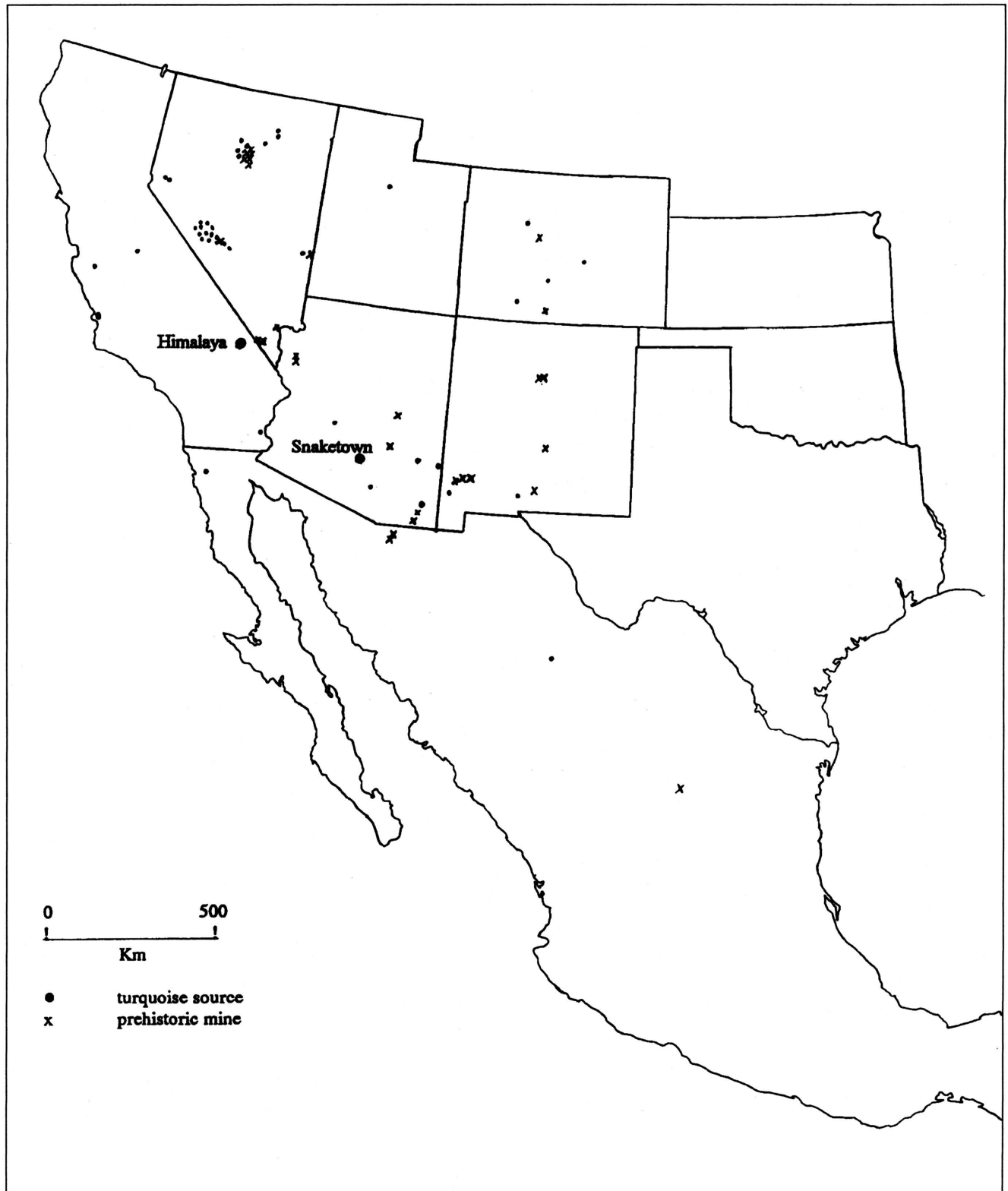


Figure 7. The location of Snaketown, Arizona, in relation to the Himalaya source identified by Sigleo (1975).

evidence for prehistoric mining, but Sigleo was able to separate the beads into two distinct groups that corresponded with two separate mining locations in the Himalaya group.

Di Peso (1974, 2:265, fn. 12, 748-749, fn. 45) reports that Sigleo identified turquoise from a warehouse at Casas Grandes, Chihuahua, as coming from the deposit at White Signal, New Mexico (Fig. 8). The White Signal area is in the Burro Mountains and is one of the closest known prehistoric turquoise sources to Casas Grandes (Sigleo 1970; Weigand and Harbottle 1992). It was within the area attributed to the florescence of the Casas Grandes culture during the period A.D. 1200-1500 (Dean and Raveslout 1993).

What we learned from Sigleo's analyses is that some prehistoric turquoise beads may have come from sources that show evidence of early mining; the sites and sources that are linked together are sometimes relatively close; and some people (e.g., those living in Chaco Canyon) may have obtained their turquoise from more than one source.

In the early 1980s, Hans Ruppert (1982, 1983) analyzed specimens from mining areas and archaeological sites in both North and South America using an electron microprobe. Not only did he include many more sources and artifacts, but he also identified differences in the chemical element content of turquoise between the two continents. He was confident discussing his South American data. Despite some overlap in the individual chemical elements, source areas could be differentiated based on specific combinations of elements, and many of the artifacts could be assigned to source-sample clusters. He did have some artifacts from South America that did not correspond to any of his source clusters and suggested that they came from sources yet unknown to us.

Ruppert's (1982) results for North America were not as easy to interpret. Altogether he included information on 542 specimens, 462 of which were source samples and 80 were artifacts from numerous sites. He did not discuss specific sources for the artifacts from two Chaco Canyon sites (29SJ629 and 29SJ423), though he did include them in his tables. When I reconstructed the data that included 20 artifacts from these two sites, the specimens grouped in clusters with source material from Cerrillos, New

Mexico, Mineral Park and the Courtland-Gleeson area, Arizona, and the King Mine, Colorado (Fig. 9). These results are similar to the evidence provided by Sigleo (1970), and involve some of the same mines. Again, Ruppert had trouble separating those mines and made no inferences because of this problem.

Ruppert suggested a correlation between one artifact from the Mattocks site in the Mimbres area of southwestern New Mexico and some of the artifacts from Chaco Canyon. The Mattocks site specimen differs from turquoise from other Mimbres sites, including one piece from the Galaz site which probably came from the Azure Mine in the Burro Mountains (Fig. 10). Another source area for turquoise found at Mimbres-area sites is the Santa Rita mine in the Little Hachita District of southwestern New Mexico. Ruppert concluded that the data for the Mimbres sites did agree to some extent with an earlier hypothesis of Steve LeBlanc that the Classic Mimbres culture was closely connected with the florescence of the Chaco culture and probably engaged in trade with Mesoamerican groups (Anyon and LeBlanc 1984). He postulated an early trade route through the Mimbres area, which changed during the later Animas Phase when Casas Grandes influenced the people living in the former Mimbres culture area; the supply of turquoise probably changed as well.

A much more extensive and comprehensive neutron activation study of turquoise was undertaken by Phil Weigand and Garman Harbottle using the facilities at Brookhaven National Laboratory. Their work spans several decades and encompasses over 2,000 specimens from about 42 different turquoise sources (28 of which exhibit evidence for prehistoric mining) and numerous sites in Mexico and the United States. The time periods represented include the early use of turquoise, especially in western Mexico where sites with turquoise date from shortly after the time of Christ through the Spanish Conquest. Although a complete report that includes all data on the source specimens and artifacts has not been published, these investigators have provided an early preliminary report, as well as a few site-specific reports and overviews of their project (Bishop 1979; Harbottle and Weigand 1987, 1992; Weigand and Harbottle 1992; Weigand, Harbottle, and Sayre 1977).

The material analyzed from Chaco Canyon included 151 beads, pendants, and raw turquoise from

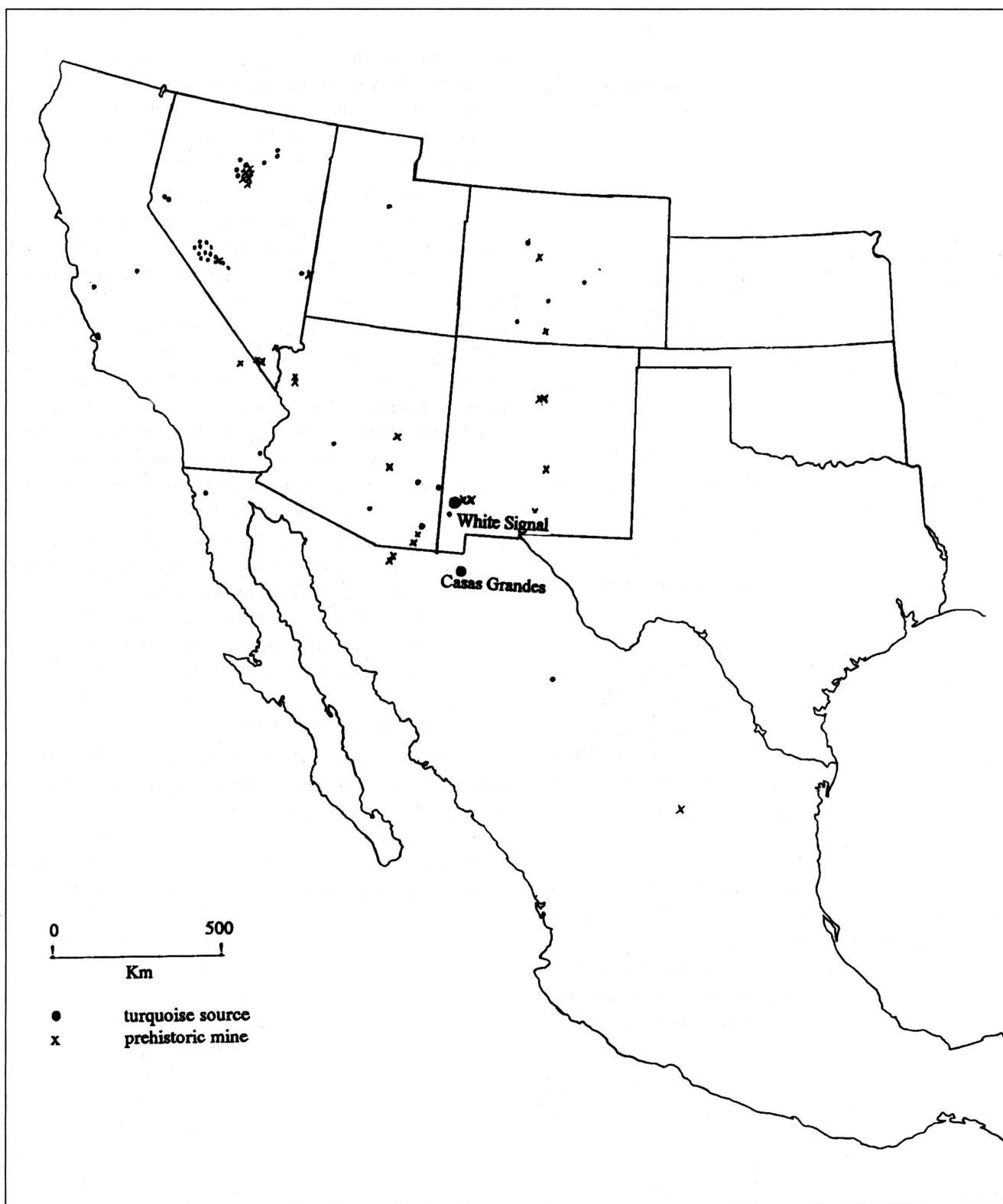


Figure 8. The location of Casas Grandes, Chihuahua, in relation to the White Signal District, a possible source of turquoise (Di Peso 1974).

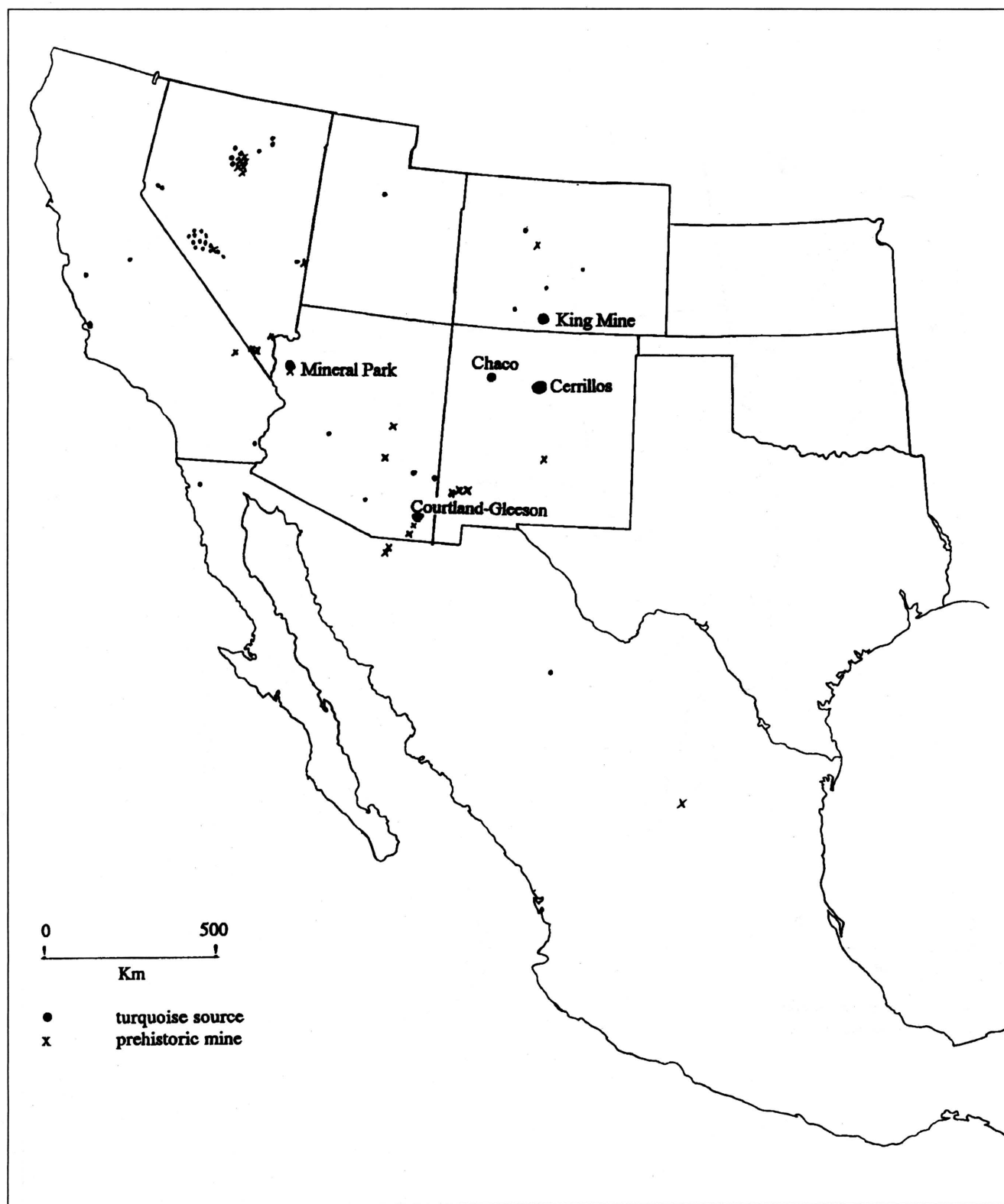


Figure 9. Some mining areas that fell into the same clusters with Chacoan turquoise artifacts (Ruppert 1982:Tables 11 and 12).

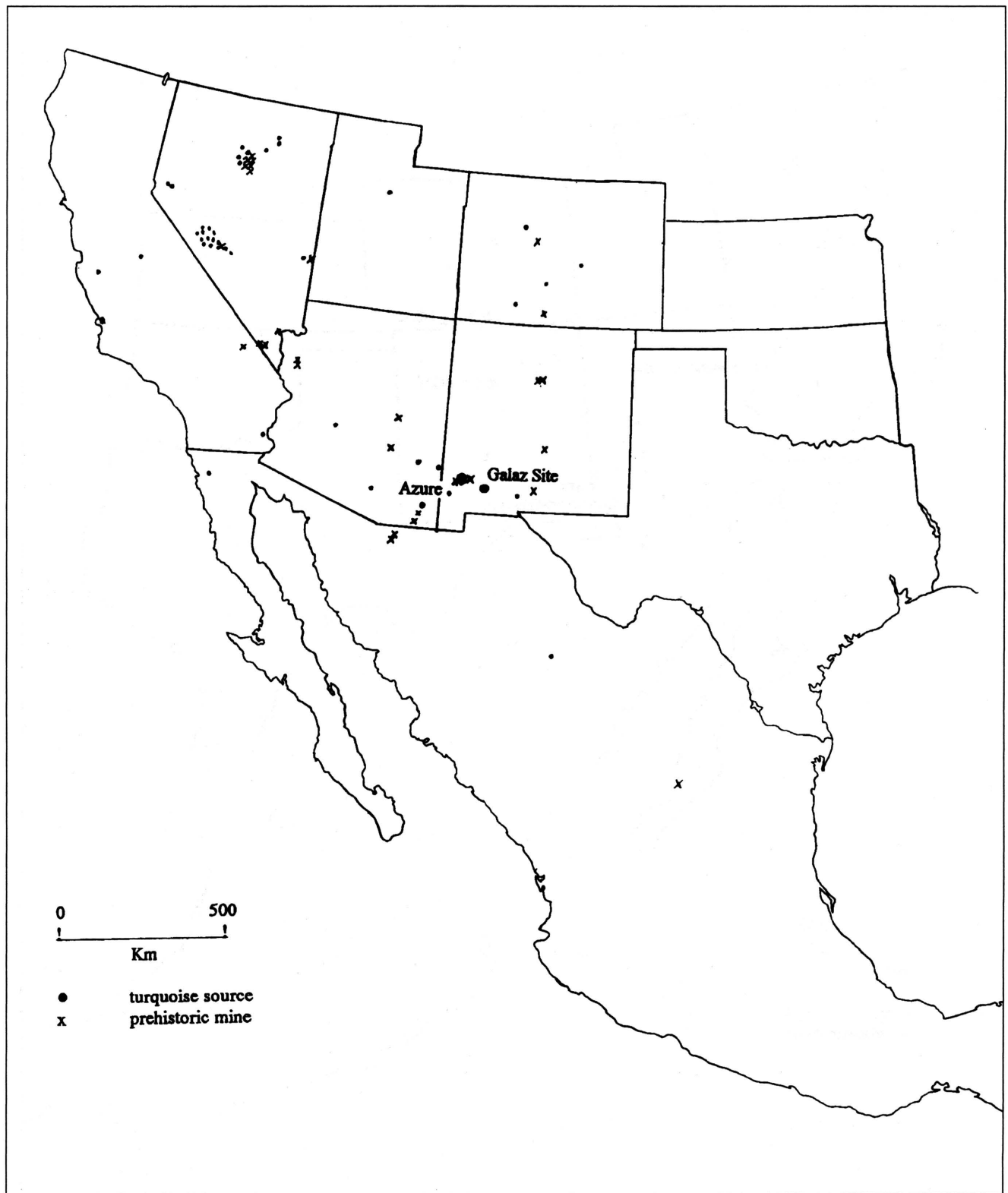


Figure 10. The location of the Galaz Ruin in relation to the Azure mines, a possible source of turquoise identified by Ruppert (1982).

ten archaeological sites dating to ca. A.D. 500-1100. After examining these artifacts, Bishop (1979:4-5; Mathien 1981b) reported that there was relative homogeneity among them with regard to consistent copper values, suggesting a somewhat restricted source area. When compared with other material in their database at the time, some Chaco artifacts could be grouped with artifacts from the site of Guasave in Sinaloa, Mexico (Fig. 11). Some turquoise from site 29SJ629, a known turquoise-jewelry-making site (Windes 1993), showed some similarity to artifacts from Snaketown. Their research was still in its early stages at that time and comparison with source materials was limited, especially for the Cerrillos Hills.

Later, Harbottle and Weigand (1987) had over 1,900 specimens available to them during the analysis of artifacts (including 20 beads) from the San Xavier Bridge site in the Tucson Basin, Arizona. The results linked one series of beads from this site with beads from site 29SJ423 in Chaco Canyon, and other artifacts from San Xavier Bridge were linked with turquoise from several other sites in Chaco Canyon. Harbottle and Weigand (1987:440) also matched one San Xavier Bridge artifact with a bead from Guasave (similar to the data on Chaco), and there were two matches with later sites located along the Rio Grande between Albuquerque and Santa Fe, New Mexico. Only one mine, LA 5028 in the Cerrillos Hills, was considered a reasonable match with one artifact from the San Xavier Bridge site. All these artifacts and the one source sample were assigned to a single cluster in their database.

Other samples from San Xavier Bridge did not fall into such a tight cluster. Some did not match any other sites. Some samples could be matched to turquoise from Snaketown and Chaco, and the source locality of Orogrande in the Jarilla Mountains of New Mexico; or with beads from El Vesuvio in Zacatecas and a source sample from the Azure mine near Tyrone, New Mexico. Other turquoise from San Xavier Bridge linked with one mining sample from Cerrillos and artifacts from several Anasazi sites in Arizona and New Mexico, as well as Casas Grandes; these sites fall into a later period, Pueblo IV (A.D. 1300-1500). Harbottle and Weigand definitely ruled out any matches of San Xavier Bridge artifacts with the Courtland-Gleeson samples they had collected up to

that time, but cautioned that additional materials needed to be analyzed.

Although not all their work has been presented in detail, Weigand and Harbottle (1992) indicate specific ties between a number of artifacts from the site of El Vesuvio in the Chalchihuites culture area in northwestern Mexico and the Azure-New Azure mines in New Mexico. An additional number of Pueblo sites from New Mexico hold high potential for having obtained turquoise from the New Azure area. The findings also suggest the Cerrillos Hills as the source for turquoise found at the site of Alta Vista which is part of the Chalchihuites culture.

Weigand and Harbottle (1992) postulate that there were several trade networks operating at different times that involved several turquoise sources in New Mexico, Nevada, and Arizona. They outline three networks that are tied to the Cerrillos Hills:

1. During the Late Classic Period (A.D. 700-900), artifacts link Rio Grande Source Area 1 (source areas 1 and 2 are considered representative of sources in the Cerrillos Mining District) with Snaketown, Arizona, and with El Vesuvio and Cerro de Moctezuma in northern Mexico. Originally assigned to the next period, La Quemada in Zacatecas, Mexico, may now also be added to this group (Nelson 1995).
2. During the Early Post Classic Period (A.D. 900-1200), artifacts link Rio Grande Source Area 1 with Chaco Canyon and Tucson Basin. During this same period, Rio Grande Source Area 2 was linked with Chaco Canyon and the Tucson Basin, as well as Guasave, Sinaloa. Thus, two separate sources in the Rio Grande area provided the turquoise used at sites in both Chaco Canyon and the Tucson Basin.
3. During the Late Post Classic/Pueblo III-IV Period (A.D. 1200-1500), artifacts suggest links among numerous sites along the Rio Grande, including Kuaua, Nambe, Los Aguajes, Cuyumunge, plus Awatovi and Chavez Pass in Arizona; Casas Grandes/Paquime in Chihuahua; Ixtlan del Rio in Nayarit; and Las Cuevas and Zacoalco in Jalisco.

Harbottle and Weigand (1992:84; Weigand 1994:29) also present schematic maps of turquoise trade routes between Mesoamerica and the Southwest in the Formative, Classic, Early Post Classic, Middle

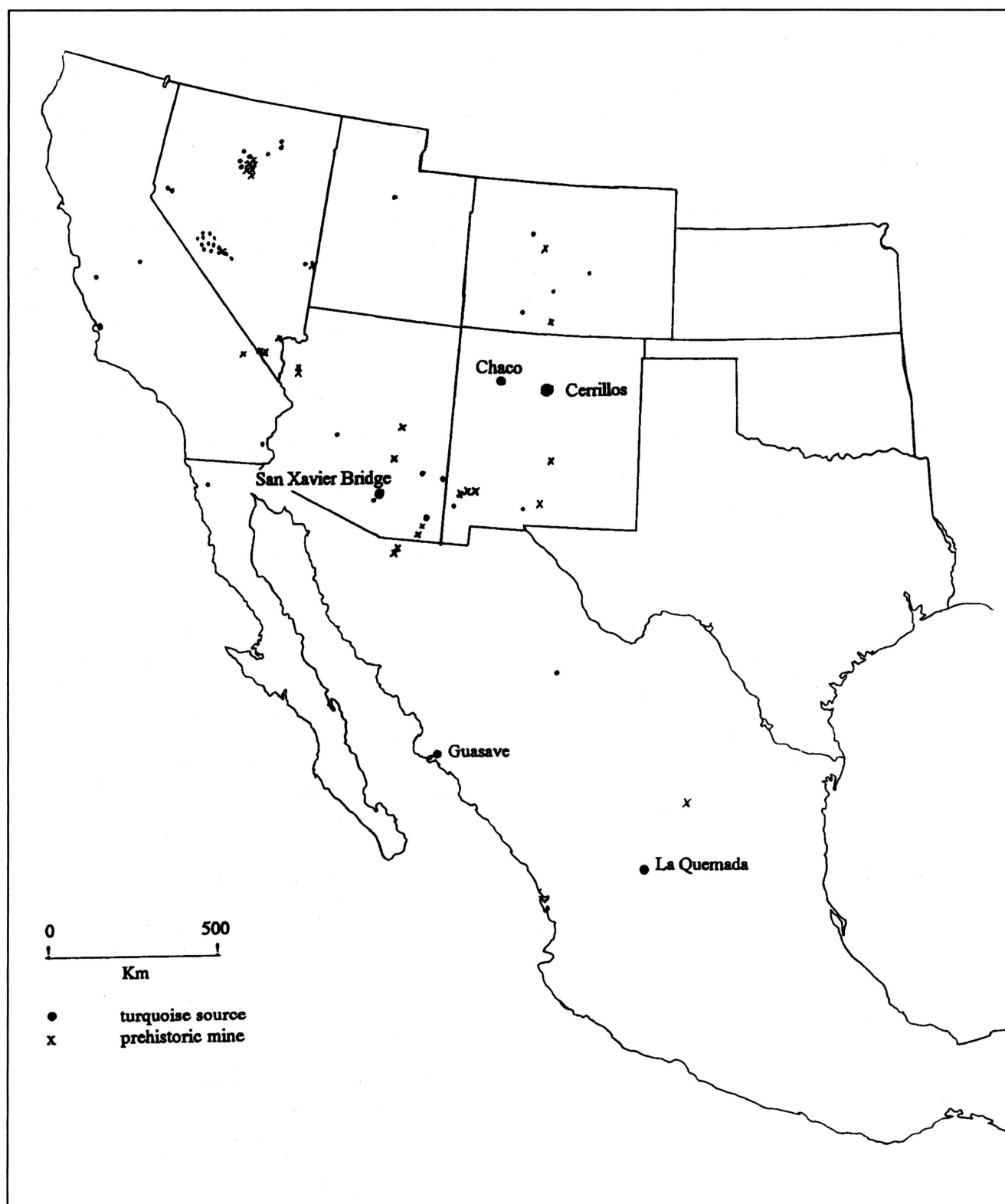


Figure 11. Early Post Classic turquoise trade networks involving Chaco Canyon sites and others in the American Southwest and northwestern Mexico based on Weigand and Harbottle (1992).

Post Classic, and Late Post Classic periods. Links for Chaco Canyon include the Cerrillos Hills, but one possible source in Colorado and one possible source in Nevada are also shown on their maps. These results are not that different from the results obtained by Sigleo (1970) and Ruppert (1982).

X-ray diffraction was used by Welch and Triadan (1991) to compare a turquoise artifact from Grasshopper Pueblo, Arizona, with a turquoise sample from the nearby Canyon Creek mines (Fig. 12). They were able to match these two pieces due to the presence of metatorbenite, a rare mineral found mainly in the area of the Canyon Creek turquoise mine.

IMPLICATIONS OF TURQUOISE STUDIES

Because the amount of information available to archaeologists is constantly increasing, the inferences they make are subject to change. When George Pepper (1909) suggested that turquoise from Pueblo Bonito came from the Cerrillos Mining District, he used only the color of the artifacts and the source specimens, coupled with the distance to turquoise sources, to propose a link between these two areas. At that time, the Cerrillos mines were the best known and also exhibited the most evidence for prehistoric mining. It was a logical conclusion. Because excavated turquoise artifacts had never been found in such great numbers as at Pueblo Bonito and because the Spanish found so much turquoise in use by the Aztec leaders when they arrived in Tenochtitlan (modern Mexico City), another inference about long-distance trade between these areas was made. The known sources of turquoise in Pepper's day were limited to the Southwest and it was only natural that trade networks between these two areas be proposed.

The topic of trade networks between Mesoamerica and the Southwest has been hotly debated for half a century. Based on turquoise and other artifacts, Kelley and Kelley (1975) even proposed that the large ruins in Chaco Canyon are the result of specific interaction between long-distance traders who came up from Central Mexico to obtain turquoise. Chaco was considered the most northerly node on the routes along the Gulf Coast and on the eastern side of the Sierra Madre; the site of Casas Grandes, Chihuahua, was thought to be a major trading center established by

members of a trading class who interacted both with the Chacoans and their homelands to the south (Di Peso 1968a, 1968b). More recent evidence indicates that Casas Grandes did not become a key site until the large sites in Chaco Canyon were abandoned (Dean and Ravesloot 1993). Although this evidence negates part of the trade model, we still need to account for the movement of various objects from one area to another.

In his search for answers, Weigand (1994) focuses on mines, miners, and their support systems. He asks numerous questions: Who did the mining at any one mine? How often did they use the mine? How were the miners supported? Did any one group control use of the mine? Was material processed at the mining area? Who used the turquoise once it was mined? Were the turquoise pieces taken back to one area and used there? Were they traded to others? And, if so, before or after being made into beads, pendants, etc.? How much was traded versus kept at the home site? Who did the trading and how often?

The data from the mining areas are still not sufficient enough to indicate specific dates for prehistoric use of all the mines or to identify who mined them, let alone determine if any particular groups controlled them. The Cerrillos Mining District is the best documented, and pottery sherds indicate use by people known as the Anasazi from about A.D. 500 through Spanish conquest. The numbers of sherds dating prior to about A.D. 1275 are few; the majority date to A.D. 1300-1600 (Warren and Mathien 1985). There is some evidence of initial preparation of the turquoise, such as the removal of the matrix, at this source area.

Approximately one kilometer east of the mines is a cluster of six small sites that contain turquoise and mining tools, but very little evidence for agriculture. Wiseman and Darling (1986) propose that these sites were built specifically to house people mining the area and not as permanent self-sufficient habitation sites. The potsherds found at these sites date from A.D. 900-1200 and are typical of those found in Chaco Canyon, in Chaco-related communities to the south in the Mount Taylor area, and at sites to the south of Cerrillos in the Rio Grande drainage. Although these researchers were unable to tie the mines directly to sites in Chaco Canyon, it is not unreasonable to propose at least a link through the Chacoan communities of the Mount Taylor region where two

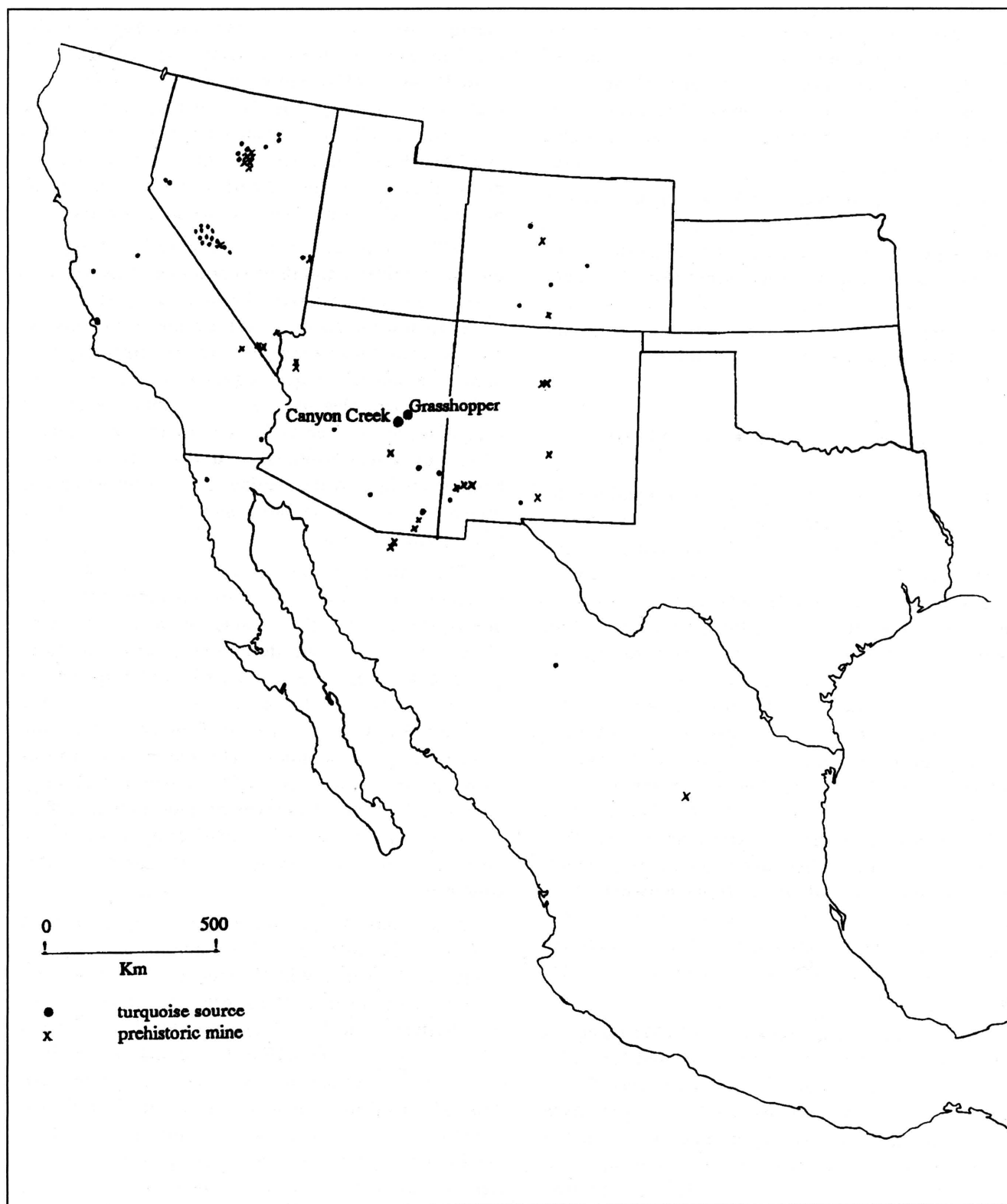


Figure 12. The location of Grasshopper Pueblo and the Canyon Creek turquoise sources identified by Welch and Triadan (1991).

major sites contained evidence of turquoise working, probably jewelry making (Mathien 1981a). Windes (1993) has documented considerable turquoise, including beads, on the surface of small sites in the East Chaco community which date to the A.D. 900s. He proposes that one of the main functions of these sites was the manufacture of turquoise jewelry. Within Chaco Canyon proper, a number of areas where turquoise was worked into jewelry have been identified at large and small sites (Mathien 1984), the majority of them dating ca. A.D. 900-1150.

After A.D. 1300, San Marcos Pueblo was established near the Cerrillos Hills; it may have housed people who mined the area. Unfortunately, the wealth of data for the Cerrillos mines is not available for most other source areas. We still cannot answer many of Weigand's questions—questions that need to be answered if we are to reconstruct a turquoise trade network, especially one extending far south into Mexico.

The studies carried out thus far cannot answer all our questions for several other reasons. First, only a limited number of turquoise artifacts from any one site have been submitted for testing. Given the results for Chaco Canyon alone, where 15,000 pieces were found with just two burials in the same room at one of many sites, how do we know that people in Chaco used only one or a few sources? The studies by Sigleo, Ruppert, and Weigand and Harbottle all indicate that Chacoan turquoise came from several sources that exhibit evidence of prehistoric use.

Second, how do we know who used, let alone controlled, the mining of the various prehistoric sources? Even at the best-documented source area, Cerrillos, New Mexico, the recovered sherd types suggest the prehistoric Puebloans who lived across a broad area of the Southwest, but do not identify which subgroup of people in this large area. For the period prior to about A.D. 1250, the evidence indicates that the miners could have come from the area around Mount Taylor (near Grants, New Mexico), Chaco Canyon, or further south near Socorro, New Mexico. After A.D. 1250, sherds matching those from sites along the northern Rio Grande are more numerous, suggesting more intensive mining efforts during later years.

Third, how do we determine whether the various analytical techniques used are the best ones for the task; e.g., do the various chemical elements that can be

discerned by the different tests adequately distinguish the various sources of turquoise? For example, the metatorbenite found at Canyon Creek (Welch and Triadan 1991) has never been reported by other investigators. There are also difficulties in characterizing a source area (e.g., the Cerrillos District [Weigand and Harbottle 1992]), and sometimes researchers inappropriately link an artifact with a source area that was unknown prehistorically (e.g., Mine No. 8 in Nevada [Sigleo 1970]).

CONCLUSIONS

Although the analysis of turquoise beads and other jewelry items provides much needed evidence that can be used to interpret prehistoric lifeways, we have much work left to do. With regard to the identification of turquoise sources, several archaeometric techniques have been tried. Much variation in chemical elements is present in specimens from the same mine and there is a lack of correlation between specimens taken at different depths (Ruppert 1982; Sigleo 1970). Some mines were exhausted prehistorically; others have been destroyed by copper mining. There are limits to the range of chemical elements that can be successfully documented using any one technique (Harbottle 1982). At this time, we cannot be sure that any one procedure will distinguish the various mining districts. As Harbottle (1982) points out, archaeometry is still in its infancy. However, we are now at a point where a critical review of the analytical techniques is needed to determine how best to proceed in our attempts to characterize turquoise sources. A different type of test or a combination of tests may be needed before we can be assured of correct interpretations of the data. It is only when we are certain about our sourcing techniques that we will be able to propose an accurate reconstruction of long-distance turquoise trade networks and the social organizations that sponsored them.

APPENDIX A: TRIALS AND TROUBLES WITH TURQUOISE TESTS

Turquoise is formed as a result of the percolation of copper, aluminum, phosphate, and iron in solution through fissures in bedrock. In its travels, the solution

also picks up traces of other elements that become part of the turquoise when the solution mineralizes. Five techniques for detecting these elements have been used with turquoise. Not all of the techniques detect the same trace elements; some are sensitive only to the presence of a few. In addition, one study of lead isotope decay ratios has been carried out.

Spectrometry

An initial spectrometrical test on turquoise beads and pendants from Pueblo Bonito in Chaco Canyon, New Mexico, failed to link artifacts with known sources (Judd 1954:83). Anderson, Stringham, and Whalen (1962:1304-1305), concerned only with turquoise specimens from a copper mine at Bingham, Utah, provide data on nine trace elements and confirmed the usefulness of the method. A third study, using arc emission spectrometry to obtain accurate determinations for eleven elements, revealed definite trends in concentration ratios for the elements barium, cobalt, magnesium, and strontium. Zinc, chromium, nickel, and vanadium were also found to be of interest; the ratio of cobalt to nickel was an excellent indicator of differences among sources (Sigleo 1970).

Sigleo (1970:59-60) examined differences in turquoise specimens from one mine. Her data from Turquoise Hill, Arizona, were so variable that she could not calculate a meaningful mine average for the analyzed elements. Two samples from Battle Mountain, Nevada, taken two inches apart, had nearly identical element concentrations; yet, there was considerable variation in five samples from the same mine, which may represent several sequences of deposition. Samples obtained vertically at 15-m depths at the Santa Rita mine in New Mexico indicated more than one period of turquoise mineralization, but provided no correlation between differences in specimens and vertical depth. Sigleo identified the need for numerous source samples from individual mines to properly determine the characteristics of mineral deposits.

X-Ray Fluorescence

X-ray fluorescence was employed to accurately grade turquoise specimens, especially those that had been dyed or hardened with plastics, as well as to

establish that it is a rapid, non-destructive technique that would be useful in determining trace elements (Ronzio and Salmon 1967; Salmon and Ronzio 1962). The analysis of 21 elements in 15 source samples from ten source areas led these researchers to believe that they were able to determine a pattern that was characteristic of the sources of the minerals.

To determine the amount of variability at any one source, 53 specimens from mines in the northern and southern areas of the Cerrillos Mining District were analyzed for 14 elements and the results calibrated as ratios to copper (Mathien and Olinger 1992). No distinction could be made between the northern and southern Cerrillos mines. When the Cerrillos data were compared with specimens from 24 other mining areas, it was not possible to separate these districts. Usually, the counts from Cerrillos encompassed most of those recorded for the other samples.

Electron Microprobe

Ruppert (1982, 1983) analyzed over 1,500 source samples and artifacts from North and South America. Of the 20 calibrated elements, only 12 were selected for inclusion in cluster analyses. Ruppert distinguished deposits on the two continents on the basis of chromium and arsenic content. For South America, the source areas could be characteristically differentiated based on certain element combinations, but for North America the results were less than satisfactory. For example, his 63 source samples from Cerrillos fell into 15 separate clusters, along with samples from other mining areas, including Mineral Park and the Courtland-Gleeson area, Arizona, and the King Mine, Colorado. He was concerned about the reliability of this method to distinguish the various North American sources. Ruppert noted that high cobalt and sulfur, and medium zinc content were more characteristic of the Azure Mine, New Mexico. Four times less zinc was seen in specimens from Orogrande, New Mexico, where some calcium carbonate was also present. No calcium minerals were present in source material from the Little Hachita District or the Courtland-Gleeson area of Arizona. Ruppert's analysis also confirmed Sigleo's observations on the variability in the content of elements at different depths and horizontal loci at a single source.

Neutron Activation

Sigleo (1975) examined her 25 source areas using neutron activation in which 30 elements were investigated. Some elements (gold, barium, lanthanum, lutetium, and iron) varied within mines as much as between them and were not found to be useful.

Ongoing neutron activation studies at Brookhaven National Laboratory (Harbottle and Weigand 1987, 1992; Weigand and Harbottle 1992; Weigand, Harbottle, and Sayre 1977:25-29) analyzed over 2,000 pieces from 28 archaeological sites and more than 40 mining areas in Mexico and the American Southwest. The Azure and New Azure mines, located only 100 m apart, could be easily separated, but at the Cerrillos Mining District, a degree of homogeneity of 10-15% in standard deviation from the mean value could not be obtained. To overcome the latter, artifacts from Pueblo sites in the immediate area of Cerrillos were considered representative of the area (Weigand and Harbottle 1992:168). This *assumption* may not prove true. We await reports of their detailed studies.

X-Ray Diffraction

X-ray diffraction was used to examine a single turquoise sample from the Canyon Creek mines in Arizona and another from the nearby Grasshopper Pueblo. Because the two turquoise samples contained a *rare* copper-uranium phosphate, metatorbernite, known only from this geographical area, Welch and Triadan (1991) concluded that the material from Canyon Creek was probably mined and used by the people from Grasshopper Pueblo.

Lead Isotope Decay

In a preliminary evaluation using stable lead isotope ratios derived from 26 samples from seven mining districts in the southwestern United States and northern Mexico (most from Cerrillos, New Mexico), Suzanne Young was able to separate the Cerrillos mines from all others using a ratio of $^{208}\text{Pb}/^{207}\text{Pb}$ (Young, Phillips, and Mathien 1994). However, when additional samples from more sources were included, the individual mines no longer clustered tightly (Young 1995:7). Further analysis allowed broad geographical separation, but only areas as large as

states could be distinguished (Young, Mathien, and Phillips 1997).

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MAN-IN-THE-MOON BEADS

Michele Lorenzini and Karlis Karklins

The unique and memorable design of man-in-the-moon beads has intrigued researchers over the years. These distinctive beads were identified in the 1960s by George Quimby as being chronologically diagnostic of Middle Historic Period sites (1670-1760) in the western Great Lakes region. The present study more clearly defines both the temporal and geographical instances of man-in-the-moon beads while taking into account possible cultural and historical implications. This project has led to the compilation of information regarding many specimens previously unknown to most researchers.

INTRODUCTION

The man-in-the-moon bead is unique among North American trade beads. Unlike other trade beads which are adorned with such universal elements as stripes, dots, and floral designs, these bear decorative elements that relate to Old World mythology. The man-in-the-moon has been a popular part of European folklore since at least the Middle Ages and its likeness has appeared in countless illustrations over the centuries. In this particular instance, the term "man-in-the-moon" is used to designate a crescent moon which has a distinct nose, eye, and mouth. It is not to be confused with other "men-in-the-moon" which are mentioned in Old World mythology (Jablow and Withers 1969) or with the plain crescent moon found on many molded beads exported to the Middle East from Europe.

In addition to its thought-provoking appearance, the man-in-the-moon bead's relatively short temporal span makes it an ideal temporal indicator. Consequently, it was decided that the authors would collaborate in a research project intended to: 1) establish the bead's core geographic distribution area;

2) confirm and possibly tighten existing dates of circulation; 3) determine how many different designs were represented in archaeological collections; 4) trace the origins of these beads and perhaps determine the place of manufacture; 5) determine who were the principal traders and recipients of these beads; and 6) provide insight into the cultural context of these beads, both within the traders' and recipients' world.

DESCRIPTION

The man-in-the-moon beads are fairly standard in size, shape, and color. They are of wound manufacture and tabular in form (disk shaped). The beads were formed by winding glass around a metal mandrel until the desired size was achieved. While still in a plastic state, the semi-globular or barrel-shaped beads were pressed flat to impart their distinctive shape. The designs were then trailed on the surface. In all observed cases, care was taken so that the eye of the man-in-the-moon was always left open. Before the glass hardened, the applied decoration was marvered or pressed into the surface.

The specimens found on North American sites are uniformly made of a transparent ultramarine (medium cobalt blue) glass (Munsell 6.25PB 3/12). The design is of opaque white glass. Several near-identical specimens discovered in France have amber-colored bodies (Opper and Opper 1992:5-6; Fig. 1). The American specimens range from about 15 to 20 mm in length (parallel to the perforation), 16 to 23 mm in width (perpendicular to the perforation), and 4 to 8 mm in thickness. The single French example which could be measured is 15 mm long and 17 mm wide.

An examination of well over 100 specimens reveals that there are two basic design varieties:

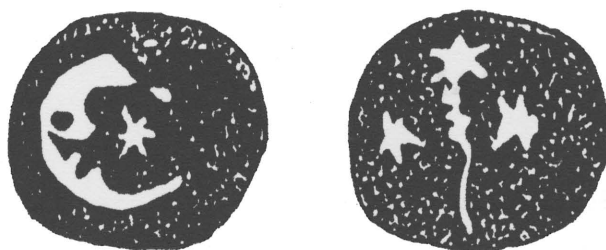


Figure 1. Amber-glass man-in-the-moon bead from a talisman necklace in the Carnac Museum, Morbihan, France (Oppert and Oppert 1992:6, Fig. 9).

Variety 1. Side A has the crescent man-in-the-moon on the left side facing a single star on the right side (Fig. 2, top; Pl. IVB). Side B depicts a star with a tail (a comet) in the center with a star on either side (Pl. IVC).

Variety 2. Side A has the crescent man-in-the-moon in the center facing left with a star on either side (Fig. 2, center). Side B has the same basic configuration as the first variety.

While the Kidds described the beads as having five-pointed stars, beads with six-pointed stars seem to predominate (Karklins 1998:pers. obs.; Wray 1983:46). In all cases the axis of the perforation was parallel to the long axis of the moon and comet.

Variety 1 corresponds to variety WIIIC1 in the taxonomic system developed by Kenneth and Martha Kidd (1970:63, 86). They also described another variety, WIIIC2 (Fig. 2, bottom), but this now appears to be just a sloppier version of WIIIC1. To minimize confusion in 30 years of bead literature, we have designated the real Variety 2 as WIIIC3.

DISTRIBUTION

To date, a total of 142 man-in-the-moon beads have been found at 24 sites in the eastern United States (Table 1). In terms of geographic distribution, Variety 1 (WIIIC1), which accounts for 111 specimens or 78% of the total, is present throughout the core area. This variety ranges from New York in the east to South Dakota in the west and south into central Illinois. Variety 2 (WIIIC3), which is represented by 22 specimens (15% of the total), has only been found at five sites in the United States: Gould Island in northeastern Pennsylvania; Old Birch Island Cemetery in western Ontario; Old Mobile near the Gulf Coast in

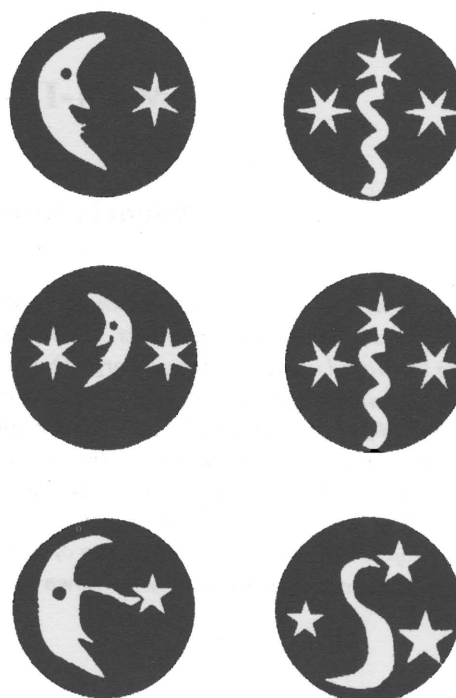


Figure 2. Man-in-the-moon bead varieties. **Top:** Variety 1 (Kidd variety WIIIC1); **center:** Variety 2 (Kidd variety WIIIC3); **bottom:** obsolete Kidd variety WIIIC2 (drawing: M. Lorenzini).

Alabama; Port Dauphin, on the coast of Alabama; and Presidio Santa Maria de Galvé at the western extremity of the Florida panhandle. The remaining 6% were either too poorly described or preserved to determine their variety.

With regard to archaeological context, taking all 142 beads into consideration, 91 or 64% of the total are from unknown, surface, or disturbed contexts; 51 specimens (36%) are from sound archaeological contexts such as burials, features, or unit levels. Of those from sound contexts, 44 specimens or 86% are from burials. Comparing the distribution of the two varieties, 80% of Variety 1 (WIIIC1) and 77% of Variety 2 (WIIIC3) came from burial contexts.

Superimposing the find spots onto a geopolitical map of the 1640-1750 period reveals that the bulk of the specimens fall within the French sphere of influence with most of the rest coming from bordering lands under the control of the British or Spanish (Fig. 3). Consequently, it is postulated that the French supplied these beads but did not necessarily produce them. It is interesting to note that no man-in-the-moon



Plate IA. *Annam: Kim Khanh First Class*; ca. 1925-1941; gold; 80 mm x 42 mm (photos: J. Sylvester, Jr.).

Plate IC. *Annam:* A gold *bai* with tassels of coral beads (unknown date and dimensions).

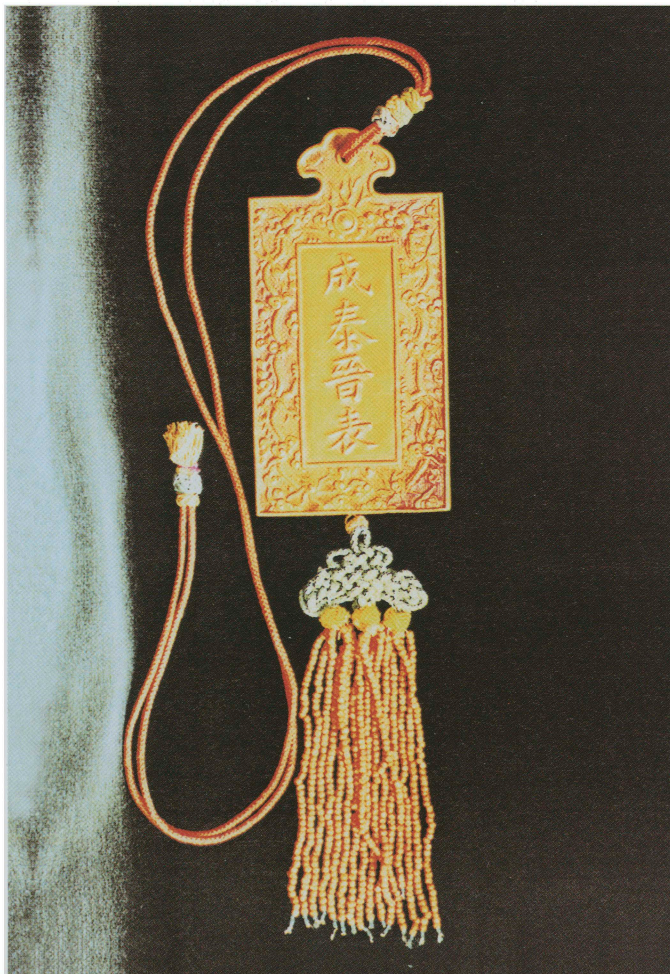
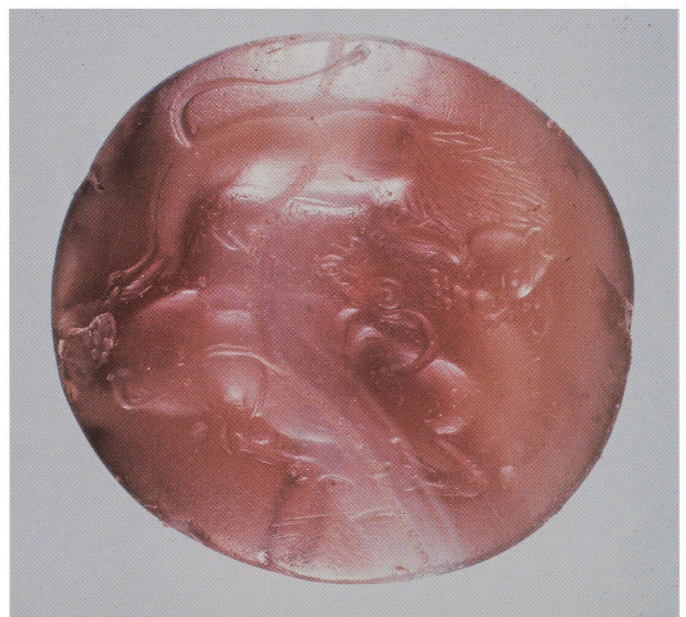
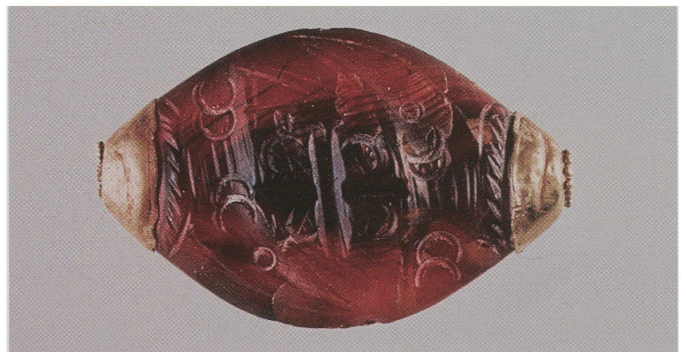


Plate IB. *Annam: Ngan Tien Third Class* (silver coin-like award); Emperor Khai Dinh (1916-1925); silverish metal; 29 mm diameter.

Plate ID. *Nichoria:* **Top:** Carnelian amygdaloid sealstone with talismanic design; length: 27 mm. **Bottom:** Agate lentoid sealstone—lion attacking a bull; diameter: 26-28 mm (all Nichoria photos by Duane Bingham).



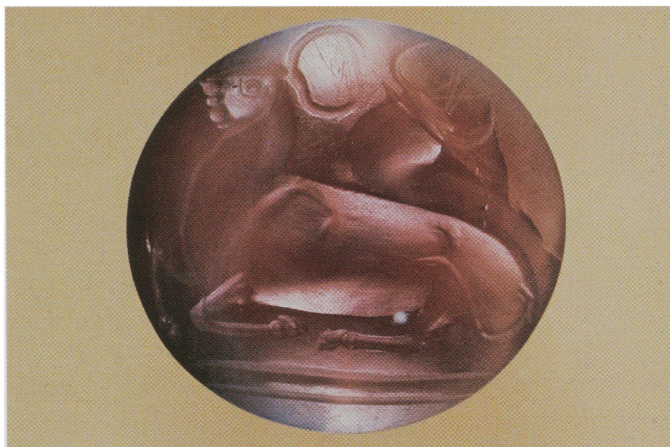


Plate IIA. Nichoria: **Top:** Agate lentoid sealstone depicting a lion attacking a bull; diameter: 26.5 mm. **Bottom:** Agate lentoid sealstone portraying recumbent bulls; diameter: 28-30 mm.

Plate IIB. Nichoria: **Top:** Agate lentoid sealstone displaying recumbent bulls; diameter: 26-28 mm. **Bottom:** Carnelian amygdaloid sealstone with faceted back depicting two water birds; length: 24 mm; width: 14mm; thickness: 8mm.

Plate IIC. Nichoria: A carnelian (**top**) and an agate (**bottom**) lentoid sealstone showing a winged griffin. Diameter of upper specimen: 15-16 mm.; diameter of lower specimen: 20-23 mm.

Plate IID. Nichoria: **Top:** Agate amygdaloid sealstone depicting a Minoan genius; length: 24 mm; width: 11mm; thickness: 7.5 mm. **Bottom:** Carnelian lentoid sealstone exhibiting a full-face male "portrait;" diameter: 17 mm; thickness: 7 mm.

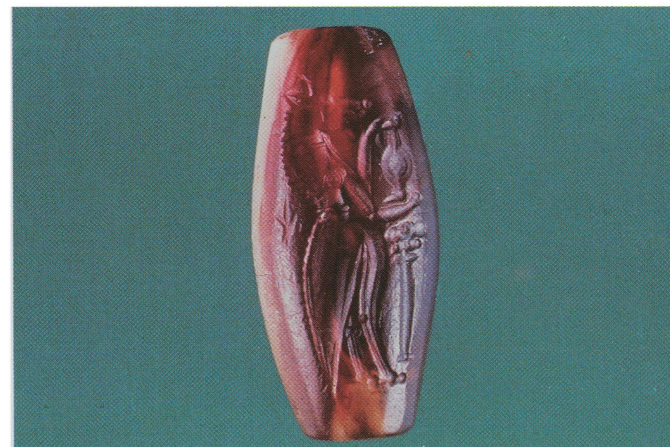




Plate IIIA. *Nichoria*: **Top:** Carnelian lentoid sealstone depicting two goats in a heraldic composition; diameter: 12-12.5 mm; thickness: 5mm. **Bottom:** Rock crystal "beetle" and ring beads; ring bead diameter: 12-16 mm; beetle-bead length: 15-17 mm.

Plate IIIC. *Turquoise*: **Top:** Beads and pendant from Pueblo Alto, Chaco Canyon, New Mexico. **Bottom:** Prehistoric stone tools from Cerrillos, New Mexico (photos: F.J. Mathien).

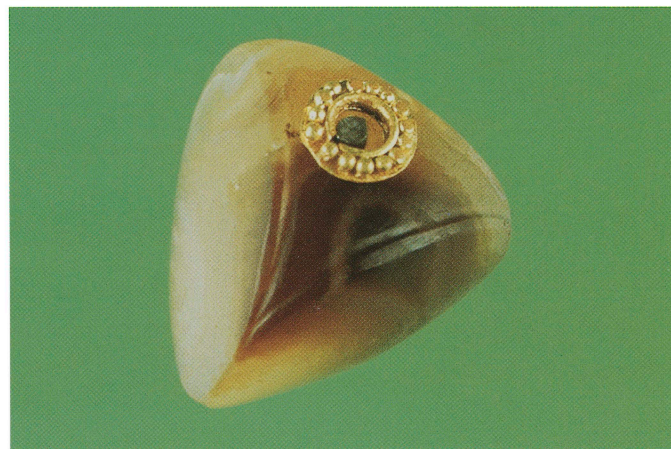


Plate IIIB. *Nichoria*: **Top:** Carnelian and amethyst beads; diameter: 3.5-13 mm. **Bottom:** Prismatic agate bead; width of each side: 18 mm; length: 18 mm.

Plate IIID. *Turquoise*: Beads and pendants excavated by George Pepper in Room 28, Pueblo Bonito, Chaco Canyon, New Mexico (photo: Nancy J. Akins).



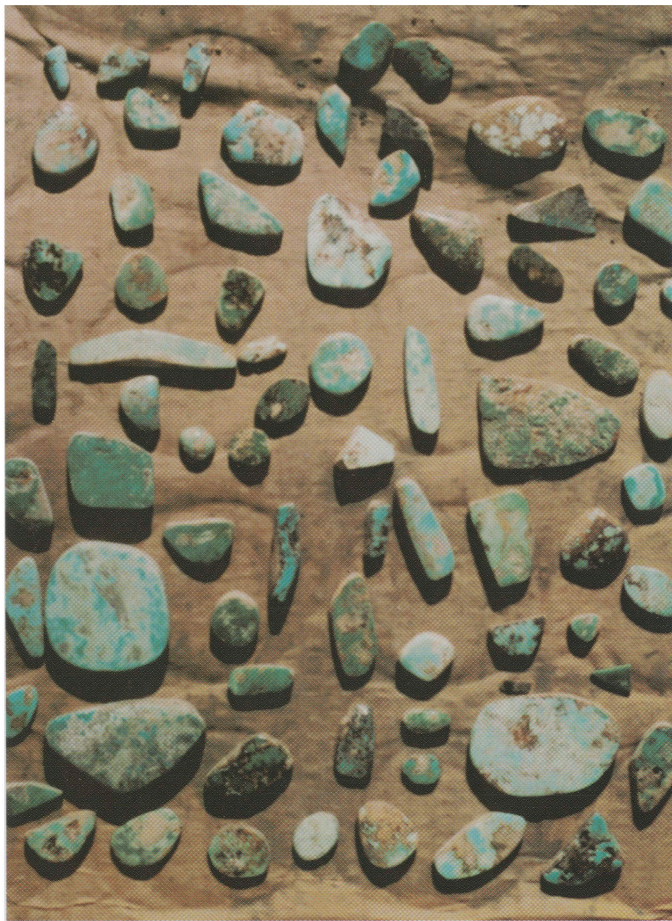


Plate IVA. *Turquoise*: Pieces recovered from the Tiffany Mine tailings, Cerrillos, New Mexico (photo: F.J. Mathien).

Plate IVC. *Man-in-the-Moon*: Side B of Variety 1 man-in-the-moon beads from the Townley Read site (1710-1745) (Rochester Museum and Science Center, Rochester, New York)(photo: K. Karklins).

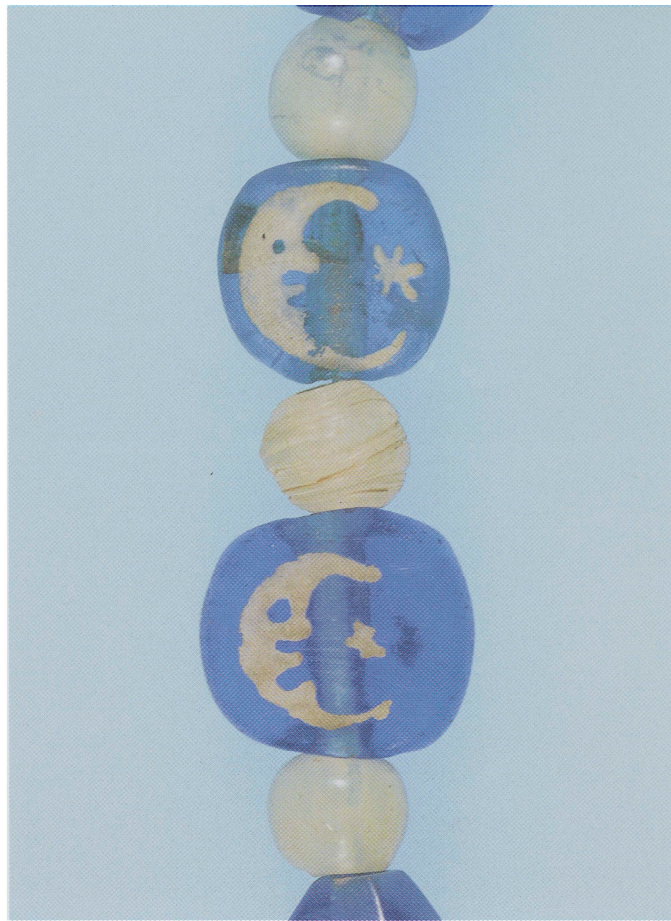


Plate IVB. *Man-in-the-Moon*: Side A of Variety 1 beads from the Seneca Townley Read site (1710-1745) in western New York state (Rochester Museum and Science Center, Rochester, New York) (photo: K. Karklins).

Plate IVD. *Man-in-the-Moon*: Group of Variety 1 man-in-the-moon beads found at the Townley Read site (Rochester Museum and Science Center, Rochester, New York)(photo: K. Karklins).

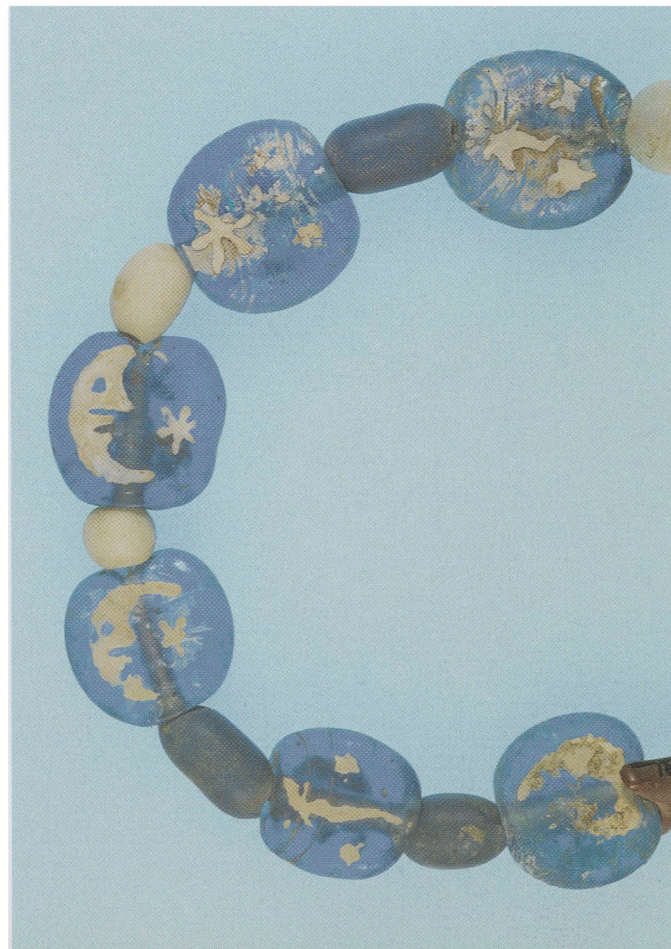


Table 1.
Summary of Site and Specimen Information for Man-in-the-Moon Beads.

NO.	FIND SITE	STATE/ PROVINCE	OCCUPATION PERIOD (SPHERE OF INFLUENCE)	VARIETY (QUANTITY)	CONTEXT (COLLECTION METHOD)
1	Huntoon Site (Wray 1983; Martha Sempowski 1997:pers. comm.; Karklins 1998: pers. obs.)	New York	1710-1745 (French)	WIIIc1 (8)	unknown (unknown)
2	Townley Read Site (Wray 1983; Martha Sempowski 1997:pers. comm.; Karklins 1998: pers. obs.)	New York	1710-1745 (British /French)	WIIIc1 (15)	1 burial (collector) 14 unknown (unknown)
3	Sevier Site (Greg Sohrweide 1997:pers. comm.)	New York	1715/20-1745/50 (British/French)	WIIIc1 (2)	surface (controlled)
4	Lanz-Hogan Site (Bennett 1982)	New York	1720-1750 (British)	WIIIc1 (2)	burial (controlled)
5	Van Etten Site (Lisa Anderson 1997:pers. comm.)	New York	1720-1750 (British)	WIIIc1 (1)	burial (unknown)
6	Knouse Site/Wapwallopen Village Site (Kent 1984; John Olandini 1997:pers. comm.)	Pennsylvania	1740-1760 (British)	WIIIc1 (15)	burial (looted)
7	Gould Island Site (Weed and Wenstrom 1992; Stephen Warfel 1997:pers. comm.)	Pennsylvania	?? (British)	WIIIc3 (1)	unit level (controlled)
8	Plain City area (Converse 1978)	Ohio	pre 1750? (French)	WIIIc1 (1)	surface (unknown)
9	Ft. Michilimackinac (Stone 1974; Lorenzini 1997:pers. obs.)	Michigan	1710-1720 (French)	WIIIc1 (8)	1 feature (controlled) 7 unknown (controlled)
10	Old Birch Island Cemetery (Greenman 1951; John O'Shea 1997:pers. comm.; Lorenzini 1997:pers. obs.)	Ontario	1750-1760 (French)	WIIIc3 (14)	burial (controlled)
11	Mahler Site (Mason and Mason 1995; Lorenzini 1996:pers. obs.)	Wisconsin	1680-1710 (French)	WIIIc1 (1)	feature (controlled)
12	Bell Site (Behm 1993; Lorenzini 1996)	Wisconsin	1680-1730 (French)	WIIIc1 (26)	surface (controlled & collector)
13	Marina Site (Birmingham and Salzer 1984)	Wisconsin	1715-1730 (French)	WIIIc1 (1)	burial (controlled)
14	Rock Island (Mason 1986; Lorenzini 1996: pers. obs.)	Wisconsin	1670-1730 (French)	WIIIc1 (5)	2 mixed (controlled) 3 feature (controlled)

Table 1. Continued.

NO.	FIND SITE	STATE/ PROVINCE	OCCUPATION PERIOD (SPHERE OF INFLUENCE)	VARIETY (QUANTITY)	CONTEXT (COLLECTION METHOD)
15	Lake Koshkonong area (Mike Erickson 1997:pers. comm.; Lorenzini 1996:pers. obs.)	Wisconsin	?? (French)	WIIIc1 (4)	surface (collector)
16	Newell Fort (Hall 1991; Floyd Mansberger 1996:pers. comm.; Lorenzini 1997:pers. obs.)	Illinois	1711-1720 (French)	WIIIc1 (19)	unknown (collector)
17	Blood Run (Dale Henning 1999:pers. comm.)	Iowa	1700-pre1725 (French)	? (8)	1 surface (collector) 7 burial (collector)
18	Crane Lake area (Douglas Birk 1997:pers. comm.)	Minnesota	mid-1730s (French)	WIIIc1 (1)	unknown (collector)
19	Larson Site (Bill Billeck 1999:pers. comm.)	South Dakota	1700-1750 (French)	WIIIc1 (1)	unknown (collector)
20	Rosa Site (Bill Billeck 1999:pers. comm.)	South Dakota	?? (French)	? (1)	unknown (controlled)
21	Skidi Pawnee Village (Watson 1995; Bill Billeck 1999:pers. comm.)	Nebraska	1700-1750 (French)	WIIIc1 (1)	unknown (collector)
22	Old Mobile (Waselkov 1991; Greg Waselkov 1996:pers. comm.; Lorenzini 1996:pers. obs.)	Alabama	1702-1711 (French)	WIIIc3 (1)	unit level (controlled)
23	Port Dauphin (George Shorter 1999:pers. comm.)	Alabama	1715-1725 (French)	WIIIc3 (2)	unit level (controlled)
24	Santa Maria de Galvé (Marie Pokrant 1999:pers. comm.)	Florida	1698-1718 (French/Spanish)	WIIIc3 (4)	3 burial (controlled) 1 unit (controlled)
25	Morbihan region (Opper and Opper 1992)	France	?? (French)	WIIIc* (1+)	unknown (unknown)
Total Beads:142					

beads have been found in Canada east of the Great Lakes, an area which was dominated by French Catholics during the period under discussion.

TEMPORAL PLACEMENT

The attribution of the man-in-the-moon beads to the Middle Historic Period (1670-1760) by Quimby (1966) and by Mason (1986) is confirmed by our findings (Table 1). They also reveal that this date range is applicable to the entire eastern United States and the adjacent portions of Canada, not just the western Great

Lakes region. The recovered temporal data further reveal that the core period for man-in-the-moon beads was between 1700 and 1750 (86% of the dated sites were occupied during this period) with a modal date of 1720.

CULTURAL SIGNIFICANCE

Because the crescent man-in-the-moon is so closely tied to European folklore, what led to this design being placed on beads intended for trade to the Indians of North America? Likewise, what

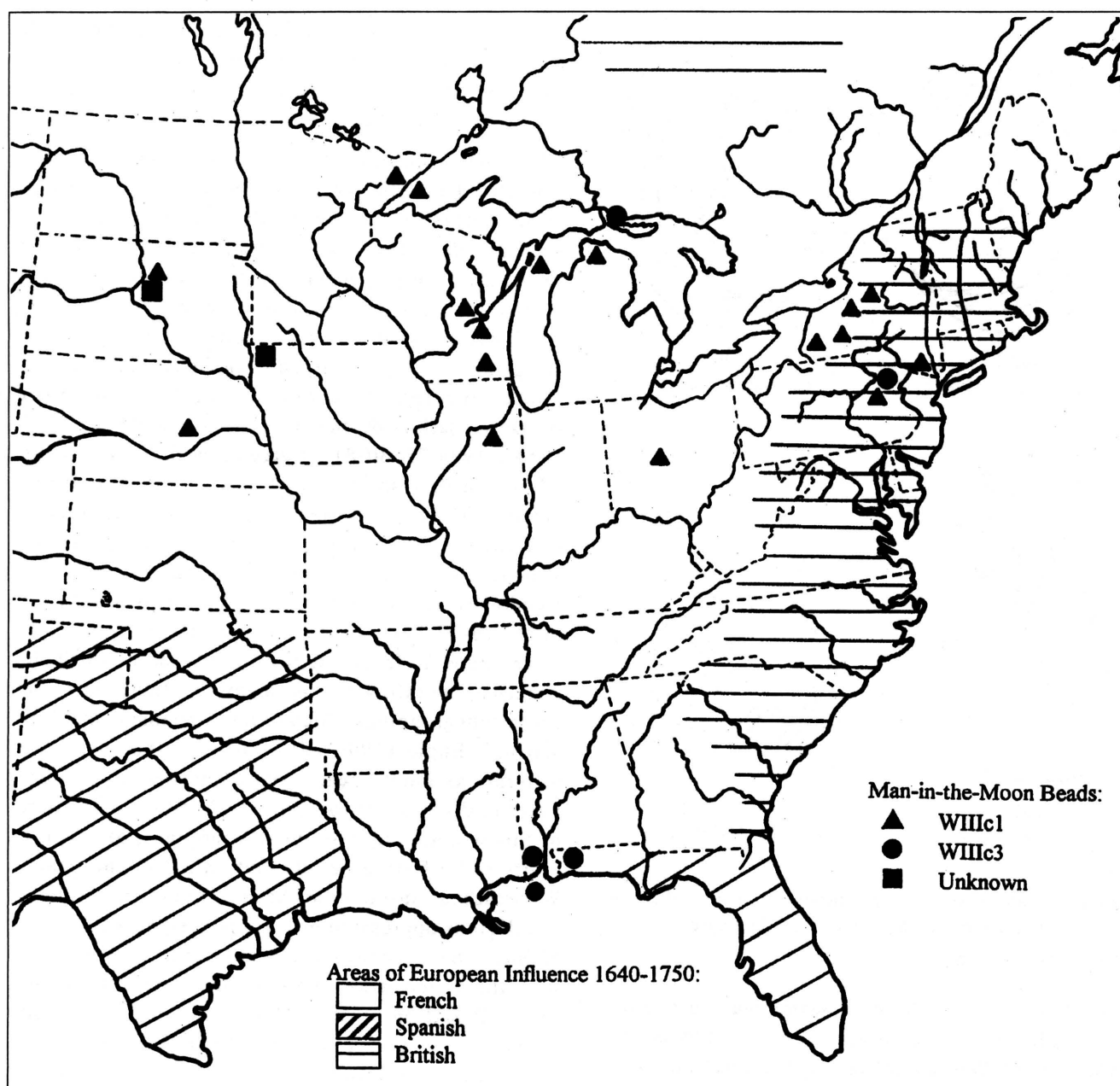


Figure 3. The distribution of man-in-the-moon beads in North America (drawing: M. Lorenzini).

significance did they hold for the recipients? Certainly man-in-the-moon legends do exist among the North American Indians (e.g., the Otoe of Nebraska [Anderson 1940:46-52]), and the crescent moon with a human face has been noted on Quapaw hides (Lorenzini 2000:pers. obs.) and purportedly in some rock art images as well but their cultural significance remains obscure. That they are relatively scarce suggests that the beads may have only been traded or

given on special occasions or to selected persons. Their preponderance in graves also suggests that they were revered by their owners.

George Conover (1889) was one of the first to tackle the interpretation of the man-in-the-moon design. He recounts an observation made by General John S. Clark that "they were not designed as a Christian symbol or of any significance as connected with Jesuit or Roman Catholic missions—simply a

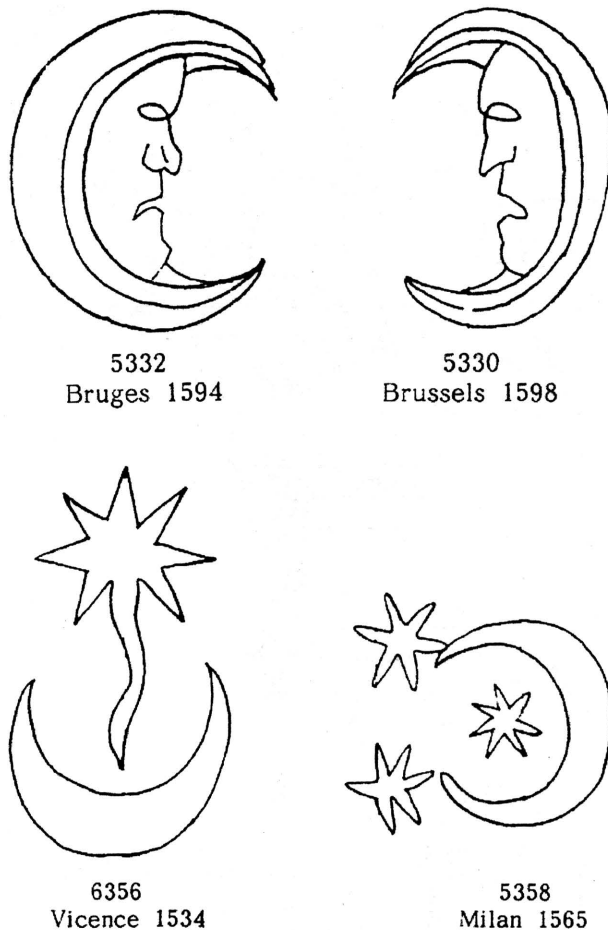


Figure 4. Watermarks on paper produced in several European centers during the 16th century (after Engle 1990:81-82).

Venetian polychrome bead, of which many are found among Indian relics.” Conover also details a letter sent in 1888 by Mr. William Bryant of Buffalo, New York, while traveling in “Old Spain, [which was] once dominated by the Moors.” He included a sketch made by his daughter of a “tile-mosaic over the portals of one of the halls of the Alhambra, Granada, Spain.” This tile-mosaic is of numerous small stars around what appears to be a comet with a tail. This is quite similar to the “B” side of the man-in-the-moon beads.

William Orchard (1975:99) had little to add:

It has been said that in all probability such beads were made by Venetians for trade among the Moors and that the designs have reference to Moorish traditions. Few of these beads evidently

found their way to the American Indians, and aside from the probability that their form and design pleased the natives’ fancy, it is not likely that they were regarded as of any other value.

More recently, Anita Engle (1990:74) has postulated that the crescent moon is an allegorical representation of Amsterdam with its core of crescent-shaped streets and canals, and that the beads are of Dutch origin. She notes the presence of several styles of man-in-the-moon watermarks on paper produced in several French cities, as well as in Belgium and Luxembourg, during the latter part of the 16th century (Fig. 4), as well as on a silver badge worn by Dutch sailors during the siege of Leiden in 1574 (Engle 1990:75, 80-81). Agreeing with Bayley (from an unidentified source) “that these symbols formed a means of intercommunication and spiritual encouragement between the mainly artisan communities engaged in the struggle for religious freedom which culminated in the Reformation,” Engle (1990:76-77) believes that the man-in-the-moon beads “were made for fellow-believers and kindred spirits in America,” pointing to “the many heretical sects and Protestant groupings which sought freedom in the New World.” Engle (1990:78) concludes that both the watermarks and the beads “represent some significant event in the struggle for religious freedom on the part of this widespread movement of artisans, of varying crafts and differing beliefs, but united in one goal.” Were the man-in-the-moon beads produced as symbols of religious oppression or was the design just a flight of fancy on the part of some beadmakers who may have seen the watermarks? This we will probably never know. Based on what we know of the Dutch bead industry, however, it is doubtful that the beads were produced in Holland. No such beads have been uncovered in any of the archaeological excavations undertaken in Amsterdam and elsewhere in Holland (Karklins 1998:pers. obs.). Furthermore, such decorated beads are more in the realm of the Venetians who excelled in this type of work. All the early wound beads recovered in Amsterdam are of plain varieties; none have adventitious decoration. Finally, the date of the beads as suggested by the archaeological evidence postdates most of the activity to which Engle refers.

There remains another possibility—that the beads may have been considered to have talismanic properties by those who brought them to North

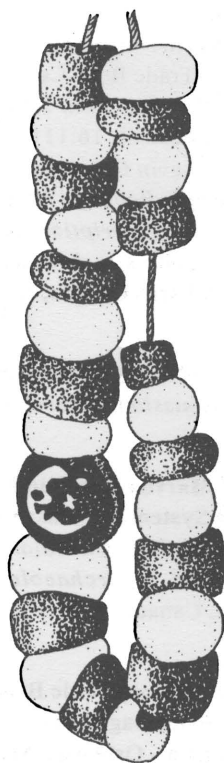


Figure 5. Talisman necklace in the Carnac Museum, Morbihan, France, which incorporates the single amber-glass man-in-the-moon bead shown in Fig. 1 (Opper and Opper 1992:5, Fig. 7).

America. The few amber-colored specimens found in northwestern France were part of talisman necklaces composed of various old beads put together by country folk during the 19th century and earlier (Fig. 5; Opper and Opper 1992:5-6). Such necklaces or *Gougad-Pateraenneu* were believed to protect the wearer from evil spirits and bad luck. It is by no means certain, however, that individual man-in-the-moon beads were believed to have similar properties in the 17th and 18th centuries.

In the absence of any historical documentation, it is altogether uncertain how the aboriginal recipients viewed man-in-the-moon beads. That they were held in some esteem is evidenced by their association with so many burials over a wide area. There is no way, however, to tell if the beads were thought to be imbued with supernatural powers or possibly signified a

sympathy for or allegiance to religiously persecuted French traders. It may simply be that they afforded the wearer a showy display of wealth or power (Pl. IVD).

CONCLUSION

The status of man-in-the-moon beads as distinctive horizon markers for the Middle Historic Period (1670-1760) in eastern North America remains unchanged. The evidence further indicates that they were primarily distributed by the French who are known to have been supplied with beads by the Dutch during the 18th century (Karklins 1983:113) although the beads themselves were probably made in Venice. Whether the beads held allegorical significance for those who distributed or received them remains uncertain. While Anita Engle presents some very interesting and thought-provoking evidence in support of this, much more documentary research is needed to validate her hypothesis. Consequently, the mysterious man-in-the-moon beads remain almost as enigmatic as before.

ACKNOWLEDGMENTS

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THE STONE BEAD INDUSTRY OF SOUTHERN INDIA

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Although previously unrecognized, South India was once home to a major stone-beadmaking industry. At its zenith in the early centuries A.D., it exported beads eastward to other parts of Asia and westward to the Roman Empire. South Indian gems were of such importance to the Roman West that the region deserves the title of "Treasure Chest of the Ancient World." Research has identified the probable sources of nearly all the raw materials used, the lapidary centers, and the trade routes over which the finished beads would have traveled. Additionally, it has revealed that the principal participants in the industry were the Pandukal people, opening a new chapter on the widening understanding of this community.

STONE BEADMAKING IN INDIA

India has long been celebrated as a source of semiprecious gemstones as a result of the mass volcanism that followed its separation from the southern supercontinent of Gondwana some 60,000,000 years ago (Wadia 1990:275-286). This resulted in deep lava flows known as the Deccan Trap.¹ Superheated water containing dissolved chemical substances percolated into cavities in the lava. As the water cooled, minerals precipitated in these cavities, leaving semiprecious stone deposits throughout the Indian peninsula.

India was an early leader in exploiting these mineral riches and turning them into beads. From about 4000 B.C., hard stones, notably carnelian, were being worked into beads at Mergarh, now in Pakistan (Jarrige and Meadow 1980:130-131). The culture that developed at Mergarh was a forerunner to the Harappan or Indus Valley Civilization (2600-1900 B.C.). This, the most extensive of ancient civilizations, exploited semiprecious stones from as

far away as northern Afghanistan (lapis lazuli) and the Narmada River Valley (carnelian). Trade in these stones is very ancient.

Since Harappan times, the center of India's stone bead industry has been located around the Gulf of Cambay (Khambhat) (Fig. 1). The lower reaches of the Narmada River are rich in secondary deposits of gemstones washed out by water action and brought down the river. Lothal, a Harappan site near the head of the Gulf of Cambay, was a major lapidary center (Rao 1973).

The Romans have left written accounts of the stone-bead industry in this region. Both *Periplus of the Erythraean Sea* (Casson 1989), written by a Greek sailor in the mid-1st century, and *Geographia*, scribed by Claudius Ptolemy (Stevenson 1991) about a century later, outlined its major components. Early European visitors to India, notably Duarte Barbosa in 1514 (Dames 1918, I:142-145), expanded on the details of the trade. A.J. Arkell (1936) brought the industry to general scholarly attention. Evidence both from Western and Indian sources has been employed to build a history of the enterprise (Francis 1982). The study of the industry at Cambay continues to attract scholars (Kenoyer, Vidale, and Bhan 1991, 1994).

What has not been appreciated is that India was home to two major stone-bead industries. The western one, concentrated in the modern state of Gujarat, has received considerable attention and is well known. The other was located in the southernmost part of the Indian peninsula. It thrived for some two millennia and at times was even more vigorous in international commerce than the western one. It has gone unrecognized for a variety of reasons, but is well deserving of attention.

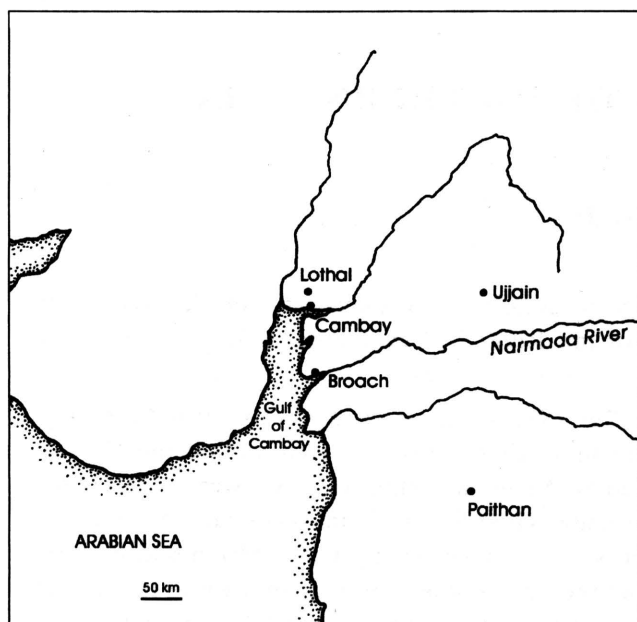


Figure 1. The region of the Gulf of Cambay showing sites mentioned in the text (drawing: D. Larsen).

THE SOUTH INDIAN STONE-BEAD INDUSTRY

The conditions for the growth of a stone bead industry in South India are similar to those in western India. The same geological processes that blessed northern regions with gemstones were also at work in the south. By the time of the development of the three southern Tamil Kingdoms (the Cola, the Cera, and the Pandya), in the late centuries B.C., international trade was officially encouraged and beads were an important export. The sources of raw materials were exploited, lapidaries founded, and trade routes established to move the beads to far-flung customers.

To examine South Indian stone beadmaking, we shall begin where the archaeological record opens, at the site of Arikamedu, in the Union Territory of Pondicherry, on the southeast coast (Fig. 2). Arikamedu lies along the last bend in the Ariyankuppam River shortly before it flows into the Bay of Bengal. India has few natural harbors along its coasts, so it was common for upriver areas to be used as ports.

Arikamedu is a celebrated archaeological site, probably the most famous in South India. It was discovered in the 1930s (Jouveau-Dubreuil 1940) and

excavated three times in the 1940s; first by an amateur French team (Faucheux 1946; Pattabiramin 1946; Surleu 1943, 1946), then under the last British director-general of the Archaeological Survey of India, Sir Mortimer Wheeler (Wheeler, Ghosh, and Devi 1946), and then by a French team lead by Jean-Marie Casal (1949). Directed by Vimala Begley of the University of Pennsylvania and K.V. Raman of the University of Madras, the most recent excavations took place between 1989 and 1992 (Begley 1993, 1996).

The initial interest in Arikamedu was that Romans had once traded there. A great many beads and bead wasters were excavated and picked up from the site, most being housed in the Pondicherry Museum. This material confirmed that there had been a major stone-bead industry (as well as glass) at Arikamedu, but its wider implications were not understood.

The stone beads are intriguing from several standpoints. One is that Arikamedu appears to have been the first place to have used, or more properly, to have altered certain stones, including the production of black onyx by chemically modifying banded agate, and creating citrine or golden quartz by heat-treating low-quality amethyst.

A crucial point is how the stones were worked. All references to stone beadmaking in India are based on the process used in the western industry and still observable today in Cambay, the modern lapidary center (Fig. 3a-d). After an initial heating to make the stones easier to flake, they are chipped into roughouts by being held against an iron point and hit with a hammer made of water buffalo horn mounted on bamboo. Then they are ground; traditionally against stones but in the last few decades against electrically driven lapidary wheels. Next, they are drilled, a process involving double-tipped diamond drill bits powered by a bow drill. Polishing follows, traditionally done by hand against fine-grained surfaces for faceted beads or tumbled in leather bags for round beads. This stage has also been mechanized in recent years.

Some beads were made at Arikamedu in the same way, but about half those of crystalline quartz (rock crystal, amethyst, and citrine) and a quarter of the beads of microcrystalline quartz (agate and carnelian) were made by a different process (Fig. 3e-h). It also

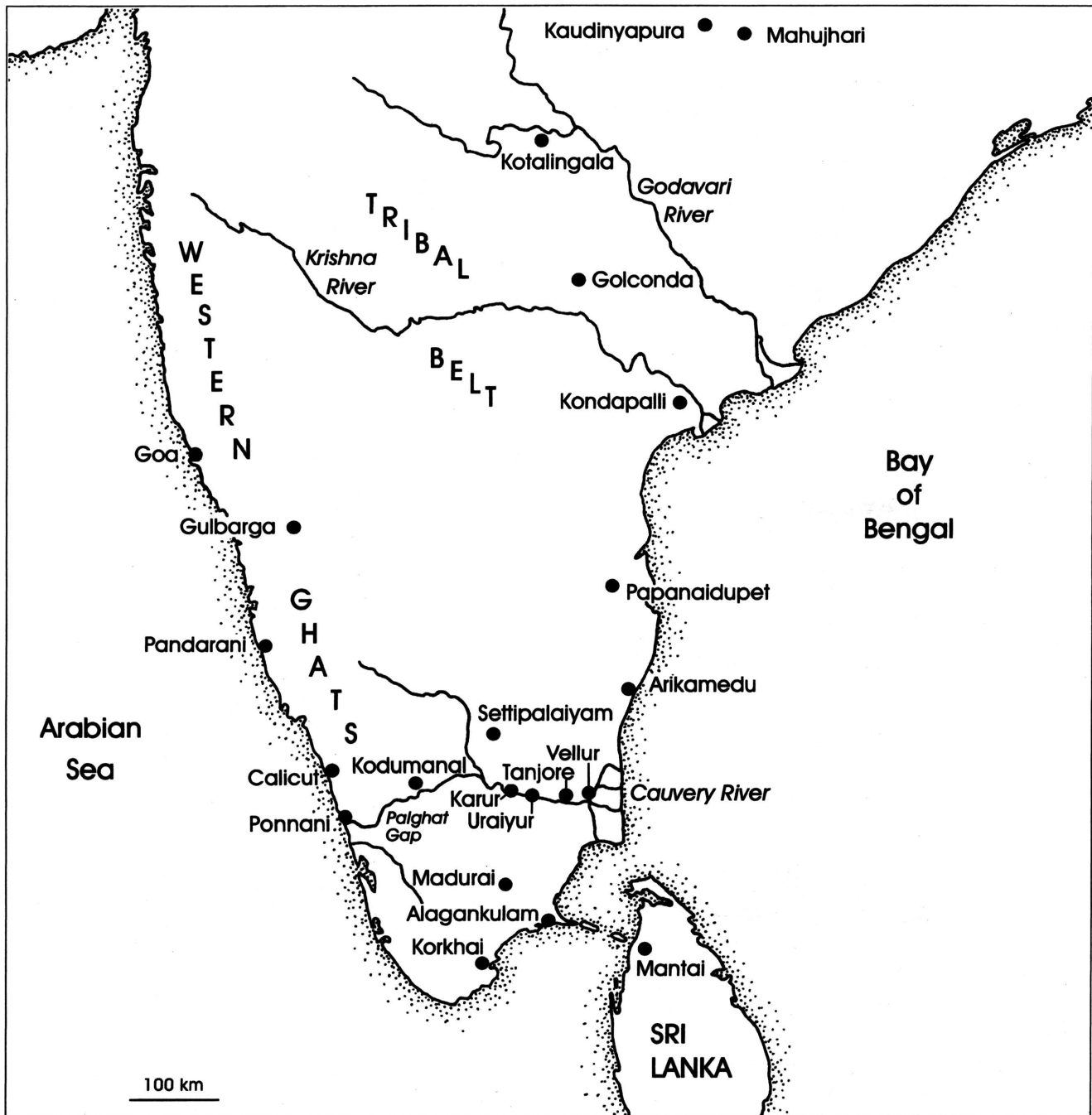


Figure 2. Southern India showing sites mentioned in the text (drawing: D. Larsen).

began with the chipping of roughouts. The roughouts were not ground, however, but pecked by being repeatedly hit with a pointed implement to shape them (Pl. VA top). The precise way in which this was done has not been determined. They were then polished, and drilled.

Two different stone-beadmaking methods were thus in use at Arikamedu. The initial chipping into roughouts was the same in both, but the next step differed. In one case the stones were ground; in the other they were pecked. Not only were these steps distinct, but in the grinding method the bead blank was

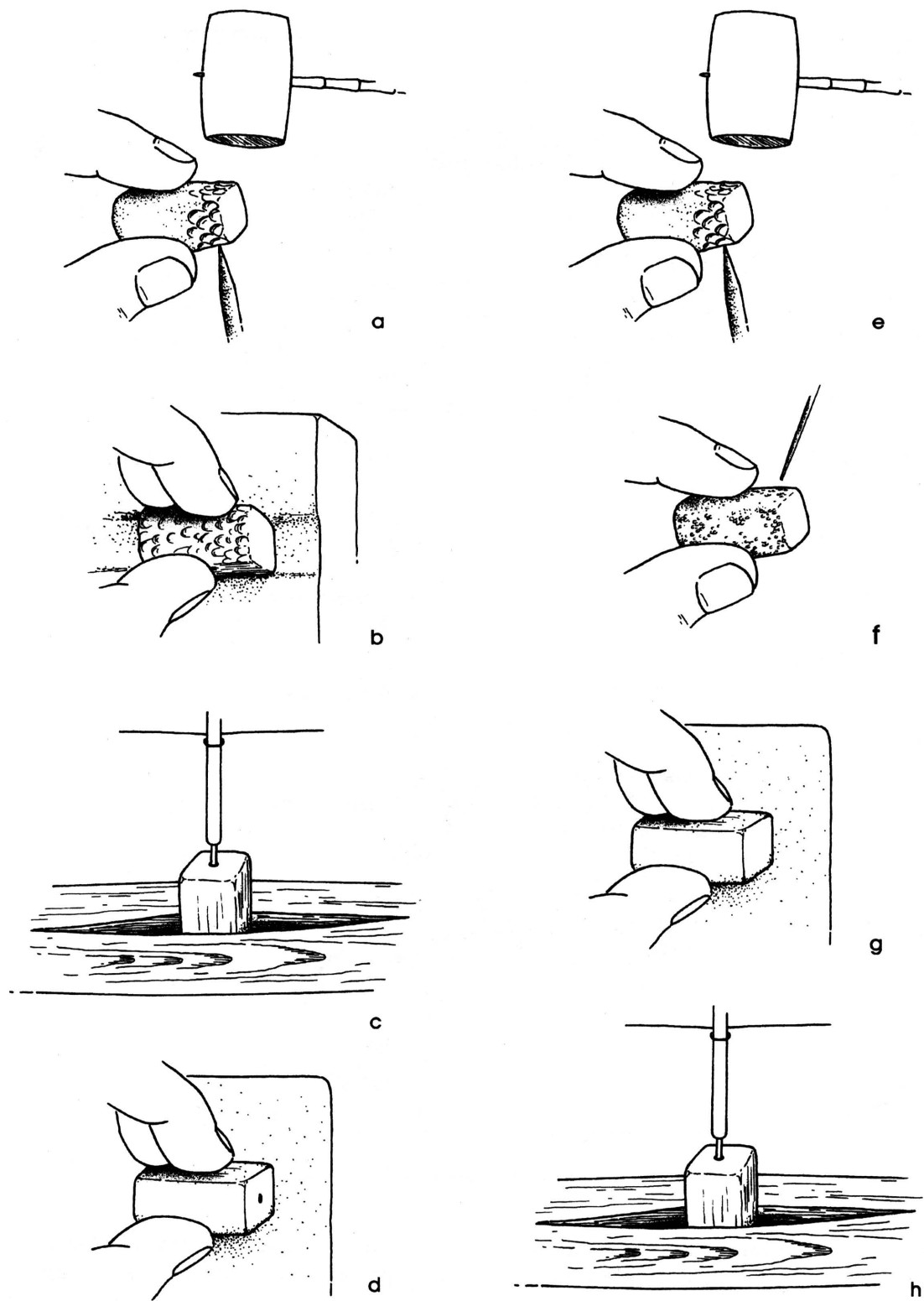


Figure 3. The steps of stone beadmaking. *a-d, the grinding method:* a, chipping; b, grinding; c, drilling; d, polishing; *e-h, the pecking method:* e, chipping; f, pecking; g, polishing; h, drilling (drawing: D. Larsen).

drilled next and then polished, while in the pecking method it was polished before being drilled.

Why should this be? When I first perceived this difference (Francis 1988), I had no definite answer. While the majority of the crystalline stone was worked by the pecking method and the grinding method was used for most of the microcrystalline stones, there was, nevertheless, considerable overlap between the groups. Perhaps the crystalline stones were easier to peck than grind, but had this been the only consideration, one would have expected a greater percentage of each material worked in one way or the other. Furthermore, this did not explain why the polishing and drilling steps had been reversed.

Another possibility was that the differences were chronological. The early excavators of Arikamedu were not interested in what was going on in the Indian city, but concentrated on the Roman connection. Nor were they very interested in beads. The data preserved from the 1940s excavations tell us little about the chronological position of the beads. What evidence did exist suggested that the two methods were used concurrently. The 1989-1992 excavations confirmed that the two methods were used concurrently throughout the history of the site.

A third possibility was that there were two different beadmaking traditions or "schools" operating at Arikamedu. The facts best support this hypothesis. Stone beadmakers from western India may well have been attracted to the flourishing lapidaries at Arikamedu, but another group of stone beadmakers was present as well.

THE PANDUKAL PEOPLE

The Pandukal people are usually known in the archaeological literature as "Megalithians," from misguided analogies of some of their burial practices with those found in Europe. The term "Megalithians" has many problems, and I have adopted Leshnik's (1974) suggestion of calling them Pandukal (*pandukal* being Tamil for "old stones," again taken from their burial practices).

For a long time, these people were only known from their grave sites. They would expose the dead for some time and then gather the cleaned bones and bury them, often in cists or sarcophagi, marking the tombs

with stones. Sometimes these were very large stones (megaliths), but often they were just stone circles.

This burial practice is believed by some scholars to be intrusive to India and these people were possibly outsiders. They may have entered what is now India early in the second millennium B.C. and were settled in the central peninsula by the middle to late second millennium. Another early date for them (905-780 B.C.) is at Korkhai, at the very tip of the peninsula, once the center of pearl fishing (Moorti 1994:4-5).

As the Pandukal people moved into South India, they introduced several traits: horsemanship, iron and gold technologies, and stone beadmaking. Their distinctive, though not unique, pottery is known as red-and-black ware, a finely polished ceramic produced by firing the pots in an upsidedown position. They also used a unique symbolic or writing system, not yet interpreted.

The work of archaeologists at Deccan College, Pune, and Tamil University, Tanjore, in the last few decades has given us a more complete idea of the life (as opposed to just funerary practices) of these people. Twenty-five years ago there were no known habitation sites connected with the Pandukal people. Dozens have since been discovered.

A picture of the lifeways of the Pandukal people is now emerging. Their village economies were not agriculturally based. Rather, the villages were crafts centers, specializing in iron smithing, gold smithing, and stone beadmaking. Despite the wide range of tools they made, plowshares were not among them. Pandukal diets relied on meat. The meat was supplied by large herds that must have grazed over considerable territory. The herds were tended by the young men of the community, whose extensive horse riding is evidenced by the trauma to their leg bones (Deo 1983; Leshnik 1974; Moorti 1984-1985, 1994; Rajan 1990:98).

PANDUKAL BEADMaking

The earliest identified Pandukal beadmaking site is Mahujhari in the Vidharba region of Maharashtra and dates around 900 to 700 B.C. (Deo 1973). Agate was widely used there, cut from nodules gathered along nearby rivers. The pecking technique was employed to form them into beads (pers. obs.).

The site of Kodumanal in Periyar district, Tamilnadu, was founded by around 500 B.C. (Rajan 1990). Kodumanal is very close to quartz (and probably amethyst) sources, as well as beryl and sapphire deposits. Beads excavated from Kodumanal included those of carnelian, yellow carnelian, onyx, quartz crystal, and amethyst (Pls. VA bottom, VB top). All were made by the pecking technique. The products were quite beautiful, particularly the quartz and amethyst beads, which were often faceted and highly polished by hand (pers. obs.)

Kodumanal can be identified with Kodumanam which is mentioned in the *Padirruppatu*, a work of the Tamil *Sangam* literature (ca. 300 B.C. to A.D. 300). It was famed for its goldsmiths. At least some of the gold used by the jewelers probably came from the melting of Roman gold coins found as "hoards" in particular abundance around Kodumanal (Wheeler 1954:137-145).

A distinctive Pandukal bead is the "etched carnelian," decorated with indelible white lines added by means of an alkali. The technique dates back to the Indus Valley Civilization. By the Early Historic Period (ca. 500 B.C. to A.D. 500), there were two regions in India that were making beads with characteristic designs. They have been designated northern and southern (Dikshit 1949), the latter now understood to be Pandukal. Unperforated etched carnelians of the "southern type" have been found at Pandukal levels at Kaudinyapura (Dikshit 1968:88-89) and Mahurjhari (Deo 1973:32). K. Rajan (1992:pers. comm.) believes the numerous etched carnelians at Kodumanal were locally made and I believe the same was true at Arikamedu, where the beads are common in local Pandukal graves.

Kodumanal is also apparently the lapidary at which lapis lazuli was cut and distributed to South Indian sites. This precious blue stone is rare in northern India except in the west, but is found at many sites in the south (Pl. VB bottom). Unworked pieces at Kodumanal suggest local cutting. The stone would have been exported from its source in northern Afghanistan through the Indus River port of Barbarikon, as reported in the *Periplus* (Casson 1989:75), sent to Muziris (see below) on the southwest coast of India, and then on to Kodumanal for working. The large number of Pandukal etched carnelians from

northern Afghanistan that are now on the antiquities market were apparently part of this exchange.

By the second century B.C., Pandukal people settled at (and probably founded) Arikamedu. K. Rajan (1992:pers. comm.), the excavator of Kodumanal, puts the decline of beadmaking activity there to the period between 150 and 100 B.C. There may have been a physical movement of beadmakers from Kodumanal to Arikamedu.

THE SOURCES OF THE GEMSTONES

A variety of raw materials were worked into beads at Kodumanal and Arikamedu. Northern sources have been suggested for the stones worked at Arikamedu (Wheeler, Ghosh, and Devi 1946:123), as well as for the carnelian used at Kodumanal (Rajan 1990:102). There are sources closer to the lapidaries than these, however, and a mechanism for bringing them to the beadmaking centers can be postulated.

The rock crystal, amethyst, and beryl worked at Kodumanal were locally obtained, and Kodumanal could have furnished quartz and amethyst to Arikamedu. Arikamedu itself has no deposits of gemstones because it is situated on a deep alluvial bed (Pascoe 1973, III:1896-1897). Other sources must be sought for the remaining stones employed at Arikamedu and for the carnelian and agate at Kodumanal.

The nearest source for carnelian is to the north, along the banks of the Godavari and Krishna rivers. These rivers, like the Narmada, have washed down stones from the Deccan Trap lava flows and deposited them near their mouths, a fact long observed (Newbold 1846:37). All the carnelian worked at Arikamedu was brought in as river-worn pebbles.

The source for Arikamedu's agates, always worked into black onyx, appears to be different, however. Raw agate at the site is in the form of chunks, not pebbles. Many similar agate chunks have been found together at the walled site of Kotalingala in the Karimnagar district, Andhra Pradesh, which is dated to the 5th to 2nd century B.C.² Kotalingala was built on the banks of the Godavari River. Evidently, a vein of

banded agate nearby or perhaps up the river was exploited by the Kotalingala lapidaries. The same source could also have served Arikamedu and Kodumanal.

The region between the Krishna and the Godavari rivers is a major source for two other stones. Golconda (Ellore) is the classical site for diamonds which were not then worked as gem stones, but used industrially to drill stone beads. Nearby at Kondapalli in the Guntur district, Andhra Pradesh, is a celebrated source for almandine garnets (Bauer 1968:304).

In sum, the Krishna-Godavari doab³ is an area within easy reach of Arikamedu and provides carnelian, agate, almandine garnet, and diamonds (for drilling). Rock crystal, amethyst, and its derivative, citrine, probably came from Kodumanal. This accounts for all the stones worked at Arikamedu except for prase, whose source has not been identified, and hessonite garnet, which was obtained either from Sri Lanka or Vietnam (Francis 1995:6-7). Furthermore, this doab is the only part of India that supplies the principal minerals used for coloring the glass made at Arikamedu: wad (bog manganese), an impure manganese ore often containing cobalt, and free copper (Francis 1996).

During the early centuries of Arikamedu's existence, the Krishna-Godavari doab was relatively unsettled. It had no urban centers and only a few villages. It is within the area that Leshnik (1974:19-21) called the "Tribal Belt," occupied by the Pandukal herdsmen and other nomads. The young Pandukal herdsmen were in a perfect position to scout out raw materials for use by the artisans of the group. Many Pandukal sites are located at iron- and/or gold-bearing areas which may have been initially identified by these riders. The cattle keepers could also have discovered sources of semiprecious stones and brought the material back to the lapidary centers. I do not suggest that the equestrians dug the stones out of the ground themselves; they probably exploited local tribesmen to do the dirty work, much as the Bhils⁴ do to this day for the western Indian industry.

TREASURE CHEST OF THE ANCIENT WORLD

Who were the consumers of these gemstone beads? Certainly, there were local customers. Stone beads are

common in both Pandukal and urban Tamil sites, but the industry was also geared toward export.

On stylistic grounds, stone beads from South India can be identified in several Southeast Asian sites of the last few centuries B.C. and the early centuries A.D. These include flat onyx pendants found in Thai sites (pers. obs., National Museum, Bangkok) and at Oc-eo, Vietnam (Malleret 1962:214-215), as well as collar beads in the "Buni complex" near Karawang, Java (pers. obs., National Museum, Jakarta). Other stone beads in Southeast Asia may also have come from southern India, but more work needs to be done for this to be confirmed.

A major buyer of South Indian stone beads was the Roman Empire. Comparing the stone beads made at Kodumanal and Arikamedu with those most treasured by the Romans leads to this conclusion. In his *Natural History*, Pliny the Elder discussed gemstones, often mentioning their Indian origins:

1. "Beryls are produced in India and rarely found elsewhere" (Eichholz 1962:225).
2. "[The rock crystal] of India is preferred to any other" (Eichholz 1962:239).
3. "Here the first rank is held by the amethysts of India" (Eichholz 1962:239).
4. "The best [garnets] are the 'amethyst-colored stones'.... Many writers state that the Indian stone is brighter than the Carthaginian" (Eichholz 1962:239-241).
5. "There are also many other kinds of green stones. A member of the common class is the prase.... India produces... these stones..." (Eichholz 1962:255-257).
6. "Formerly, as is clear from the very name, sardonix meant a stone with a layer of carnelian resting on a layer of white.... Stones that have now usurped the name... lack all trace of the carnelian of the Indian stone [and] come from Arabia...." (Eichholz 1962:233). This marks the change in fashion from the West Indian sardonix to the South Indian (not Arabian) black onyx.
7. "[Second only to diamond] in value in our estimation comes the pearls of India and Arabia" (Eichholz 1962:213).

Not only are these Indian stones, but they are all but exclusively South Indian stones: the beryl of Kodumanal; the almandine garnets, prase, and black onyx of Arikamedu; and the pearls of Korkhai. Rock

crystal and amethyst are found elsewhere in India, but sites in the north are very poor in these stones compared to their contemporary South Indian counterparts.

TRADE ROUTES

The chief port used by the Romans in this trade was Muziris, on the southwest coast. The *Periplus* describes it thus: "Muziris, in the same kingdom [the Cera], owes its prosperity to the shipping from Ariakê [roughly Gujarat] that comes there as well as Greek shipping. [It exports] all kinds of translucent stones, diamonds, sapphires..." (Casson 1989:81-83).

The site of Muziris has never been precisely located. Casson (1989:296) places it near Cranganore, but this has not been verified. Nonetheless, it remained the chief trading port of South India for the Western world for centuries. Musaeus, Bishop of the Dolens, in an account of perhaps the 4th century declared it, "Muziris the Mart of all India on this side of the Ganges..." (Ambrose 1905:240). It figures prominently on the Peutinger Table, probably a medieval copy of a 3rd-century Roman map. It is, in fact, the most important city on the map east of Antioch (Stuart 1991).

Muziris not only traded by sea but also inland. The Tamil poem *PuRam* says: "and the merchants of the mountains, and the merchants of the sea, the city where liquor abounds, yes, it is Muziris..." (Méile 1940:93). Ptolemy dimly perceived its connection with inland sites. He placed it on the Psuedostomus (false mouth or inlet) River, and wrote, "Between the Psuedostomus and the Baris rivers... [are] Punnata in which is beryl... [and] Carura regia Ceronothi [Karur, capital of the Cheras]" (Stevenson 1991:154).

Three routes can be suggested for the transport of gemstones to Muziris for trade with the Roman West. The route or routes used may have been partially determined by which ethnic group controlled this aspect of the trade. All of the routes may have been used at one time or the other, or even simultaneously. They are:

1. *An overland route in the hands of Tamilians.* The beads from Arikamedu would have gone up the Cauvery River past Uraiyur, the Cola capital, and on to Karur, the Chera capital. Pearls from the south would have traveled overland through Madurai, the Pandya capital, to Karur. From Karur, the goods would have gone up the Cauvery a short way and then up the Noyil River to Kodumanal, where its stones would be added. From there, travel would continue up the Noyil to the Palghat Gap in the Western Ghats and then down the Ponnai River to Muziris.
 2. *A sea route controlled by the Tamilians.* Beads from Arikamedu would be shipped to Alagankulam and transshipped through the reefs and islands of "Adam's Bridge" in the Palk Strait to Mantai, in northern Sri Lanka. There, pearls would be added and the whole sent to Muziris. The beryl and other beads of Kodumanal would arrive at Muziris through the Palghat Gap and down the Ponnai River. The sea route is known to have been heavily trafficked between Muziris and Arikamedu and beyond, as described in the *Periplus* (Casson 1989:89).
 3. *A land route controlled by the Pandukal people.* A heavily occupied belt of Pandukal settlements, several of them rather large in size, running from the Palghat Gap to the delta of the Cauvery River, has been identified by Moorti (1994:17). He has put forward the idea that it was involved in commerce, including trade with Rome. This route would have linked Arikamedu to Kodumanal, and beyond to Muziris. It would leave out the pearl trade (there are virtually no Pandukal settlements between Korkhai and Madurai), but this could have been linked to Muziris by sea. Pandukal horsemen could have taken gemstones along this route with considerable speed. It would have the advantage of avoiding the inevitable taxes that the Tamil kingdom capitals would have levied on the cargo if the first overland route described here had been used.
- Whichever route or routes were used, they all required cooperation between the Pandukal people and the Tamilians, as well as between all three Tamil kingdoms. This is not hard to imagine when the large potential profits from this trade are taken into account.

THE INDUSTRY IN LATER TIMES

South India remained a source of semiprecious-stone beads for many centuries after the period of intense trade with the Roman West, which ended in the 2nd century A.D. Dionysius Periegetes in the 4th century wrote in his *Description of the Whole World*: "along the course of mountain torrents [Indians] search for precious stones, the green beryl, or the sparkling diamond, or the pale green translucent jasper [prase], or the yellow stone [citrine], or the pure topaz, or the sweet amethyst..." (Prasad 1977:199). All these stones are South Indian gems, except the "pure topaz," which cannot now be identified.⁵

In the post-Roman era, trade in these gems continued. The Muslim traveler Ibn Khurdadbeh, writing of western India in the mid-9th century, said: "crystal is obtained from Mulay and Sandan" (Nainer 1942:198). Sandan has not been identified, but Mulay is a transliteration of *malai* or "mountain," referring to the region beyond the Western Ghats. The Chinese writer Wang Dayuan in the mid-14th century reported that precious stones (*ya-hu*) were available from Fandariana (Rockhill 1915:484). *Ya-hu* may be a transliteration of *yaqut*, Arabic for precious stones, often of the corundum group. Fandaraina has been identified as Pandarani on the southwest Indian coast, to which the stones would have come from across the Western Ghats (Hardie 1985:19).

Later, European visitors remarked on this region as a source of gemstones. When Vasco de Gama opened the way to India for Europe in 1498, he returned with a letter from the Zamorin of Calicut for the King of Portugal promising "precious stones in great quantities," among other goods (Birdwood 1891:163). In the same century, the Russian Athanasius Nikitin wrote of his journey from Gulbarga to Calicut: "I went to Kooroola, whence the akik [agate] is produced and worked, and from whence it is exported to all parts of the world. Three hundred dealers in diamonds reside in this place..." (Major 1857, III:30). Kooroola has never been identified. There is a Curula city in Ptolemy's *Geographia* (Stevenson 1991:150), on the southeast coast, but whether this is the same place is not known.

Subsequently, the German Sebastian Münster (1559:1065) wrote of "abundant beryl, chrystophrase, diamonds, carbuncles [garnets], many pearls [or beads] and gems," all South Indian stones. The

Dutchman John Huyghen van Linshotan, in 1598, made the astonishing statement that no rock crystal was found in India, that it was all actually "beryllo," but that chrisolites, amethysts, and agates "are in great numbers found in Cambaia and Ballagatte, and are brought to Goa, to be sold, whereof they make Beads, Seales, Ringes, and a thousand such like curiosities" (Tiele 1885, II:138, 141). "Cambaia" is Cambay and "Ballagatte" (*balaghat*) is a designation for "beyond the mountains," in this case beyond the Western Ghats. Another notice came from François Pyrard in Goa in 1611, who wrote: "The ships leave Goa towards October, and touch at Cochin for precious stones and spices..." (Gray and Bell 1888, II:175).

A remnant of the industry continued through the end of the 19th century. W. Francis (1985:67), in the *Imperial Gazetteer* published in the 1890s, said that quartz was worked at Settipalaiyam in Coimbatore District and amethyst was exploited near Vellur in Tanjore District. Bauer (1968:477), writing in 1903, identified quartz beadmaking in Vellur. John Anthony and I have visited these villages, as well as the jewelry centers of Tanjore (Thanjavur) and Tiruchirappalli (ancient Uraiyur), and have found no beadmaking or memory of it in any of these places.

THE HIDDEN INDUSTRY

The South Indian stone-bead industry was probably at its height during the late centuries B.C. and early centuries A.D. It flourished during Roman times, when trade between India and the West, via Egypt, was most significant. It survived for many centuries thereafter, as shown by notices in Arab, Chinese, and European sources. Whether it was as strong in this later period as it had once been is difficult to judge from the scattered references that exist.

Yet, this industry has remained unknown. Why should this be? The last European mention of stones exported from South India is in the 17th century, about the time Arikamedu was abandoned (Francis 1996). It appears that the glass beadmakers of Arikamedu went to Papanaidupet, the village where glass beads are still made in the ancient manner. The fishers and farmers of Arikamedu settled less than a kilometer away at Virampattinam, the modern village by the site, which preserves the name of the original town.⁶ The stone



Figure 4. Section of Ptolemy's map of India showing the western portion. Barygaza empor(ium) at the lower left is modern Broach and erroneously sits on the northern bank of the Namadus (Narmada) River. Upstream at the upper right is Ozene regia Tiascani (Ujjain, capital of Tiascani) (from a map published by the Government Photozincographic Office, Poona, 1880).



Figure 5. Another section of Ptolemy's map. Ujjain (Ozene) is center left. A mountain range is in its vicinity and ends with the "Sardonyx Mountain in which is the sardonyx stone." In truth, the source of the stones is across the river from Broach (from a map published by the Government Photozincographic Office, Poona, 1880)

beadmakers seem also to have left, migrating to other centers in South India, but never regaining their former status.

Visitors, writers, and officials of the British Empire preserved much of what is known of India as the subcontinent came under Imperial sway. Stone beadmaking in the South was apparently of such minor importance that it attracted little attention. In contrast to the agate-bead industry of western India, the weak remnant of the southern industry was not recognized for its historical role.

This "blind spot" is of great antiquity. The Romans had a good idea of the workings of the western agate-bead industry. The *Periplus* correctly identifies Broach (Barygaza to the Romans) as the port from which beads cut at Ujjain (Ozênê) were shipped westward. Paithan (Paithana) in modern Maharashtra was said to be the source of the stones (Casson 1989:83), but this is highly unlikely. Kingdoms generally hostile to Malwa, of which Ujjain was the capital, controlled Paithan, and the mines of Ratanpur were far more accessible to Ujjain.

Ptolemy's map (Figs. 4-5, cf. Fig. 1) shows an understanding of the political facts of the region. Broach (Barygaza) was the port on the Narmada (Namadus) River. Upstream was Ujjain (Ozzene), the capital of the kingdom. Beyond was a mountain range with the "Sardonyx Mountain" at its extremity.

But there were some misunderstandings. Ujjain is not on the Narmada and the stones come from the riverbed, not a mountain, but this was a common misperception. The greatest error was in placing the Sardonyx Mountain far inland, when the true source of the stones was just south of Broach. I suggest this is a case of Indian disinformation.⁷ Had the Romans known that the stones were obtained right across the river from the port they were using, they might have been tempted to go and buy them there themselves, eliminating the Indian middlemen. With the Sardonyx Mountain indicated as being so far inland and the prevailing Indian opinion of this country as being inhabited by tigers, snakes, and "communities of vile caste," the Romans would not have been inclined to attempt a visit to the source.

Yet, there was no understanding of the mechanics of the South Indian stone-bead industry. All the Romans knew was the importance of Muziris as a port.

Ptolemy places "Putanna in which there is beryl" vaguely inland. The importance of Arikamedu (the Podukê of the *Periplus* and the Poduca of Ptolemy) was never recognized. The land connections that bound Arikamedu, Kodumanal, and Muziris were lost on the Roman geographers.

SUMMARY

An industry producing beads of semiprecious stones operated in the far south of the Indian peninsula for some two millennia. At least in the early centuries of its operation, it was a major exporter of beads to Southeast Asia and the Roman West. Despite its importance, its very existence has gone all but unrecognized. Romans and later customers knew only the port through which the beads were sold.

The industry was innovative. It was the first to produce black onyx and citrine, to drill beryl crystals, and perhaps to use double-tipped diamond drill bits. It also pioneered the use of certain bead styles, among them collar beads, flat pendants perforated through the top edge, multi-faceted stone beads, and particular designs of etched carnelians.

The principal actors in the industry were the Pandukal people. Their young herdsmen were likely responsible for scouting out the sources of raw materials and bringing them to the lapidary sites to be processed. The stone beadmaking centers were the Pandukal communities of Kodumanal and, later, Arikamedu. The wealth of stone beads and pearls was sent either by land or sea (or by both routes) to Muziris for export to the West, along with pepper and other goods, making the port an essential trading station.

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ENDNOTES

1. These lava flows are several kilometers deep in many parts of the Indian peninsula. They are collectively known as the Deccan Trap. "Deccan" is derived from Sanskrit meaning "the south," referring to the peninsula (Yule and Burnell 1902:301) and "trap" comes from the Swedish for "steps" or "stairs," due to the step-like shape of the lava flows (Wadia 1990:275).
2. This important site, excavated by V.V. Krishnasastry, still awaits full publication. The information presented here is from personal communication with Krishnasastry and personal observation.
3. "Doab," literally "two waters," refers to the region between two rivers. Compare "punjab," the region of five rivers.
4. Members of the Bhil tribe dig the stones along the Narmada River. The "Agastya Samhita" section of the *Garuda Purana*, probably completed before 500 A.D., says that carnelians were found in areas "occupied by communities of vile caste" (Shastri 1968:247). "Caste" in this case is a translation of *jati*, which means either caste or tribe. Ratanpur, "Village of Gems," is the traditional center of this mining. John Anthony and I have visited it several times since our first visit in 1981. In 1995, we found no one mining at Ratanpur, and were advised to go to Damlai, about 15 km away, where we found the Bhils occupied in their work. Bose (1908) went through exactly the same experience in the winter of 1907-1908. The Bhils, being nomadic and non-agriculturists, prefer to switch locales every once in a while.
5. The Romans usually referred to peridot as topaz (Eichholz 1962, X:250-253), but peridot is not available in India. Moreover, this was called the

"pure topaz" and evidently meant some other stone, not now identifiable.

6. Arikamedu is an archaeological name meaning "mound of Arakan," as a statue of this Jain avatar was found there.
7. Several other such cases can be cited, such as gold-digging ants, diamonds retrieved from eagle nests, and the enormously exaggerated size of Sri Lanka.

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THE KROBO AND *BODOM*

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Certain relatively large beads, almost always found in Ghana, have come to be called "bodom" by bead traders, collectors, and researchers. Most students of this bead believe it is the product of the Krobo powder-glass industry proliferating today in southeastern Ghana. Upon closer inspection, however, there appear to be two distinct groups of bodom that we may, for convenience, call "old" and "new." While the new bodom are definitely made in Ghana today, using techniques that have been observed and documented, the old bodom are substantially different in enough ways to suggest that they were made elsewhere by other methods. This study examines the origins and methods of manufacture of bodom and tests the hypothesis that the Krobo made old bodom.

INTRODUCTION

Bodom beads (pronounced bo-DOME or baw-DAWM) have been studied by a number of individuals, principally Lamb (1971, 1976) and Liu (1974, 1984, 1991). Lamb (1971) first thought it unlikely that the old *bodom* could have originated south of the Sahara, but by 1976, he had reversed his opinion based upon observations of Krobo beadmakers. Although Lamb should be given considerable credit for his pioneering studies of this bead and the powder-glass industry in general, it is possible, in light of Liu's closer inspection of *bodom*, that Lamb may have erred in his later study. Other literature concerning these particular beads is scanty. The articles already cited plus some recent summaries by Peter Francis (1990a, 1990b, 1993) are virtually the only academic references one will find concerning *bodom*. There are other references concerning beadmaking in Ghana (Haigh 1991, 1992; Sinclair 1939; Sordinas 1965; Wild 1937) which are useful for tracking the powder-glass industry in space and time, but these references provide little insight into the

enigmatic old *bodom*. The very interesting work of Kalous (1979), which was a strong rebuttal to Lamb, is basically a linguistics analysis that does not help us understand the fundamental questions related to old *bodom*: Who made them? How old are they? What materials were used? How were they made?

Evidence presented in this study is derived mainly from field observations in Kroboland during the 1990s, and visual inspection of beads collected in West Africa, mainly Ghana. There are, indeed, two main *bodom* styles: old and new. New Krobo-made *bodom* have many of the features of old *bodom*, while contemporary powder-glass techniques used in making these new *bodom* suggest many techniques concerning how old *bodom* may have been made. Yet, it remains conjectural whether the Krobo were actually the makers of old *bodom*.

The classic old *bodom* is a large bead, sometimes measuring 5 cm (2 in.) or more in either diameter or length. It is frequently biconical and typically has a yellow surface with a black core. It sometimes features decorations that resemble Venetian lampwork in that the bead appears to have glass rods or fragments applied onto the base by some hot-working technique (Pl. VC top, center). A second classic style has swirling or flowing designs seamlessly blended with the surface, as if the bead had passed through a molten state (Pl. VC bottom). In either case, old *bodom* usually bear no evidence of grinding and typically retain a smooth glassy surface. New *bodom*, made of powder glass, have designs that are more jagged (powdery in appearance), have a gritty matte finish, and show evidence of grinding (Pl. VD top, most beads). New *bodom* do not always have cores different in color from the surface of the beads (Pl. VD bottom, right).

To complicate matters further, there are *bodom* that appear to share features of both the old and new

styles described above. In addition, there are certain smaller beads, including the *akoso* (Pls. VIA top, bottom, VIB top), *ologo* (close in appearance to Venetian lampworked bicones), or *zagba* (long striped beads), that are technically similar in many respects to *bodom*, the main differences being size and shape. Finally, contemporary Krobo informants identify a number of *bodom* patterns, giving rise to such compound names as *akoso-bodom*.

"*Bodom*" is a word of Akan origin (Kalous 1979). The term is current in major bead markets and bead-producing areas of Ghana, including the Ashanti Region, Kroboland, and Accra. Among bead traders, the term is often applied to a single large and old (or old-looking) bead that may command a top price if *bodom* status can be attached to it. In Twi, the Akan language of the Ashanti, *bodom* can refer to a type of tree, in addition to a type of bead. The plural in Twi is *abodom*, a term Hausa traders sometimes use. Among the Krobo, who speak a Ga-Adangbe dialect, *bodom* means "big bead" or "the biggest bead in the necklace." The Krobo language is more closely related to Ewe than it is to Akan dialects (Twi and Fanti, for example), although there is considerable Akan vocabulary in Krobo.

There is a certain "look" to the beads Lamb (1976) calls "*bodom*," and his work appears to be the first in-depth investigation of this particular bead. He observed Krobo beadmaking and commissioned a Mr. Tetteh to make *bodom*, work that was done convincingly enough to conclude that it was the Krobo who made old *bodom*. Kalous (1979), in his rebuttal, argued that the beads described by Lamb are not true *bodom*, that true *bodom* are not the products of powder-glass technology, and that true *bodom* could not have been made by the Krobo. Kalous does not offer alternative names for the beads in question, nor does he discuss alternative technologies or possible origins.

It is not clear whether Lamb and Kalous were talking about the same bead. Lamb discusses the types of beads shown in his photographs, calling them "*bodom*," while Kalous, without photographs, talks about beads that the Ashanti call "*bodom*." It is never clear whether Kalous actually ever saw the beads he discusses. Lamb likely attached the catchy Ashanti term to the beads in question without giving it too much thought, after which the term became the popular

Ghanaian marketing term that it is today. To Kalous, "*bodom*" is a misnomer for the beads Lamb describes. We know which beads Lamb was discussing; the same cannot be said for Kalous.

Both Lamb and Kalous have valid points. Lamb is correct in that the beads in question were likely made using powder-glass technology. We might also accept, for the moment, the proposition that it was non-Akan beadmakers in southeastern Ghana or Togo, if not the Krobo, who made the beads he calls "*bodom*." We should agree with Kalous, however, that the *bodom* of the Ashanti is not necessarily the bead discussed by Lamb. The *bodom* of the Ashanti and other Akan peoples is deeply intertwined with traditional religion, shrouded in mysticism, rarely displayed, shielded from outsiders, and kept in special places. Ashanti *bodom* are "found," not produced, are sometimes said to come "from the north," and are charged with supernatural powers, such as the ability to reproduce or grow. Although the Krobo make and possess beads called "*bodom*," these beads might not be the true Akan *bodom*, just special, more-contemporary beads, original designs, or imitations. Some of Lamb's types might be considered true *bodom* by the Ashanti, but it is possible that the Ashanti *bodom* include a number of other bead types, just as the Krobo *bodom* ultimately do.

If we accept the view that the *bodom* concept has Akan origins, the beads Lamb attributes to the Krobo cannot be true *bodom* in the Ashanti sense of the term. What Lamb calls *bodom* are relatively modern beads that greatly post-date true Akan *bodom*. Lamb's *bodom* might not even resemble the Akan types referenced by Kalous. Lamb is talking about certain large beads he says were and are made by the Krobo; he calls these beads "*bodom*." Note that the beads Lamb discusses and other large beads of many descriptions are commonly called *kpo* by the Krobo, a term that may be translated as "locket" in reference to "the largest bead on the necklace." Furthermore, not all Krobos are familiar with the term "*bodom*," which suggests that Lamb may have simply imposed this bead name onto his Krobo associates and the bead "world" in general.

Liu (1991) highlights a subgroup of *bodom* characterized by decorations that look hot worked, the construction of which cannot easily be visualized with our current understanding of vertical or horizontal powder-glass molding techniques. Both Liu and

Lamb, however, mention a component method for making *bodom* and some of Mr. Tetteh's experimental beads were made with just such preformed components. Field research in Kroboland with Ransford Tetteh (no known relation to Lamb's Mr. Tetteh), a Krobo beadmayer, has confirmed these observations of beads made of preformed components. The production of powder-glass beads from components is frequently ignored, yet this component method, to be described below, goes far to explain how many old and new *bodom* were made.

Finally, Sordinas (1965), in a detailed article describing the making of *adjagba* (large striped beads) by the Krobo, does not use the term "*bodom*," although contemporary Krobos might call a large *adjagba* "*bodom*" in certain contexts. Curiously, *adjagba* is an Ewe word, the corresponding Krobo word being *zagba*, which shows the close linguistic relationship between Ewe and Ga-Adangbe (Krobo). The *adjagba* discussed by Sordinas were being made as he performed his study (the early 1960s), while some of the *zagba* pointed to by the author's contemporary informants are clearly from the "old" period, evidencing many classical *bodom* features.

This paper focuses on the types of *bodom* discussed by Lamb and Liu and on the role of the Krobo in their manufacture. By examining current beadmayer practices among the Krobo to identify techniques that could have been employed in making old *bodom*, insights may be gained into how the old *bodom* were made and their alleged Krobo origin.

WHO MADE OLD *BODOM*?

There are a number of active and defunct glass-bead industries in West Africa. Major contemporary powder-glass beadmayer areas in Ghana include Kroboland, some 60-80 km (40-50 mi.) northeast of Accra, and the Ashanti Region where the beadmayers are Ashanti or other Akan groups. Recent beadmayer has also been reported in the Anlo or Ewe areas of the Eastern Region (Haigh 1991, 1992).

Both Lamb (1976) and Sordinas (1965) describe the making of powder-glass beads in Kroboland. Sordinas spent time with a certain beadmayer named Samuel Tetteh (no known relationship to the other Tettehs mentioned above) of Huhunya, a Krobo town.

Sordinas did not use the term "*bodom*" in his study, but Lamb, a decade later, distinguished between *adjagba* and *bodom*, all the while observing several similarities between the two types. Earlier articles describe powder-glass beadmayer by the vertical-mold method at Dunkwa by Apollonians (Nzima) from southwestern Ghana or southeastern Ivory Coast (Wild 1937), and by the horizontal-mold method at Goaso in today's Brong-Ahafo Region (Sinclair 1939). An old man interviewed at Goaso, who happened to recall Sinclair, said that he had made beads in the 1930s and had learned the art in Ivory Coast. These places—Dunkwa, Nzima, and Goaso—are Akan, but not traditional Ashanti areas.

The origins of beadmayer in Ashanti and elsewhere in Ghana are unknown. While the legend of Osei Kwame (an Ashanti from Dabaa, near Kumasi), as reported by Francis (1993), says Ashanti beadmayer started only in 1937, this date is unlikely, given the contemporaneous evidence of beadmayer in Akan areas by Wild and Sinclair. Today, it is the Krobo and the Ashanti who make the bulk of the beads in Ghana. Despite all the fragmented historical references to beads in Ghana, there seem to be few, if any, reliable accounts of powder-glass beadmayer before 1900. In the early 19th century, Bowdich (1819) made some vague references to "boiled" beads at Kumasi, but his account was otherwise very confusing and did more to mislead students with respect to *aggrey* beads than to inform them of the powder-glass industry.

A Nigerian powder-glass-bead industry operated from at least the early 20th century, but this industry now seems to be defunct. Euba (1981-82) believes the Yoruba learned powder-glass technology from the Krobo and only took it up when the materials for their traditional methods became exhausted. The Yoruba industry is distinct from the Ghanaian industries, however, in that the beads were not made in molds and water was used as a binder. Otherwise, beadmayer in Nigeria might reach back to the first millennium, suggesting a possible origin for the Ghanaian industries (Willett 1977). The wound-glass-bead industry of Bida (Nigeria), despite the great differences in technique compared to the powder-glass industry, is important in understanding both the spatial and technological diversity of beadmayer and glass working in West Africa. Future investigations may also reveal current or past beadmayer in Togo and the

Ivory Coast. In the latter country, at Bondoukou, glass-bracelet making analogous to that of Bida was reported by Freeman (1898) in the late 19th century, although no evidence or memory of this industry seems to survive today.

Elsewhere in West Africa, there is contemporary powder-glass bead production in Mauritania using a wet method (binders) without molds to make *murakad*, the so-called “*kiffa*” beads (Oppen and Oppen 1989). To account for the cores of old *bodom*, Liu (1984) suggested that a binding technique similar to the Mauritanian process (and, indeed, the Yoruba process) could have been used. The Mauritanian industry could have spawned the Ghanaian industries, but if anything, the opposite would appear more likely, although it is even more likely that these two widely separated industries developed independently. It is possible that the contemporary powder-glass bead industries throughout West Africa have a common, but as yet unidentified, ancestor industry with roots as deep as ancient Egypt (van der Sleen 1973), but all of this is mere speculation. In the absence of glass-making technology, West Africans were forced to recycle imported glass and, therefore, innovated their various powder-glass industries as the solution to their need for small glass objects—above all, beads.

Limited archaeological evidence suggests the existence, if not the manufacture, of powder-glass beads in Ghana at least as far back as the 1600s (Francis 1993). Krobo Mountain, the outcrop from which the British drove the Krobo in 1892, is now a sacred place visited once annually by the Krobo. In the 1970s, however, Lamb and Kalous sparred over the importance of this rock during their heated debate on *bodom*. Lamb (1976) said there is evidence of pre-conquest beadmaking on the hill, while Kalous (1979) said that this insignificant little tribe, the Krobo, inhabiting this “mountain fortress” and preoccupied with defense, had neither the wherewithal nor the time to produce beads, let alone the fabulous *bodom*. A personal visit in 1998, to the Yilo village atop Krobo Mountain failed to produce any physical evidence of beadmaking, although the several accompanying guides insisted that beads had been made there before the expulsion.

DeCorse’s excavations at Elmina, with the firm terminal date of 1873, have produced a number of interesting clues concerning beadmaking in Ghana.

According to DeCorse (1989), stone abraders (presumably for working beads) found at Elmina have also been found at Ankobra, Secondi, and Winneba, all of which are Akan towns on the coast. There is also some evidence of beadmaking at Begho, a long-abandoned trading center in the interior.

Beadmaking could have come to Ghana from two or three directions during the past several centuries. The Akan reached their current homes from the north and northwest, while the Ga-Adangbe group, including the Ga and Krobo of the southeast, appear to have Yoruba roots to the east. The Ewe followed the Ga-Adangbe from the east. The Akan, moving southeasterly, and Ga-Adangbe groups of southeastern Ghana made contact in Akwapim (the area of modern Koforidua) as early as the 16th century, while the great 17th-century Ashanti priest/statesman, Okomfo (priest) Anokye, came from Akwapim (according to the Ashanti), the last Akan state in the direction of Kroboland.¹ In the early 1800s, the Ashanti Empire under Osei Bonsu encompassed the whole of modern Ghana, including Kroboland, which may account for the Akan component in the Krobo language, the Akan place names in Kroboland, and the *bodom* beads in Ashanti regalia. How much beadmaking technology crossed the Akan-Krobo frontier is rather difficult to determine, but a variation of the Osei Kwame legend has him going to Kroboland to learn beadmaking, instead of dreaming it. Theoretically, beads and beadmaking methods could have been exchanged along this frontier for the past 400 years.

The Krobo were certainly making beads as early as the 1920s. Ransford Tetteh’s “father” at Odumase-Krobo and another octogenarian beadmaker at Tsebi Manya both said they made beads in the 1920s, while the latter presented a *bodom* from this period that he himself had made.

Although the Krobo say they have been making beads for a long time, they frequently admit that they learned the practice from the Ewe, perhaps as recently as the early 20th century. The Krobo are quick to point out, however, that they made a number of technical innovations upon the lessons of their Ewe teachers and, indeed, Krobo beads today are the best made and most innovative of Ghanaian-made beads, as evidenced by their production of *bodom* and a number of other intricately designed beads. Liu’s

“hot-worked” *bodom*, which seems older and is certainly rarer, may be of Ewe origin, while today’s Krobo *bodom* may just be a copy of it.

The Ashanti and other Akan groups claim that *bodom* come from the ground, the north, or both. They do not claim to have made them. They do not say that they get them from the Krobo or that they buy them in the market. The Krobo, on the other hand, living to the south and east of Akan country, claim to make *bodom* and have lately been seen doing it. Thus, three possible groups of *bodom* are hypothesized:

1. New *bodom*, as made by Mr. Tetteh in the 1970s, by Ransford Tetteh in 1992, and by other contemporary Krobo beadmakers in southeastern Ghana, including Charles at Tsebi Manyia.
2. Old *bodom*, featuring “hot-work” decorations, dark cores, and seemingly different materials than the new *bodom*. (Note that what appear to be old *bodom* have been called *aggrey* by Quiggin [1949], in an apparent interpretation of Bowdich [1819].)
3. True *bodom*, elusive, of which few, if any, specimens have been seen and accurately described by outsiders.

In 1992, Ransford Tetteh, who was attempting to duplicate the older style, differentiated between new and old *bodom*, using this very terminology. Lamb (1976) differentiated the new and old styles, stating that the older style is of a quality not reproducible today, but was convinced that the beads of his Mr. Tetteh (the newer style) were close-enough approximations of the older ones to conclude that the Krobo actually made the latter.

Francis (1993) has suggested that the true *bodom* will be found in the regalia of the Ashanti royal family. Lamb (1976), in fact, photographed certain beads called “*bodom*” that were said to have come from Ashanti stool regalia. These beads are technically identical to the old *bodom* styles being discussed here. In 1993, the Ashanti Queen Mother, an octogenarian, displayed a “*bodom*,” to use her terminology, that she said she had “met” many years ago (Stanfield 1994). It was a rather large Venetian lampworked bead with a brick red core and red, white, and blue flag-type decorations. It is not known whether this bead possessed the supernatural powers frequently reported for true *bodom*. An interesting experiment would be to show a selection of both new and old *bodom* to

knowledgeable Ashanti informants, such as the Queen and her retainers, and obtain their views on the origins of these beads and whether or not they are true Ashanti *bodom*. The upshot of all this is that it is likely that the “old” *bodom* and the “true” *bodom* are one and the same thing, such that we need not whip the Lamb-Kalous horse any longer. It further appears that Lamb simply applied this Ashanti word to the beads he found and had made in Kroboland, foisting this “foreign” word onto the Krobo.

Lamb (1976) witnessed the Krobo making *bodom* in the 1970s and actually acquired newly made beads that convinced him that the Krobo must have made all of the beads he called *bodom*, including the older types. The photographs in his article show both types. Some of them were from a private collection in Somanya, a Krobo town, while others were said to have come from stool regalia. Ransford Tetteh, along with octogenarian beadmakers interviewed in 1992, said that both new and old *bodom* are/were made by the Krobo. No Akan beadmakers have been observed or reported making these types of beads. The only other candidate groups are the Ewe, including the Anlo around Keta Lagoon, who some Krobos say introduced the Krobo to beadmaking, and the Yoruba, whose wet-formed, moldless industry cannot be entirely ignored.

Haigh (1991) observed the Anlo (Ewe) making beads. In the same article, he makes no mention of the Krobo bead industry, but mentions the Ashantis. In an article on powder-glass beadmaking in Ghana, it is hard to believe that Haigh would make such an omission. Nevertheless, the existence of an Anlo bead industry is believable since Haigh observed the industry first hand.

Both the Krobo and the Ewe came to southeastern Ghana via Yorubaland along a similar route and met at Notsé, in southern Togo. It was at Notsé, according to legend, that the Krobo met their deity, Kloweke, who was Ewe and who introduced *dipo* (female puberty rites) to the Krobo and led them across the Volta. The Krobo may have been settled on Krobo Mountain as early as the 16th century, while the Ewe stayed behind in the area east of Kroboland. The construction of Akosombo Dam and Volta Lake in the 1960s tended to separate these two groups, but historically, the two have been in close proximity.² If one of these groups carried beadmaking skills, it is possible that both of them did.

DeCorse (1989) mentions evidence of bead reworking at Ife (Nigeria) between the 8th and 12th centuries, and among the many theories related to *aggrey* beads, one proposes a powder-glass bead from Ife (Euba 1981-82). Indeed, there is plenty of evidence for beadmiking among the Yoruba, and among the powder-glass beads that may be so attributed, there are specimens that have hot-work-looking decorations and other attributes reminiscent of *bodom* beads.

Beadmaking could have been practiced intermittently for at least four centuries by both the Krobo and Ewe in more or less their current areas, with some periodic transfers of method or spurts of innovation crossing the Krobo/Ewe frontier. Most evidence points to the Krobo as the makers of old *bodom*, but the Ewe make beads even today and may have been influential at different times among Krobo beadmikers, as the octogenarians attest. It is notable that the majority of Krobo informants claim the old *bodom* as their own, but these same informants attribute the closely related *akoso* bead to the Ewe. Could the Ewe have made the *akoso* and then transferred the skills to the Krobo, who proceeded to innovate with the *bodom*?

The question of who made the old *bodom* cannot be answered with certainty. The Krobo are the author's best candidates because they make *bodom* today, have a great tradition of using *bodom* (and many other beads), and are the major source of *bodom* coming on the market. Not all of the old beadmikers interviewed were certain that the Krobo made the old ones, however, and the notion that the Ewe introduced beadmiking to the Krobo, perhaps as recently as a century ago, should not be ignored. Finally, the Yoruba, out of whose territory the Ga-Adangbe (including the Krobo) and the Ewe migrated, cannot be entirely ruled out as the origin of the beadmiking industries and the makers of these mysterious old beads. The least likely candidates are the Ashanti, who never claim to have made these beads and who demonstrate few of the requisite techniques in their current beadmiking practices.

HOW OLD ARE OLD *BODOM*?

Major distinguishing features between new and old *bodom*, as described here, are the nature of the

decorations, the materials, and the cores. Lamb (1976) mentioned that some of the decorations are so fine as to resemble lampwork, but he stopped short of distinguishing clearly between new and old types. He presumably viewed differences as merely temporal variations in workmanship, rather than variations in technique or materials, and grouped all of his specimens, including Mr. Tetteh's experimental beads, into a single class of beads. The old *bodom*, thus, would be the product of the same industry as the contemporary *bodom* he commissioned. Lamb concluded that new and old *bodom* are actually the same bead, while at the same time glossing over differences in materials and quality of workmanship.

Bodom range in age from current to no older than the 19th century. If we can date the material used to color the older types, especially the predominant yellow, we will have a good estimate of the earliest likely date for the production of old *bodom*. No old *bodom* have been scientifically excavated, according to Francis (1993), and from their colors it seems obvious that 19th-century Venetian trade beads served as raw material. Many such lampworked beads are still widely available in Ghanaian markets and, when asked, beadmikers today can identify specifically the European beads preferred for making powder-glass beads and can even identify the beads used to make old *bodom*. In fact, Ransford Tetteh, in the early 1990s, was using old Venetian beads in his attempts to make old-style beads, while other informants, including Kwaku Amedievor (Fig. 1) at Sekesua (Upper Krobo), mentioned several imported beads used as raw materials (e.g., the use of *bunale* [yellow "Hebron" beads] to make *apé*).

DeCorse's excavations at Elmina have unearthed Venetian lampworked beads with colors that match those of the older *bodom*, suggesting that raw materials appropriate for the making of these beads were available in Ghana before 1873. Leaded yellow-glass beads traced to 19th-century Venice were, thus, probably used for the yellow surfaces of most old *bodom*. These yellow beads are still used as raw material today for the making of "quality" Krobo beads, as witnessed by the author. Before the introduction of ceramic dyes in the early 1980s, almost the sole source of color for powder-glass beads was old European beads.



Figure 1. Retired Krobo beadmaker Kweku Amedievor (born ca. 1911) and his wife at Sekesua, Upper Krobo. He began to make beads about 1931, and reportedly made “nice eye beads” as well as *zagba* during his career (photo: Kirk Stanfield).

If powder-glass beads, including old *bodom*, can be no older than the materials from which they are made, the old *bodom* would logically be somewhat more recent than their materials, such that any extant specimens probably date no earlier than the last half of the 19th century.

WHAT MATERIALS WERE USED?

Until the introduction of ceramic colorants, called “dyes” by Krobo beadmakers, in the early 1980s, beads in Ghana were made almost exclusively from scrap glass and old beads, although metal oxides and other colorants played minor roles. For this reason, older Ghanaian beads come in a limited range of colors (white, gray, yellow, green, and black) with decorations, usually stripes, of red, blue, green, and brown. Clear (colorless), brown, and green bottles, along with window glass, are the most common source of base glass, while opaque white hand-cream jars (*asra*) and cobalt or Bristol-blue medicine bottles are used when available. The latter sell at premium prices in the glass markets. European beads, including reds and greens, were used sparingly because of their cost.

Pre-dye *bodom* seem to have been made with powders of certain leaded yellow Venetian beads for the outer surface and powders or fragments of beads of other colors, usually red, green, and brown, for the decorations. Lamb (1976) mentioned that special glass

ingots from Venice or Jablonec (Gablonz) were used prior to World War II. The black or dark cores of these beads are likely to be comprised of junk glass and may even include sand. It was said by Ransford Tetteh that a mixture of ground powder-glass beads of various colors yields dark or black glass. Indeed, some visible cores have multi-colored flecks in a grayish matrix. To the beadmaker, the core hardly matters; it is merely a material-saving device for conserving valuable colored glass in a core that is unseen. Beads showing the black core through the yellow surface are allegedly more valuable, but it is more likely that the imperfect surface coat is the result of poor technique or paucity of materials. Beads made of old beads, such as the cored old *bodom*, are called *wuajeto* (made of old beads) and those *bodom* with cores visible through the surface are frequently called *wuajeto bodom*.

The colors of certain powder-glass beads are said to be mixtures of glasses of various colors. This is sometimes true of the *awuazi*, a beautiful light blue bead made from a mixture of *asra* and Bristol-blue bottle glass. *Awuazi* are said to have been made on Krobo Mountain, while several octogenarian informants stated that they made these beads in the 1920s and 1930s. The typical *akoso* color appears to be a combination of yellow Venetian lampworked-bead glass and *asra*, as does the color of many *bodom*. *Asra* glass seems to impart a creamy look to the yellow.

The advent of glass dyes in the early 1980s has reduced the labor required to make beads by obviating the need to powder so many old (and expensive) beads. Today’s *bodom* is usually one solid color (no black core), usually yellow, with black, green, or brown decorations. It is also rather common, with whole necklaces available in Ghanaian markets. The trained eye can easily differentiate between old and new, but common sense will tell the buyer that, anytime a whole necklace of these beads is offered, they must be new.

Other materials have been used to color beads. Among these are black and red iron oxides, a certain red shale called *gba tee* (*gba* = red; *tee* = stone), a certain brand of laundry blue, and enamel removed from imported Chinese enamelware.

An elaborate Krobo vocabulary exists for describing old beads used to make new beads. When asked what it would take to make a true *adepoade* (zigzag lines) *bodom*, Joe Akwateh (1994:pers.



Figure 2. Old beads of the *bodom* family. The *akoso* in the center appears to have a fragment of a “green-heart” bead inlaid in it. The green bead on the right appears to be made of Venetian beads. Note the fire-polished appearance and the apparent lack of cold grinding (John Picard collection; photo: Jamey D. Allen).

comm.), at Aketewia (upper Krobo), said he needs *ologo*, *oblekum*, and *kikayi*. *Ologo* (round) is the yellow Venetian bicone colloquially known as the “king” bead (there is also an African-made *ologo* in the *bodom* family to match the Venetian). *Oblekum* is a tiny brown seed bead used to make *oblekumie* (beads that “prevent misfortune”) of any size or to make designs on big beads. Old *bodom* sometimes appear to have the *oblekum* brown for decorations. *Kikayi* were not clearly identified.

Beadmakers obtain old beads from Hausa traders who scour the countryside for used beads. Mixed bags of their findings are on sale in all of the major bead markets. Mostly small European beads, one finds fragments of simple beadwork, broken hanks, and a near-infinite variety of small bead chowder. From one such bag of ten kilos or so, a knowledgeable informant, Vida Doler (1995:pers. comm.) of Atua Akwateh, identified by name a number of European beads, mostly seed- and pony-sized, used by beadmakers in the making of new beads, including:

1. *Kumelo*. The Venetian “green heart” (opaque brick red exterior over a translucent green core); used for *akoso* and *bodom* decorations; larger ones are broken for useable fragments (Fig. 2). Both the color of designs and glass fragments in old *akoso* very frequently call to mind the brick red coating of “green hearts.”

2. *Afriyo*. Old white seed bead; can be larger; used for white in “terrazzo” (a type of fragment bead) and other beads. These are the first beads worn by a new mother.
3. *Yomotse-obu* (Obu’s pretty daughter). Old white seed bead with blue stripes used to make “terrazzo.” Also used in bracelets or belts for children.
4. *Ajowa-blu*. Cobalt blue seed bead. Can be used for stripes on African-made *yomotse-obu* and for “terrazzo.”
5. *Yoholo-mue* (*mue* = beads). Small green molded discs; can be used for designs. Worn by pregnant women.
6. *Soso-ba*. Small green (*ba* = green) tubular tile (Prosser) beads; used for designs.
7. *Afriyo-ba*. Green *afriyo*; smaller light green seed bead; used for decorations.
8. *Oblekum*. Tiny brown seed bead; used to make designs on *bodom*, *akoso*, and *powa* (the Krobo version of striped or chevron beads); the brown version of *ajowa-blu*.
9. *Koli*. Light blue translucent seed beads identical to larger beads of the same color; used in belts and armlets; used to make “*koli*.” (That’s no misprint! European “*koli*” are altered by “cooking,” as described by Sordinas [1964].)

Many of these beads, samples of which have been collected, are easily dated to the 19th century or earlier, and inasmuch as Krobo informants are so deeply knowledgeable on this subject, it is plausible that these same materials were used by 19th-century Krobo beadmakers to make old “*bodom*.” More knowledge than skill seems to have reached the late 20th century.

HOW DO THE KROBO MAKE *BODOM*?

Liu’s (1984) proposition that old *bodom* were made using a wet method similar to *kiffa* techniques cannot be ruled out entirely, although evidence derived from current practices suggests that the old ones were likely made using the dry method, which is the method used universally in Ghana’s contemporary bead industry, with one exception.

The basic powder-glass methods used in Ghana for making beads have been well described by a number of researchers, but only Lamb (1976) devoted much

attention to the use of preformed components. The two basic methods are the vertical mold and the horizontal mold, both using dry glass powder. Preformed components of dry powder are made in what amount to horizontal molds, while other preformed components, especially among the older *bodom* types, appear to be pieces of hot-worked glass or bead fragments. Some *bodom* even have European beads imbedded in them (Fig. 2).

According to Krobo informants interviewed in 1992 and 1994, both old and new *bodom* are made of preformed components, as follows. First, a vertical mold the size of the desired *bodom* is prepared. With the mold turned on its side, one of the (normally) two decorations is constructed using the basic methods. The mold, still on its side, is then placed in the oven to fuse what amounts to a segment of the outside wall or "shell" of the bead. This step is repeated with the same mold to create a second shell or as many shells as may be desired. Once the shells have been created, the mold is placed in a vertical position and the newly made shells are fitted into it in the positions in which they were made. A cassava leaf stem (or possibly some other suitably wet, green, slow-burning stick) is centered in the mold to create the perforation. The mold is then filled with base powder, usually yellow, both inside and outside the preformed shells, although it is desirable to keep the outer surfaces of the shells as free of powder as possible. This assemblage is then heated until the components and the base powder have fused. After cooling, the bead is ground to remove any excess base glass that may be covering the decorations.

Ransford Tetteh was using this method for making *bodom* in 1992, and specimens of intermediate steps, including preformed shells, were collected (Pl. VIB bottom). Although this method appears logical and was presented as the method used by the Krobo since at least the 1920s, certain important questions remain unanswered. With respect to old *bodom*, the method described above cannot readily account for the black cores, the lampwork effects, seams that would likely appear on beads made in parts, and the typical biconical shape.

Dark Core

To understand how the black core could have been achieved, return to the beadmaking process outlined

above. As explained by Ransford Tetteh, instead of filling the mold completely with the base color, only enough is added to form the bottom of the bead. Then a thick stick is placed in the mold and base color is added around it to fill the spaces between the shells. After carefully removing the stick, black glass, usually scrap, is added until the mold is almost full, after which, more of the base color is added to form the top end of the bead. It would appear that this more complicated procedure was instituted in an effort to conserve the valuable and scarce yellow glass derived from old beads. Lamb (1976) described a very similar procedure for making the black core: once the yellow base is added, a wooden mandrel is used to push the outer yellow coat outward to make room for the black core. The cassava leaf stem is added after the whole bead is assembled.

It is also possible, although it has not been observed, that the black core was preformed in a smaller mold and positioned after a bit of yellow powder had been added to form the bottom of the bead. Some very rare *bodom* appear to be decorated black or gray cores without a yellow coating.

The black core is usually questioned in terms of how it was made, rather than why it was made. The "why" arguments, as mentioned above, are split between pragmatic material economy and cultural inspirations. Perhaps these old *bodom* have cores because core-forming was the technology of the beadmakers. In West Africa, one finds the so-called *kano* bead, with the monochromes generally attributed to Hebron. There is, however, another would-be *kano* bead that features multi-colored fragments as decoration on a black matrix, formed on cores. These beads also share with old *bodom* a conical perforation, as if they were made on mandrels. Some unusual cored beads are shown in Pl. VIC top.

One is tempted to suspect a link between the wound-bead industry of Bida, the core-formed *kano* beads of likely Middle Eastern origin, and old *bodom*. The link is likely to be the Yoruba, who brought or received glass beadmaking from the North, who hosted the Krobo in the 13th or 14th century (Euba 1981-82), who may have influenced beadmaking in Bida in the 19th century, and who practiced their own powder-glass beadmaking at least in the 20th century.

Lampwork Effects

The explanation of the lampwork effects is more conjectural. New *bodom* usually have ragged lines for decorations that were obviously made of glass powder not so carefully poured. Many of the old types, however, and including *akoso*, have smooth-edged flowing decorations, often cruciform. These effects could have been achieved by carefully pouring extremely fine powder of the right type of glass before heating the shells to much higher temperatures than are possible when an ordinary bead with a perforation is being made. Lamb (1976) stated that, if the temperature is just right, there will be a certain amount of viscous flow on the outside of the bead. Even newly made ordinary beads sometimes show this flow (Pl. VIC bottom).

If there is no perforation at risk of closing, as would be the case if only a shell of a bead were being made, there would be no temperature constraints or limits on the duration of firing. Components could thus be heated enough to get the glass to flow. Such temperatures have long been achievable, inasmuch as there is a history of metal casting in both Ghana and Nigeria using forced air. Even today, with the mass production of beads, temperatures hot enough to get glass to flow and yield a lampwork appearance are sometimes attained, as evidenced by many newly produced powder-glass beads available in Ghanaian markets. Certain older powder-glass beads, copies of which are still being produced, have preformed eyes that have attained a glassy appearance, no doubt the result of high temperatures achieved in the absence of the perforation constraint when making preformed eyes.

A second type of lampwork effect looks somewhat like trailed decorations. These decorations seem to have been made by hot working fragments of glass or glass beads with techniques that are still in use today. Some of the most prized beads in Kroboland are those made by heating and reshaping whole European beads or carefully prepared bead fragments. At Elmina, DeCorse (1989) uncovered what appear to be fragment beads and, in 1992, the reshaping of both whole beads and fragments was observed at Odumase-Krobo. In addition, seamless translucent beads are currently being made of bottle fragments (Pl. VID top).

It is likely that fragments of beads and other glass objects were used to construct components and it is



Figure 3. The mold on the left is for making the base of a *zagba* type. The one on the right is used to make decorative components (Kirk Stanfield collection; photo: Robert K. Liu).

possible that some of these fragments were hot worked into shape before the complete component was assembled. DeCorse (1989:49) reports evidence of the winding of viscous glass shards at possible 17th-century sites.

Eye beads are currently made by first preparing eyes in small molds (Pl. VID bottom). The technique appears to be quite old, with certain old specimens resembling Middle Eastern styles. A recently found mold, said to be some twenty years old, had nothing more than thin U-shaped indentations resembling the decorations on *akoso* (Fig. 3). Preformed eyes and other decorations are positioned along the sides of bead molds during the filling process and, from Lamb's photographs of Mr. Tetteh's work, it seems obvious that preformed decorations were used to make his new *bodom*.

An interesting method for making hairpin-shaped line designs on *akoso* beads involving the use of water was observed at Tsebi Manyi. First, a multiple vertical mold is soaked in water. While the mold is still wet, yellow glass is sprinkled in the holes to create the outer coat of the bead. With a pin, the beadmaker scrapes the standard *akoso* loops out of the yellow. He then spreads glass powder the color of the decorations into the scraped out lines. If two colors of decorations are required, the pin process is repeated. Once the decorations are made, the cassava stem is inserted and the mold is filled with base color, which today is usually the same glass powder mixture as the outer coating.



Figure 4. A new *bodom* obtained in Ghana. Note the seam between the yellow base and the cruciform decoration on the right (Kirk Stanfield collection; photo: Jamey D. Allen).

Designs on many new *bodom* and *akoso* appear to have been made using this technique, with line designs that are scratchier looking and thinner than the designs on old *bodom*. If the procedure were more carefully performed, however, with more appropriate glass and if the beads were heated longer at higher temperatures, it is quite possible that a hot-worked effect could result.

Seams

If *bodom* beads are made of preformed components, one might expect seams between them and many, in fact, do have obvious seams, especially newer, hastily made ones (Fig. 4). The seams are not so apparent on the older specimens, possibly because the components were fused at higher temperatures, the materials were different, or in some cases, the beads were finished better. Some classic “flowing” cruciform *bodom* appear to have different shades of yellow glass inside and outside the decorations, suggesting different batches of powder, while the seam between the shell and the rest of the outer coating appears to be the cruciform decoration itself. Translucent beads made today of bottle fragments are virtually seamless, having been made by manipulating fragments in a mold, a kind of hot-working technique. Apparently, bottle glass can be softened enough to shape round, seamless, clear beads that, incidentally, once tricked a major bead dealer in Dakar who mistook

them for certain old “Dutch” beads usually found in Mali. A characteristic that many of these new translucent beads share with certain old and new *bodom* is cracks around one end of the perforation, where the glass fragments have not been completely fused. These cracks result from repeated manipulation of the softened glass with an awl-like device (a “pin”) consisting of a nail driven into the end of a shaped stick or dowel. Indeed, this device may be considered a mandrel used to manipulate hot glass.

Biconical and Round Shapes

So far, explanations for the seams, dark core, and hot-working effects of old *bodom* are suggested by current practices. The biconical and round shapes of most older *bodom* defy explanation by the techniques observed so far, however. Many of the old *bodom* with these shapes exhibit no evidence of grinding, something that would be required to achieve these shapes in beads produced in vertical molds.

There are two possible explanations concerning how biconical, round, or otherwise tapered but unground beads could be mold made. The first method involves what might be called a vertical half-mold, the bottom of which is in the shape of half the bead (an end), with the top part of the mold extending vertically or, more likely, continuing to angle outward slightly. Joe Akwateh (1994:pers. comm.), at Aketewia (Upper Krobo), described the process as follows:

Make one end of the bead in the mold, then add the other end very carefully. After cooking for a while, the glass powder will begin to fuse and the bead will be strong enough to manipulate. The bead may then be turned over so that the original freestanding end can take the shape of the mold.

This technique can be used even for the perplexing cruciform decorations and may explain why the ends of certain of these biconical beads are not symmetrical. Using one or two pins, it is not hard to visualize how a hot bead may be manipulated, as is done with the contemporary translucent beads. The bead could be inverted several times during the cooking, all the while maintaining the perforation with a pin. On many old *bodom*, the perforation is conical with cracks or seams around the larger end of the

perforation which is frequently concave, presumably from hot piercing. Considerable grinding of the ends frequently removes these features. These same perforation features are observed on the new "seamless" translucent beads made of softened fragments of colored window louvers.

There has been resurgence in recent years of beads composed of separately made halves (ends) which differ from those produced using the half-mold method just described for old *bodom*. The contemporary examples are obvious copies of Venetian bicones and analogous older African-made beads in the *bodom* family called *ologo* by the Krobo. The mass-produced new ones are not always well made and commonly feature discontinuous designs between the two halves. In many cases, the two halves are not flush at the equator, suggesting that the upper and lower hemispheres were cooked separately before being attached. Virtually all the new two-part beads have a colored equator where the two halves are attached, apparently with ceramic colorants as "glue." While the mismatched halves are common in the new bicones, the perforations themselves always line up, suggesting that the bead was manipulated with a pin subsequent to the joining of the two halves. This two-part method for making biconical and even round beads greatly reduces grinding and finishing time, while the widespread use of powdered ceramic colorants reduces material-preparation time.

Yet another alternative method, which has been suggested by Liu (1984), would be a horizontal half-mold, a variation on the observed technique of turning a vertical mold on its side to create shells or a variation of the two-part method just described. With a horizontal half-mold, either a thin shell with just the outer coating and decoration, or a complete half-bead, including a black core, could be constructed. Certain old *bodom* suggest that only the shells were made, while apparently more contemporary beads, such as certain *zagba*, suggest full halves were preformed. Two identical horizontal half-molds also raise the possibility of a closed two-part mold having been used in the past.

CONCLUSIONS

The weight of evidence suggests that it was the Krobo who made the old *bodom*. The old *bodom*

logically predate the 1892 British expulsion of the Krobo from Krobo Mountain, their traditional home. The techniques used to make both old *bodom* and related beads survive today among contemporary beadmakers, the major differences between old and new *bodom* amounting to materials and workmanship.

The Krobo make *bodom* today and they are the best candidates for authorship of the old *bodom*. They most likely made all of the beads Lamb called *bodom*, including the old "hot-worked" types. We cannot, however, entirely rule out the Ewe as the makers of some of the older related beads, such as the *akoso*. The Ashanti and, in general, the Akan, although they probably have beadmaking traditions as old as the Krobo, are not likely to have made these particular beads. Akan *bodom* from "the north" might actually be different beads and may or may not include the types of beads discussed here. Ultimately, the entire *bodom* "industry" might be traceable to Yorubaland.

Good evidence of a Krobo origin for *bodom* is their ability to make such beads today, while there is, as yet, no evidence of any beadmaking skills elsewhere in the region, past or present, as refined as those of the Krobo. The beadmaking tradition in Kroboland likely came from the east, from Yorubaland, and the Yoruba probably brought it from the north or were influenced by northerners. The Akan beadmaking tradition came from the north and west, but there is no evidence that the Akan ever made the types of beads described here.

Old *bodom* are not likely to predate the 19th century. None of these beads have been scientifically excavated, although other types of powder-glass beads have been found at various sites around Ghana (DeCorse 1989). The materials for making these beads, especially the older *bodom*, seem to be derived from European trade beads dating to the 19th century. What other source of yellow glass predating Venetian beads in West Africa could possibly give these beads greater age? "Hebron" beads? Indian/Asian *lada* beads? The yellow base and the decorations of the *bodom* are obviously the colors of Venetian beads, with some allowances for impurities that can pollute the process and for other exotic ingredients, such as old bottle glass.

Upon visual inspection, old *bodom* frequently included preformed components made using dry powder-glass technology. Some current techniques,

which could have been employed in the past, begin to resemble hot working, such as use of the awl-like "pin" device (a proto-mandrel) to work glass fragments into seamless, round, translucent beads. Temperatures hot enough to get glass to flow, resulting in lampwork effects, have always been achievable, as evidenced by both new and old Ghanaian-made beads.

New and old *bodom* were differentiated in this study for the purposes of clarifying major issues concerning this bead. Now, as this study concludes, these two categories should be recombined because, in fact, the two are rather inseparable, being extremes of dry, molded, powder-glass technology in use over the past two centuries. Old and new varieties differ mainly in materials, quality of workmanship, and age, but not much in technique or origin. None of these beads are Akan or European and none have been made by the wet powder-glass method. These *bodom* are dry powder-glass beads made in molds by the Krobo.

ACKNOWLEDGEMENTS

Numerous Krobo acquaintances and informants provided much useful information to make this article possible. Among them, Vida Doler deserves special mention as my long-time guide and special friend throughout the 1990s. The late Ransford Tetteh also deserves special mention for it was this beadmaker who, in the early 1990s, was attempting to reinvent the beads and techniques of his ancestors. Charles and Cedi of Tsebi-Manya (Upper Krobo) have been great innovators throughout the 1990s, while Kweku Amedievor, Joe Akwateh, Mammy Korkor, and several other retired older beadmakers in several Upper Krobo villages provided a body of knowledge that will soon be a victim of modernity. I would also like to thank the Yilo Queen Mother (Somanya), Felicia and the other bead ladies at Agomenya, the Nana Kloweke Dipo Fetish Priest (near Odumase-Krobo), and Uncle Lomotey for their valuable contributions and friendship.

ENDNOTES

1. Ewe informants say that Anokye was actually an Ewe from Notsé and the name would likely be spelled "Anotse" in Ewe or Krobo. The /ky/ in

Akan has the same /ch/ sound as the /ts/ in Ewe and Ga-Adangbe. The Krobo language is more closely related to Ewe than it is to Akan, although there is much Akan vocabulary in Krobo. Ransford Tetteh's town name, Odumase-Krobo, is Twi and translates as "under the odum tree." There is also an Odumase in the Ashanti Region, along with a Bodomase—"under the *bodom* tree."

2. *Akoso* means "crossing" or "blocking," as in the *Akoso-mbo* Dam and the *akoso* bead, which typically has crossed hairpin decorations. *Akosu* is either a misspelling of the bead name or from another language.

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BOOK REVIEWS

Indian Beads: A Cultural and Technological Study.

Shantaram Bhalchandra Deo. Deccan College Post-Graduate and Research Institute, Pune 411 006, India. 2000. 206 pp., 12 color plates, 56 b&w figs., 3 maps. Rs.600 (about \$13.00) + \$9.00 postage (soft bound).

This posthumous publication of a report submitted in 1988 by the renowned archaeologists and ancient historian S.B. Deo is very useful as a source of information on the textual and historical uses of beads, pendants, and amulets on the Indian subcontinent. It is unfortunate that it was not published earlier since a great deal has been published on beads and beadmaking technology in South Asia since 1988. Consequently, many of the issues relating to technology, raw materials, and typology are not up to date and could be misleading to those who are not familiar with the literature.

In Chapter I, the author provides an overview of the cultural significance of the study of Indian beads, emphasizing the importance of literary references that can help to understand the social and religious meaning of specific types of beads. In Chapter II he briefly discusses the antiquity of Indian beads, the techniques of manufacture, and the raw materials used. This chapter is perhaps the least accurate given the amount of research that has been published by numerous scholars in the last decade (*see suggested readings below*). For the experienced scholar, however, this chapter is useful in providing important literary references that have not been noted in other publications. One of the leading archaeologists of India, the author was very well versed in classical Indian literature. He begins with the most ancient Sanskrit texts, the Rg Veda, and traces the various mentions of beads and amulets through the later Vedic texts, the Buddhist and Jain texts, Gupta literature, medieval texts from throughout the subcontinent, and

ends with the important Mughal and colonial period literature. Although he does not always give exact references, an enterprising student will at least know which treatise to examine.

In this same chapter, Dr. Deo discusses ancient beadmaking centers and provides a general map showing the best-known sites. It is unfortunate that he does not include the many prehistoric beadmaking sites of the Indus Valley, such as Mohenjodaro, Harappa, Amri, Balakot, Rehmandheri, and Mehrgarh. The information on beadmaking at these sites was known and in published form at the time of his study. His map of the mineral resources of the subcontinent also does not reflect information that was present at the time. In his summary of bead manufacturing techniques, he has some interesting observations that have not been reported by other scholars—specifically the references to literary texts that discuss polishing, perforation, and bead stringing. Other aspects of manufacture are less informative and in many cases simply repeat what had been published by earlier scholars; e.g., etched beads.

In the extensive section on bead raw materials, Deo does provide information on specific types of materials found at different sites. This is a very useful compilation because it provides the bead researcher with names of many relatively obscure sites that have beads, along with identifications of some new types of raw materials and possible source areas. As mentioned above, however, the source areas are only potential localities and without detailed petrographic studies, it is not possible to link a bead from one site to a specific resource locality.

Perhaps one of the most interesting contributions of this section is Appendix I which provides a list of different types of Vedic amulets. Most of the amulets are made of plant materials that are perishable and not preserved in the archaeological record. Consequently, their enumeration in ancient texts provides us with an

unprecedented view of the range of materials used to produce beads and pendants. Most bead researchers have been limited to the study of preserved materials such as stone, bone, and shell, but here we have reference to perishable materials used to make amulets. Many amulets made from similar materials in South Asia today are made as beads or pendants and it is not unlikely that the ancient amulets were also made as beads or pendants.

Chapter III focuses on typological classification and the author uses the approach outlined by Horace C. Beck. While it would have been nice to see the development of a more comprehensive bead typology, the author does provide important information on the types of beads found at different sites. Here, a table relating bead types to sites would have been a very useful illustrative device.

Chapter IV is devoted to amulets and pendants with a heavy dose of literary references to types of amulets and their meaning. This section provides an important new contribution to the typology of ornaments by presenting them in distinct groups and, where possible, linking these categories with literary and historical references. By placing these ornaments in their social and religious contexts, the author has opened up a whole new perspective on the study of South Asian beads and pendants.

In the next chapter, the author attempts to link specific bead and ornament types to depictions on sculptures. Although some of the associations are somewhat vague, he does provide a glimpse of changing ornament styles from the prehistoric through the historical periods.

Chapter VI discusses possible links between the Indian subcontinent and adjacent regions. Considering that there have been numerous studies of this topic in recent years, this chapter is somewhat out of date and some of the comparisons with beads from other world regions are quite tenuous. Nevertheless, the information provided here is a valuable resource for bead researchers looking for projects that need testing. Numerous scientific techniques relating to materials analysis and technological studies, as well as basic morphological analysis, can be done to determine if beads from one region are derived from or in any way related to beads from another region of the world.

In his conclusion (Chapter VII), Dr. Deo tries to summarize the basic patterns revealed in his broad study. The overall message is that more work needs to be done and his only regret is "the voluminous data which still awaits detailed study" (p.121). The text is supplemented by an extensive bibliography that lists many important and rarely seen sources, primarily from classical and medieval sources of the subcontinent. The numerous illustrations extracted from many different publications, as well as his own original documentation, provide a wealth of information beyond that provided in the text. Overall I found this book to be highly informative and strongly recommend it for the serious bead scholar.

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Beads, Body, and Soul: Art and Light in the Yoruba Universe.

Henry John Drewal and John Mason. UCLA Fowler Museum of Cultural History, Box 951549, Los Angeles, California 90095-1549. 1998. 288 pages, 420 color figs. \$35.00 (paper cover).

This splendidly illustrated book was produced to accompany an exhibition of the same name at the UCLA Fowler Museum in Los Angeles during the first part of 1998. It sold out quickly and had to be reprinted as the exhibition visited other venues in the United

States. As well as being a gorgeous picture book on beads, this is also a serious piece of research and an essential for African beadwork studies. The Yoruba of southwestern Nigeria are known for the artistic versatility and quality of their beadwork, so this book is a really welcome addition to my library.

The book is divided into three main sections: 73 pages on Yoruba beadwork in Africa, 111 pages on Yoruba beadwork in the Americas, and 76 pages for the catalogue of the exhibited beadwork. The first section is divided into an Introduction, A Historical Overview, and Patrons, Artists, Process, Aesthetics. In the latter subsection, James Adetoye, a member of a famous dynasty of bead artists, was an essential source of information. Among the many illustrations are pictures of the beaded crowns and caps—almost 80 of them—in the ownership of the Alake (king) of the city of Abeokuta, all of them with information concerning which Alake owned them, going from the 1860s to the present day. Contemporary Yoruba Beadwork also features the work of artists Jimoh Buraimoh and Olabayo Olaniyi, showing that innovation can continue alongside the traditional.

Yoruba Beadwork in the Americas has five subsections: History, The Cultural Values Encoded in Beads, Bead Arts in Cuba and the U.S., Yoruba Beadwork in Brazilian Condomblé, and Beads of Identity in Salvador de Bahia, Brazil. There is, in fact, a considerable Yoruba population in the Americas—the descendants of former slaves. About two out of every five slaves who were transported to the U.S.A., Cuba, and Brazil between 1500 and the mid-19th century were Yoruba, and among their continuing cultural traditions is the use of beads. One striking use of beads that seems to be unique to this group of Yoruba is to embellish the aprons made for the sacred *bata* drums. It is fascinating to see the richness and diversity of what one might term “overseas Yoruba” beadwork. There are all sorts of pictures including bead stalls that show what is on offer and others that show transatlantic versions of the African objects seen in the earlier section.

The catalogue of 70 objects which forms the final section of the book is fully illustrated and contains full descriptive notes. The objects are all of African

Yoruba origin, and almost all of them are from the Fowler Museum of Cultural History's own collection.

To sum up, we have here a bead book which is a truly important and well-researched work. At the same time it is full of amazingly beautiful images... a real eye-opener to the richness of the Yoruba tradition which will inspire any bead researcher or beadworker.

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Flights of Fancy: An Introduction to Iroquois Beadwork.

Dolores N. Elliott. Iroquois Studies Association, Inc., Johnson City, New York. 2001. 26 pp., 83 color figs., 3 B&W figs. \$30.00 (soft cover).

For over 200 years, the Iroquois have been producing beadwork for sale to tourists at such places as fairs, pow-wows, and major attractions, most notably Niagara Falls. Commonly called "beaded whimsies," these were produced by the tens of thousands and came in a myriad of forms, from relatively simple small pincushions to large and elaborate creations. On some the decoration was relatively plain; on others it can only be called "extravagant." This publication honors and celebrates the creativity of the Iroquois beadworkers and their wonderful creations.

Dolores begins with a brief account of how she came to admire this form of Native American beadwork and amassed her extensive collection of over one thousand pieces. There follow summary statements on The Iroquois, the History of Iroquois Beadwork, Beadwork as Souvenirs, and The Earliest Beadwork. The remainder of the spiral-bound book is devoted to the different forms and functions of whimsies which are grouped into four categories: pincushions, wall hangers, flat cloth pieces, and

clothing. Unfortunately, these are not very well thought out and there is much overlap between the different categories causing unnecessary confusion for the reader. Furthermore, the "flat cloth pieces" category does not appear further on, apparently having been replaced by the heading "Containers and Purses," not all of which are flat.

Pincushions are the most common whimsies and have a wide range of forms from round to heart-shaped to multi-lobed as well as being in the form of shoes and boots. While the bulk of these are unifacial (no decoration on the back), there are two forms which were made in the round: birds and strawberry emeries. The wall hangers include whiskbroom holders, match holders, picture frames, wall pockets, horseshoes, and canoes. The "Containers and Purses" section encompasses purses of several forms as well as hanging vase-like containers. The clothing category includes Glengarry and round caps, belts, moccasins, and skirts, as well as flat purses. The different forms are amply illustrated in the numerous color illustrations which generally depict specimens from the author's collection.

In addition to describing the different forms within each category, Dolores also provides information on the two principal beadworking styles, the materials used, the presence of words and dates on many specimens, the intended uses of the objects, and their dating. A bibliography lists suggestions for further reading.

Neglected by scholars and collectors for many years, whimsies have recently caught the public's attention and have become much sought after. This publication will allow the ever-growing hoard of enthusiasts to better understand and appreciate these distinctive and colorful mementoes.

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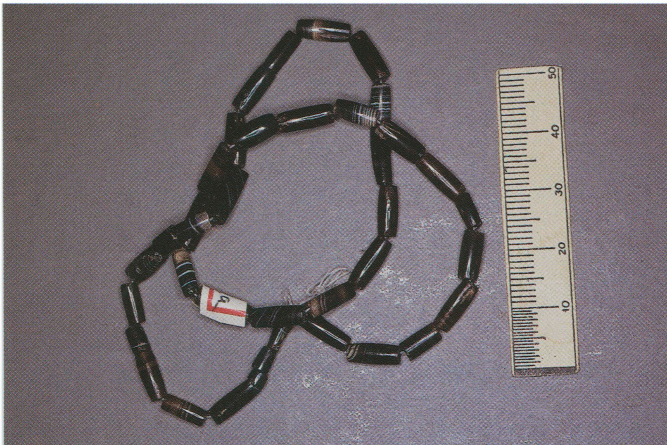


Plate VA. India: **Top:** Pecked hexagonal-bicone-bead roughout from Arikamedu; surface find; each scale unit is 2 mm (photo: M. Kenoyer). **Bottom:** Onyx beads, including an etched specimen (to left of label) from Kodumanal (photo: P. Francis, Jr.).

Plate VC. Bodom: **Top:** Old beads of the *bodom* family; the left and center beads show inlaid-type decoration (John Picard collection; photo: Jamey D. Allen). **Bottom:** Classic old *bodom* bicone from Ghana with dark core and flowing cruciform design suggesting hot-working techniques (photo: Robert K. Liu).

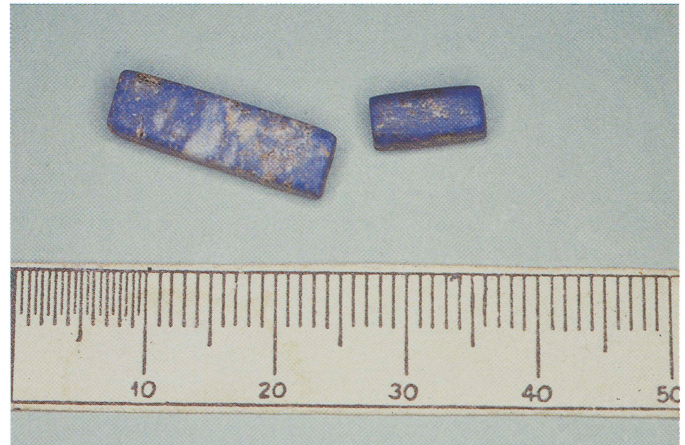
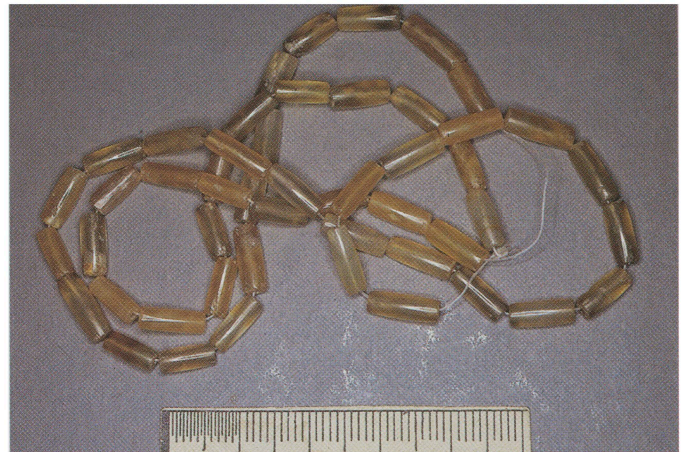


Plate VB. India: **Top:** Yellow carnelian beads from Kodumanal; scale is in mm. **Bottom:** Square tubes of lapis lazuli from Kodumanal. This is the most common shape of lapis bead found at South India sites (photos: P. Francis, Jr.).

Plate VD. Bodom: **Top:** Beads of the *bodom* family, both old and new, including those with inlaid European beads. Note the rare decorated core in the lower left. **Bottom:** *Bodom* with a dark core of scrap glass(?) (right) and without (left). The central bead is old; the others are new style (Stanfield collection; photos: Robert K. Liu).





Plate VIA. Bodom: Old beads of the *bodom* family. **Top:** From the left: small old *bodom*; inlaid green *akoso*; yellow *bodom*; rare light blue *bodom*. **Bottom:** From the left: *akoso* with inlaid fragments; unusual yellow specimen with stripes; *adepoade* (zigzag) *bodom*; unusual *akoso* (John Picard collection; photos: Jamey D. Allen).

Plate VIC. Bodom: **Top:** Unusual cored beads (John Picard collection; photo: Jamey D. Allen). **Bottom:** Shiny yellow beads suggesting hot-working from Ghana (Stanfield collection; photo: Robert K. Liu).



Plate VIB. Bodom: **Top:** *Akoso* beads from Ghana. The bottom row is African made; the top row is European. **Bottom:** Stages of *bodom* construction—left, a preformed “shell”; right, a finished bead before grinding made by Ransford Tetteh at Odumase-Krobo (Stanfield collection; photos: Robert K. Liu).

Plate VID. Bodom: **Top:** Seamless beads made from bottle glass in Ghana by Cedi at Odumase-Krobo. **Bottom:** Seamless eye beads made by the brother of Ransford Tetteh at Odumase-Krobo (Stanfield collection; photos: Robert K. Liu).

