

BEADS

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Cover. *Jade*: Necklace, Tomb B-4/7, Altun Ha, Belize, ca. A.D. 600; pendant height: 4.6 cm (all *Jade* photos by D. Pendergast and Photography Department, Royal Ontario Museum, Toronto).

Back Cover. *Jade*: Human-figure pendant with truncated legs, Tomb A-1/1, Altun Ha, Belize; height: 7.0 cm.

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KARLIS KARKLINS, editor

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DRESSED TO KILL: JADE BEADS AND PENDANTS IN THE MAYA LOWLANDS

David M. Pendergast

Jade was a material of paramount importance in ancient Maya life owing to its symbolic significance. The meanings of jade's color lent to the stone, and to those adorned with objects fashioned from it, an unmistakable aura of power. As a result, jade objects figure very prominently in the archaeological record, and their forms and contexts bespeak their ancient meanings. The tracing of the shapes, carving, production techniques, and use history of jades underscores the role of jade in Maya belief, political economy, and personal ornamentation.

INTRODUCTION

From very early in their history until at least the opening years of the Spanish conquest, the ancient Maya revered jade as a sacred material, suited to the most important ritual and ceremonial uses that their religion and social structure dictated. The importance of jade in ancient Maya life is only hinted at by Spanish chroniclers, whose principal concern was generally to describe a culture that they sought to transform. Even Diego de Landa, whose 1560s account of Maya social and material culture is the most extensive one produced, makes just a few maddeningly brief mentions of Maya uses of stone beads as he had observed them, and mentions only once the function of beads as ornaments of nobility:

The occupation to which they had the greatest inclination was trade... exchanging all they had for cacao and stone beads, which were their money, and with this they were accustomed to buy slaves, or other beads, because they were fine and good, which their chiefs wore as jewels in their feasts (Tozzer 1941:94-96).

Insulated as he was from much of Maya daily life in 16th-century Yucatan, de Landa barely skimmed the surface of the meanings and uses of jade and other

beads among the people whose culture he strove to understand. In addition, he could not have been aware that the cultural context in which he found himself was different in many substantial ways from that of earlier centuries, and hence allowed him only a slightly opened window on the Maya past. Luckily, archaeological work during the past hundred years has gone a long way toward opening the window fully.

JADE AS A SACRED MATERIAL

The fundamental significance of jade to the ancient Maya resided in symbolism rooted in religious belief. The critical aspect of the stone was not its rarity, its tensile strength, or its ability to take a high polish, but rather its green color. Because jade's green hue was seen as representative of water and of fertility, the material was of critical value for a variety of ritual uses. The symbolism presumably derived from mimicry of the color of much tropical water and of the living plants—corn, beans, and squash—on which life depended. Among the lowland Maya of the Yucatan Peninsula, the Guatemalan Peten, and western Honduras, the stone's importance was enhanced by the fact that it was a highland product, brought long distances to the great cities and small communities in which it was as essential a commodity in ceremonial contexts as other imported goods were in secular settings.

Because it was color rather than mineralogical properties that lent jade its importance, the Maya included many other types of stone with even the slightest greenish tinge in their repertoire of materials suitable for ceremonial use; the term "social jades" has been suggested for such objects (Hammond et al. 1977:61). Hence, whereas the archaeological assemblage includes a great many beads and pendants

of jadeite, there are also large numbers of artifacts that embody mixtures of jadeite and albite, as well as serpentine, and even quartz with slight copper inclusion (*see* Bishop, Sayre, and Mishara 1989). It follows from this that in archaeological parlance the term "jade" denotes not jadeite alone but rather the variety of materials that held importance for the ancient Maya. In fact, in their quest for the color green, the Maya overlooked nephrite, which in truth fits the description but generally appears black; the material, not uncommon in the archaeological record, was favored for axes and wood-splitting tools because of its physical properties but was never recognized as appropriate for ceremonial use.

THE TECHNOLOGY OF JADEWORKING

The symbolic significance of green stone was so great that it led the Maya to develop a very specifically focused set of attitudes toward and techniques for the production of beads and pendants. The overriding consideration appears to have been conservation of the precious substance, with the result that stoneworkers avoided potentially wasteful procedures and concentrated on ones designed to permit maximum use of every bit of the raw material. This meant, first of all, that the approaches to bead production and to the designing of elaborately carved pendants were generally structured to minimize alteration of the natural shapes available to the carver. Second, the conservation approach dictated a drilling method that produced material suitable for other uses, and finally, the specialized production techniques were employed with great care in order to preserve the limited wastage for specific non-artifact use.

Retention of natural shape insofar as possible often meant that beads were made in irregular rather than spherical shapes, and in many instances were little more than polished and drilled river pebbles (Pendergast 1979: Fig. 55g-h; 1982:Fig. 35a) (*see* cover; *see also* Pl. IA). In other cases, necklaces consist of irregular bits of jade, many almost certainly offcuts from larger objects, that have been polished and drilled. The variety in bead form and color surely indicates that although intensity of color was the principal indicator of the importance of a piece of raw material, importance could be established by bead size



Figure 1. Obese human-figure pendant with truncated legs, Tomb B-4/2 Altun Ha, Belize, ca. A.D. 675; height: 8.35 cm (all photos: D. Pendergast and Photography Department, Royal Ontario Museum, Toronto).

and sphericity even when the object's color was not of the finest.

Pendants posed a much larger challenge than beads for the artisan, because ceremonial requirements for presentation of a ruler or a deity had to be met within the confines established by the shape of the raw material. Solutions to such problems were as varied as the lumps of green stone themselves, but usually involved contorting the poses of figures (Pendergast 1979:Fig. 19k; 1982:Fig. 31d) (Pl. IB top), truncating limbs or other features (Pendergast 1982:Figs. 35b,

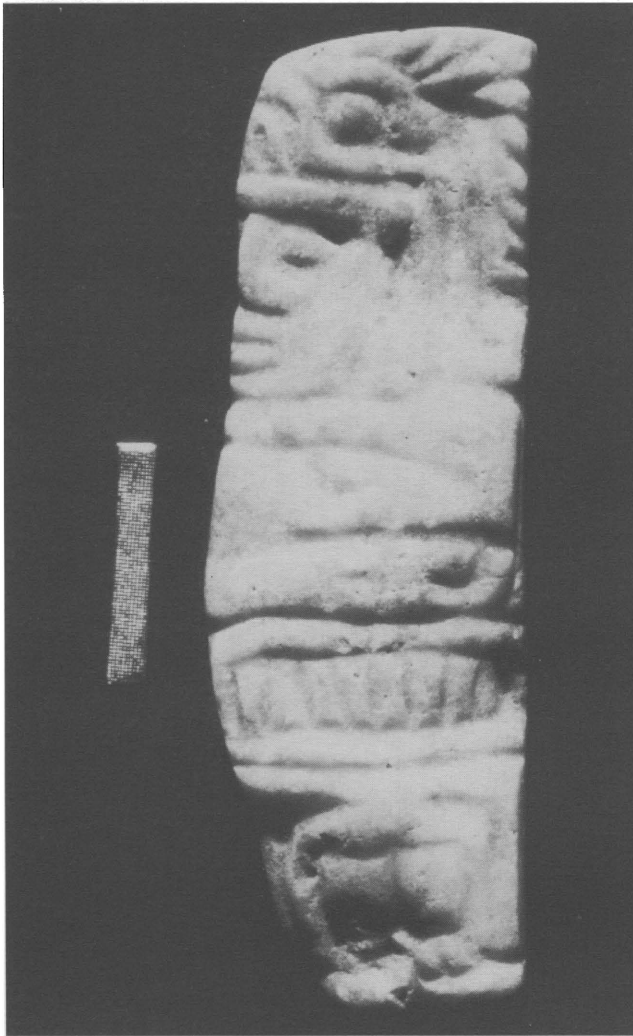


Figure 2. Human-figure pendant with bird-head headdress and truncated legs, Tomb B-4/2, Altun Ha, Belize; height: 10.55 cm.

56a, b, e) (Figs. 1-3; *see also* back cover), altering proportional relationships among the distinguishing features of deities, or a combination of all three (Fig. 4). In some instances the presence of incompletely obliterated production cuts on the reverse surfaces of pendants tells us that when sufficiently large lumps of raw material were available they were sawn into pendant blanks, but even in these cases the retention of edge irregularities was essentially universal (Figs. 5-8; Pls. IB bottom, IC, ID, IIA, IIB, IIC).

Drilling posed singular problems for the conservation-minded stoneworker, because control of the apparatus was less than absolute and the dimensions of the area to be perforated were often



Figure 3. Human-figure pendant with disproportionately large head and truncated legs, Tomb A-1/1, Altun Ha, Belize; height: 5.0 cm.

highly limited. For most beads and pendants, drilling was unavoidably destructive in the sense that it cored out from the body of the object a quantity of powdered stone. In addition, rocking of the drill in the hole resulted in a considerably greater diameter at the object's surface than at the centre. These considerations led to drilling from opposite ends, with a resultant biconical perforation in which only the point at which the two shafts join represents the drill diameter. In some beads and a very few pendants, however, entry diameter carries through the piece even though opposite-face drilling was employed (Pendergast 1979:Fig. 20c). Perforations of this type permitted extraction of a core that could be sliced into



Figure 4. Human-figure pendant with disproportionate head and truncated legs, Tomb B-4/2, Altun Ha, Belize; height: 7.95 cm.

small discs to be perforated for use as minor beads. Such disc beads are, in fact, moderately common in the archaeological record, but traces of their perforation-core history have generally been eradicated by polishing.

In spite of the problems in drill control and the need for retention of the waste material, Maya jewellers managed to perform many truly remarkable feats of pendant-drilling. Most oblong pendants are pierced longitudinally, an arrangement that permitted suspension with the carving in natural orientation only by the passing of a cord down through the perforation to be tied off with a small bead and passed back up through the hole. The longitudinal drilling was in itself an achievement that required very considerable manual dexterity, but larger objects not



Figure 5. Sawn-slab pendant, Structure J-9, Altun Ha, Belize, ca. A.D. 450 (?); height: 11.2 cm.

infrequently also have a transverse perforation, presumably to allow for insertion of a stabilizing cord that passed around the wearer's chest. The fact that such perforations either intersect the longitudinal one or pass very close beside it provides further documentation of the artisan's skill.

We must remember also that in producing any object of jade, but particularly a large and elaborately carved pendant, the worker was entering an awesomely special religious context in which error, especially one that damaged an object and hence probably destroyed its symbolic significance and power, was fraught with risk both for the individual and for the community. The tension that surrounded such endeavors must therefore have been of the highest order. Among the truly striking examples of the jeweller's art and the risks it entailed is the

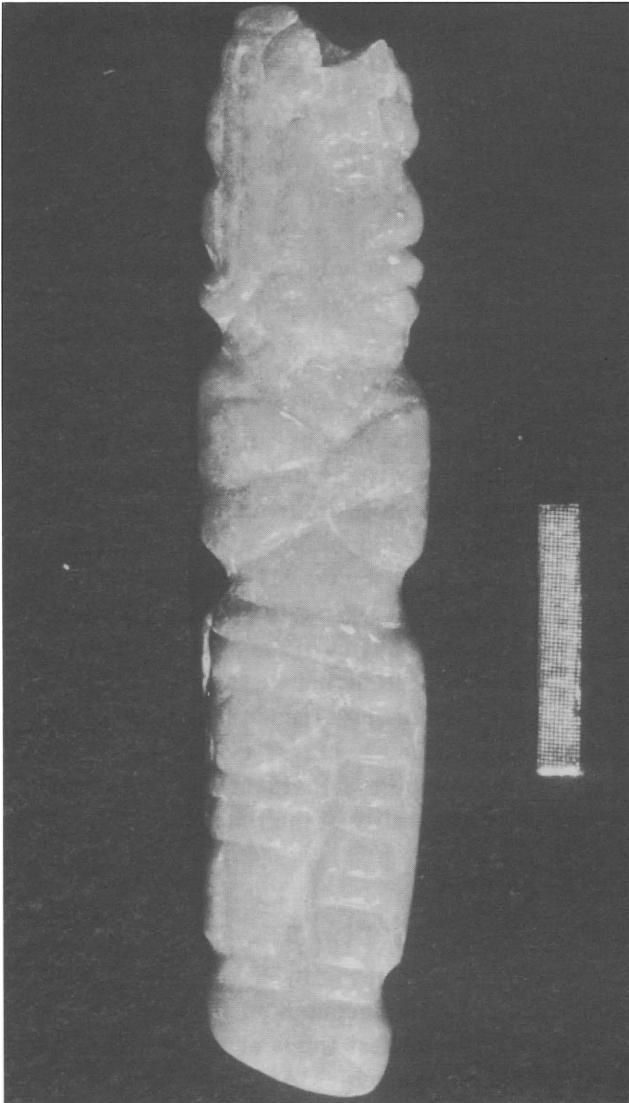


Figure 6. Human-figure pendant in submission pose, Tomb A-1/1, Altun Ha, Belize; height: 10.35 cm.

20.3-cm-long pendant (Pl. IIC) from Altun Ha, Belize, with an elaborately carved scene on the obverse and a hieroglyphic text on the reverse (Pendergast 1982: 84-85, Fig. 55), that is drilled both longitudinally and transversely as well as at various spots around the perimeter. The production of a 20.3-cm.-long hole was undoubtedly the supreme challenge of the pendant-maker's life, and one that he nearly failed; inspection of the perforation under bright light shows that the drilling came within just a bit more than a millimeter of piercing the pendant's rear face.

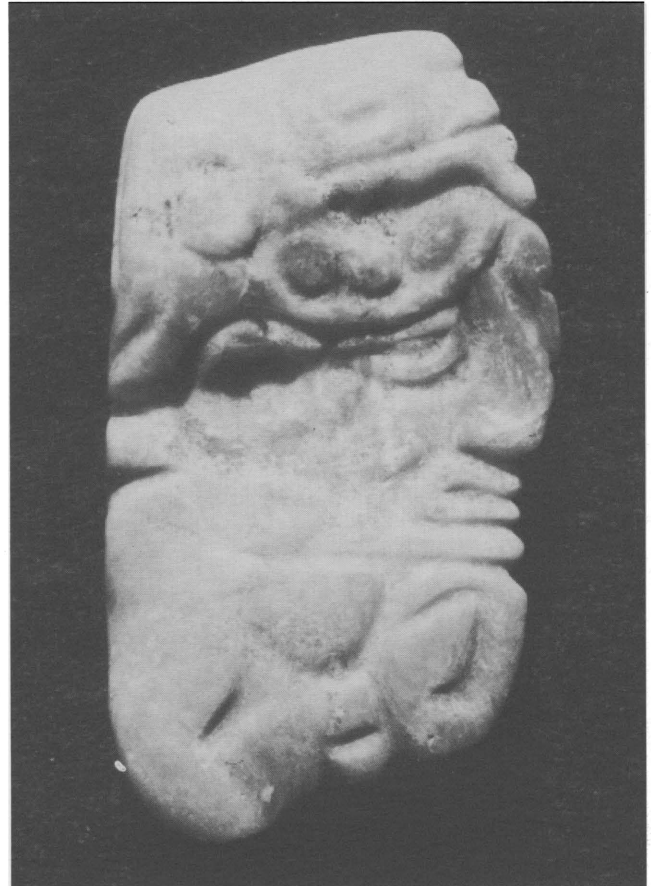


Figure 7. Human-torso pendant, Tomb B-4/2, Altun Ha, Belize; height: 5.5 cm.

THE JADEWORKER'S TOOLKIT

The remarkable feats of jade carving and drilling that abound in the Maya archaeological record pose one major question for which there is, sadly, very little in the way of an answer: How was the work done? The difficulty in providing an answer to this very important query is essentially the same as that encountered in all areas of ancient Maya technology; it results from the extremely poor preservation that characterizes the tropical environment, combined with the fact that the Maya left virtually no pictorial record of daily life. Hence, although we have not only the archaeological objects themselves but also numerous depictions in stone and pottery of rulers and nobles in their finery, we know next to nothing about the people who produced jade beads and pendants and only slightly more about how they carried out their work.



Figure 8. Jaguar-head pendant, Tomb A-1/1, Altun Ha, Belize; height: 3.45 cm.

The techniques employed by Maya jewellers have performed more a subject for speculation than an object of scientific analysis owing to the absence of jewellers' toolkits in the archaeological record. Studies such as that by Kidder, Jennings, and Shook (1946: 118-124) and the pioneering work of Foshag (1957) have suggested a variety of techniques based on observation of the finished products and, in Foshag's case, knowledge of the mineralogical and physical properties involved. The sum of our knowledge as provided three decades ago by Rands (1965) has been significantly augmented in a broader study of jade in Mesoamerica (Bishop, Lange, and Easby 1991). The problem is that much of the jeweller's equipment no longer exists because it was made of wood and other perishable materials, and the remainder very probably consists of objects unlikely to be identifiable as artisan's tools, although one potential jeweller's kit has been recovered in northern Yucatan (Andrews, Rovner, and Rovner 1975:91).

Sawing with a very thin wooden blade either edged with or driving a finely powdered abrasive, or with a string coated with abrasive-impregnated resin, is obviously in evidence on unfinished objects, but it is equally obvious that the tools have long since succumbed to the rigors of the tropical environment. A wooden drill tipped with chloromelanite (Foshag 1957) or corundum, probably used in a bow-drill apparatus (Kidder, Jennings, and Shook 1946:123) would be represented today only by the unidentifiable tip, and a bird bone used as a core drill might very well be classified only as a worked object, not as a jeweller's tool. Carving of complex scenes was probably carried out with stone and abrasive-tipped wooden gravers, and polishing with stone or wooden objects, probably in conjunction with cloth in later stages, and a very fine abrasive. The issue of the types of abrasives used can clearly never be resolved, and the debate regarding the physics of the process continues to this day. It is frustrating that we shall never be able to reconstruct the labors involved in the production of jade beads and pendants, but at least we have the products of those labors as evidence of the artistic talent and technical ability of their makers.

JADE AS ADORNMENT, JADE AS POWER

The use of jade is documented from only a few centuries after the earliest times at which the Maya were culturally recognizable. At Cuello, in northern Belize, jade objects appear as early as 900 B.C. (Hammond 1991:199), and jades, in the form of simple beads that are largely albite, are known from Altun Ha at about 450 B.C. (Pendergast 1982:179-184, 200-201). Complex jade carvings are, however, much more common, as are quantities of jade in general, during the Maya Classic period (A.D. 250-925). The discussion that follows is focussed on the Classic, although many of the practices examined were surely part of the cultural repertoire prior to the Classic as well.

The variety among jade pendants is tremendous (Pendergast 1979, 1982, 1990a; Proskouriakoff 1974; Rands 1965), and can often be judged even in relatively limited archaeological assemblages (Taschek 1994:67-104). The uses to which jades were put in ancient Maya society were, however, far less varied; in general terms they fall into three primary

categories, which we shall examine in a moment. In all three categories, the uses of jades reflect the essential quality of the stone as the signifier of concepts important in Maya religion, and hence as a symbol of power.

The most frequently recurrent and most generally visible use of jade beads and pendants occurred in the costume of royal personages and of their attendant nobles. Here the visual magnificence of raiment was given additional impact not only through the incorporation of specific religious imagery in virtually every part of the regalia but also in the use of the essential green color in necklaces, chest ornaments, belts, wristlets, anklets, headdress elements, and elsewhere on the royal body. Schele and Miller (1986:67-72) provide a short but evocative description of royal costume and the place of jade within it, but in truth no summary of such finery can begin to do justice to the handiwork of Maya craftspeople and the effect it exercised over the populace. Every bit of royal costume bespoke the link between the ruler and the gods, and defined the role a leader played as intercessor for the community's well-being. Jade was of especial importance in the conveying of this message, for even though the use of the precious material was not confined to the nobility, the concentration of jade in royal costume spoke of power in a voice that no one could fail to understand.

If we move for a moment from the message to the medium, we enter a realm in which simple principles of physics may tell us something about the display of power by the nobility. The dressing of a ruler in the mass of finery surely took place in a cloistered spot but, of course, the object of the endeavor was to produce a manifestation of power that would be visible throughout some ceremonial occasion. Imagine if you will a royal person clad in a large and complex headdress, numerous elements of body-covering including a massive backrack, then adorned with one or more jade necklaces, a number of pendants, a belt with jade elements, anklets, wristlets, and other pieces of the precious stone, and you will recognize immediately that when in full finery the ruler must have been nearly immobile. Combine this knowledge with the requirement that the individual climb temple stairs, perform a complex ritual, and then descend the

stairs in a dignified manner, and you cannot fail to conclude that the weight of raiment must have dictated that the personage be assisted at every step—and particularly in the descent of the stairs—by a coterie of retainers. The very stone that underscored royal power must, at the practical level, have been a tremendous impediment to the carrying out of essential royal public duties with the proper amount of decorum.

JADE AS A GIFT TO THE GODS

The power demonstrated by jade in its role as royal adornment was given a second meaning in one of the critical, though not universal, elements of Maya construction. Whether in major temples or in minor structures, whether in a city's heart or in outlying residential zones, the practice of placing an offering either at the base of a new building or near its summit was of major importance. The purpose in every case was presumably to ensure the success of the endeavors for which the structure was intended. Because of its ceremonial importance, jade often appeared in such construction offerings (*see*, for example, Pendergast 1982:42, 46-47, 53, 75, 81, 82, 106, 109; Taschek 1994:67-104; Willey et al. 1965:482-483), even in buildings in which no subsequent use of jade is in evidence, or would be expectable.

Offerings of jade extended beyond the construction-related sphere to situations in which massive disposition of the valuable material, almost certainly aimed at propitiation of the gods or at enhancing connections with them, were the order of the day. The most famous of such offerings involved the Cenote of Sacrifice at Chichen Itza, in northern Yucatan (Proskouriakoff 1974), into which huge quantities of objects, imported from many spots, were cast. A different type of destructive offering is represented by successive altar-top events at Altun Ha, Belize, that involved shattering of jades, either before or as the result of huge fires lit on the altars (Pendergast 1982:104, 110, 117-118). In these instances the effect as regards the jades was the same as in construction offerings: objects of incalculable value, often of heirloom status, were given up for the good of the community.

JADES AS AFTERLIFE ACCOMPANIMENTS

The third category of jade-object use involves the placement of beads and pendants with the deceased, both in royal tombs and in burials of lower rank or status. I cannot begin to attempt an exhaustive discussion of burial-related jades, either as regards their variety or as regards their quantity, both of which vary greatly from site to site and over time. It is worth noting, however, that the concentration of carved jades in royal tombs reflects, at least to a fair degree, the concentration of such wealth depicted on monuments and pottery vessels (e.g., see Pendergast 1979:Fig. 34b). As in the case of offerings, the deposition of jades in tombs removed the objects permanently from view and from use, and hence signalled the overwhelming importance of the individual interred. When such efforts involved pieces of unquestioned major significance and considerable antiquity, such as the jade plaque from Altun Ha (Pendergast 1982:Fig. 55), the impact on the community must have been immeasurably great. The most outstanding example of voluntary relinquishment of a jade of unspeakable importance is surely the full-round jade carving of the sun god from another Altun Ha tomb (Pendergast 1982:57-59, Fig. 33a-c).

JADES AFTER THE CLASSIC

As the fabric of Maya society began to disintegrate in the 8th century A.D., the power exercised by rulers over many aspects of life, including the importation and use of jade, must have begun to diminish. By the end of the 9th century or the opening years of the 10th, royal control over trade in jade, and indeed the very need for such trade, had effectively ceased in most lowland Maya cities. Virtually all of the cities investigated throughout the southern part of the lowlands (modern Belize, the Peten, and portions of the Mexican states of the Yucatan Peninsula) had ceased to function as centers of social and political power by about A.D. 900-925; only two communities, one the major center of Lamanai and the other a small island community linked to the mainland city, are known to have survived the Classic collapse essentially unscathed (Pendergast 1990b, 1993). One can only speculate about the fate of jadeworkers when their skills were no longer needed, just as one ruminates on the changes that must have

affected all who had toiled in the service of rulers who no longer held sway in lowland centers.

With the onset of the Postclassic in the 10th century, the focus of Maya life changed sharply in both the southern and the northern sections of the lowlands. In the north, the arrival of central Mexican peoples brought about shifts in religious belief and practice, but seem not to have reduced the focus on jade as one of the essential ingredients of a successful existence. In the south, in contrast, jade came close to disappearing as an element in offerings and burials, and the few pieces that do occur were surely heirlooms, or occasionally were reworked from fragments of larger objects of considerable antiquity. The place of jade may have been taken by shell and other materials suitable for beadmaking, and the tradition of use of certain shells that were once conjoined with jades in royal raiment, notably *Spondylus*, as indicators of rank or status may have continued in a limited fashion. To all intents and purposes, however, the role of jade was reduced to so low a level as to be effectively nil in the southern lowlands Postclassic, even though occasional use of pieces continued through the early 16th century.

JADES, BEADS, AND EUROPEAN ARRIVAL

Although jade no longer held the place of eminence it once enjoyed in Maya religious practice, the significance of its color was certainly not lost on the southern lowlands Maya of the 16th century. The economics of obtaining jade were, however, apparently beyond the capacity of the people. Reuse of ancient pieces, which may have been recovered through accidental digging or intentional search in abandoned structures, was therefore apparently the standard practice. Sources of exotic shell seem also to have dried up, with the result that beads of clay came to be the common adornment, an immeasurably large step down from the grandeur of earlier centuries.

With the arrival of the Spaniards in what is now Belize around 1544, the Maya had opened to them a source of an entirely new kind of ornament, the glass beads that the Europeans brought for trade and other purposes. Much of the use of beads at Tipu, one of the two excavated Historic-period native communities in Belize, focussed on children (Pendergast 1993:128-

129; Smith, Graham, and Pendergast 1994:Table 3), presumably in reflection of the conversion and catechizing process. In contrast, all but one of the glass beads recovered at Lamanai come from the presumed house of the community's leader (Pendergast 1993:128; Smith, Graham, and Pendergast 1994:23-25, Table 1), and hence can probably be seen as having performed a different version of the validation of power that characterized jades in earlier times. Neither the Spanish hold on Tipu and Lamanai nor the quantity of European beads brought into the communities was sufficient to disrupt native production, and so pottery beads continued in use alongside glass from the mid-16th century until rebellion brought an end to European presence at both sites in 1638-1641. The disappearance of Spanish influence was followed by resurgence of some pre-contact offering and other practices, but also by Maya continuation of a mixture of native and Christian religious practice. All evidence suggests, however, that the now centuries-gone use of jade as personal adornment to denote power did not reappear. Yet jade had not lost its significance, even though in their time in the southern lowlands the Spaniards had succeeded in altering Maya belief and daily life more than they knew. Sometime after 1641, when the Maya of Lamanai erected a monument in what had been the nave of the Christian church, they included among the offerings at the great stone's base a reshaped piece of a centuries-old carved jade pendant.

ACKNOWLEDGEMENTS

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STONE BEADS AND THEIR IMITATIONS

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Simulations of precious-stone beads began to be made as soon as feasible materials became available. From antiquity onward, we have replicas of stone beads made of glazed stone, faience, and other ceramics, and glass. In contemporary times, glass and plastic have become the predominant substitutes for stone beads, although materials of organic origin, such as bone and tusk, have also been used. Information is presented on the background, materials, and techniques for detecting such simulations, using primarily visual clues provided by macro color photographs.

BACKGROUND

During the Stone Bead Symposium at Bead Expo '96, the bead community had an opportunity to hear from professional archaeologists capable of analyzing their bead finds with high technology and precision. In this article, I address the opposite: extremely low technology, performed essentially with the hands and eyes. Most independent bead researchers, who are not affiliated with any particular institution, work this way, often with no access to even rudimentary equipment such as dissecting microscopes or hardness points. By comparison, if one is associated with a museum, university, or government research agency, there are both colleagues in related fields who are available for consultation and/or help in physical testing and, similarly, have access to both basic and sophisticated viewing and testing equipment. The bright side for the unaffiliated student of beads is that their tools and skills are very portable and simple, thus easily applied. Eyesight and wits are what they use when looking at or collecting beads, all based on comparison and conjecture. Thus, the appearance, hardness (as tested by rubbing against the teeth), and weight of beads serve as the primary clues. Often, the opportunity to observe beads is spur of the moment, without a further chance to study them with any

instruments, at leisure, or with access to comparative material. But as exposure to beads increases, knowledge builds, so that our database and skillbase enable us to become better visual analysts in detecting simulations and imitations of any type.

Central to this supposition is that one have a knowledge of the prototype, as well as the materials used to produce copies. Historically, relatively few materials were used for imitating stone beads and, with the exception of dZi beads, such activity is really the backwater of simulation. The truly exciting copies today are of materials other than stone, such as glass and polymer.

Imitating beads is possibly the second oldest profession in the world. We can only go back to about 5,000 B.C. for copies of stone beads, as revealed by a strand of tabular obsidian beads from Iraq at the Sackler Gallery of the British Museum, where one imitation is made of unfired clay. Dr. Mark Kenoyer (1994) has looked at the Indus Valley or Harappan civilizations and shown that faience was used for copying turquoise, which also occurred in Badarian Egypt. Brunton (1928) has stated that these copies were so good that contemporary field archaeologists were frequently unable to differentiate between turquoise and its faience imitation. Such fidelity is a rarity, except possibly with current dZi simulations, as most copies lack this quality. This is puzzling, as the peoples who wear and use beads are constantly exposed to them, and are keen and astute observers; why would they be fooled by some of the outlandish copies that are on the market?

I theorize that economics drives this acceptance of fakes. Accurately copying the original of any bead entails so many variables that it is nearly impossible to do so and have an economically viable product (Liu 1980b). If one can use a feasible substitute for a rare,

expensive, or difficult-to-work material, someone in the market will accept this copy whether or not it is true to the prototype. Fairly soon, that it is a copy no longer matters; it becomes symbolic of the real one and gains acceptance. There are obvious economic rewards to such acceptance, as seen in the battles waged between various beadmaking countries (Liu 1974, 1987b). The imitation may even be better than the prototype because synthetic materials are usually lighter and produce a more regular configuration, all of which facilitate the stringing of beads into necklaces.

I feel that few bead users are really fooled by simulations, only those who are beginning collectors or those who are looking for bargains and permit a low cost to sway their judgement. In either of the latter categories, ignorance of the prototype or the inability to recognize materials is to blame. Ironically, to experienced bead collectors, clever copies are often more exciting and interesting than the real beads.

MATERIALS

Materials used for making copies are not that numerous. Natural substances simulating natural materials include stones or ivory imitating other stones. Examples include dyed walrus ivory for jadeite or possibly malachite, dyed steatite for lapis, and howlite for turquoise. Of synthetic materials substituted for natural substances, faience, glass, and plastic have been used the most for stone imitations; ceramics other than faience have only been utilized on a minor scale (Liu 1992, 1995; Ogden 1982). (Here, the term synthetic means human made, not in the context used for gemstones whereby the synthetic simulation has the same hardness, chemical composition, etc., as the prototype.) In the Industrial Age, imitations in glass and plastic superseded all others. Perhaps 80% of the copies we see fall within the last two centuries.

Thus, stone imitations are neither numerous nor that difficult to detect, although the current practice of making stone replicas to ease collecting pressure on the prototypes may create a new problem. Some of these replicas are being produced under the direction of an archaeologist (Kenoyer 1996). Others are being

made at the request of a dealer for the purpose of reintroducing the beautiful shapes of ancient beads into the market (Kamol 1998:pers. comm.), while still others are probably forgeries of expensive ancient beads (Liu 1998). Some of the stones used for the replicas are the same as those utilized for their ancient prototypes; others may never have been so used in the past. Unfortunately, just as glass replicas have been aged to simulate great age, similar procedures can be applied to stone replicas. With hardstone replicas, artificial aging may not even be necessary, since many of the ancient prototypes are in excellent condition and show few apparent signs of wear. The ultimate detection of good replicas may depend upon an examination of silicon casts of the perforations, or electron microscope photos of the different surfaces left by both ancient and modern production methods (Gwinnett and Gorelick 1996). The presence or absence of microscopic wear on suspect beads, such as micro percussion scars derived from long use, may be diagnostic as well.

Supposedly, even such minute details have been applied to the large number of imitation dZi beads now on the market, most likely produced in Taiwan or elsewhere in Asia (Hibler 1997). Simulated dZi beads are among the most sophisticated of stone imitations; previous efforts have ranged from crude to excellent (Liu 1995), but since the onset of the Asian demand for these etched agates, the copies have greatly improved. At least advised by those with a thorough knowledge of such beads and their technology, the forgers may also have benefited from the extensive exchange of information on dZi beads that has occurred since the 1980s (Allen 1982; Ebbinghouse 1982; Francis 1982, 1992; Liu 1980a).

Besides simulations, replicas, imitations, and copies, there are other phenomena encountered in the realm of beads, such as transpositions, degradations, and outright fantasies (Liu 1977, 1985, 1987a; von Saldern 1972; Zeltner 1931). These complicate the detection of imitations if one is unaware of them, but do not hamper the actual differentiation process between the real and the copy. In those rare instances when the study sample is limited, such as in the case of an etched carnelian bead with human figures (Davis-Kimball and Liu 1981), the difficulty arises from having no comparative material.

EXAMINATION AND DETECTION TECHNIQUES

Basic requirements for the detection of fakes and imitations are eyesight, a loupe, and the hands to feel the texture and heft of a bead. Almost always, the copy will not weigh the same as the original, usually less. If one is able to identify glass and plastic, one can detect the majority of fakes. Mentally comparing the weight of the specimen at hand versus the original is greatly facilitated if one is familiar with the relative weights of glass and plastic. Most experienced bead researchers also tap or rub a bead against the incisors to help determine if an example is stone, glass, or plastic. While possibly not very sanitary, the vibration or feel of the material against the teeth can usually tell the tester to which of the three categories a bead belongs, as well as the relative hardness of its medium, which is comparable to how hard points are used in determining the hardness of gems on the Moh's scale.

EXAMPLES OF SIMULATIONS

During the illustrated lecture from which this article is adapted, about 90 slides were used to illustrate the various types of stone beads and their imitations, as well as other materials frequently mistaken for stone by bead collectors, such as coral. Here, due to space considerations, the number of examples has been reduced to 18. Consequently, many bead types, materials, and historical periods will not be examined.

The Ancient Middle East

The precious materials of antiquity consisted not of diamonds or colored gems, but what we would now consider semiprecious stones, such as amazonite, lapis lazuli, agate, carnelian, onyx, and rock crystal. All the beads in Pl. IID (top) are unprovenienced specimens from the Middle East, mostly Afghanistan; a number date to the Neolithic period. The agate leech bead (Pl. IID top, lower right) is especially interesting since this is one of the eminently collectible beads and was until recently quite rare. Described by Beck (1941) and

considered by him to be "especially connected with India," both the classically thin types and the thicker types (Beck 1941:Pl. IV, Nos. 8-9) are increasingly available, either as genuine examples, or probable fakes and/or replicas (Liu 1998). The occurrence of the thicker type in recent finds from the Middle East and China may provide important clues to trade with India.

Ancient Egyptian simulations of lapis lazuli in glass and faience are shown in Pl. IID (bottom). In the upper row, a glass and a faience specimen (left and center, respectively) lie next to an ancient lapis tabular bead from Afghanistan. The lower row depicts two ancient Egyptian drop pendants of glass (left side) and one of faience compared to an ancient hexagonal bicone lapis bead from Afghanistan (right). These are close in color but the shiny surface of the glass and faience contrast sharply with the dullness of the real lapis. The Egyptian glass drop pendants (often found in near-pristine condition) definitely date to the 18th Dynasty; the other faience beads and pendants may as well.

A much closer match occurs between ancient Egyptian amazonite beads and their faience copies. In Pl. IIIA (top), the four beads on the left are faience; the three on the right are their stone prototypes.

Other ancient Egyptian imitations of stones are shown in the upper row of Pl. IIIA (bottom). These are, from left to right, faience copies of amazonite(?), turquoise, and carnelian. The lower row depicts ancient beads of amazonite, glass (because I had no example of ancient Egyptian turquoise), as well as a carnelian cornflower pendant. It is readily apparent that the faience version of the cornflower bud is much better made than the stone original, and utilized much less labor. Most faience ornaments were mold-pressed, while their stone counterparts required extensive lapidary work. This contrasts with the Chinese philosophy of imitation, where the labor saving is not always apparent or possibly does not even matter much. Egyptian skills in faience and glassworking were utilized to supply the large demand for ornaments necessitated by the funerary practices of the period, and reached a peak in the 18th Dynasty, especially as regards faience ornaments.

Asia

Two undated beads found in ethnographic contexts in Indonesia are shown in Pl. IIIB (top). Even Adhyatman and Arifin's (1993) study of the beads from this large archipelago contains no information on these specimens. The impressed crumb-glass bead in Pl. IIIB (top, right), probably of Chinese manufacture, may be an imitation of the native bead of fossilized dinosaur bone (left). An unidentified softstone with dendrites (not shown) may have also served as a prototype for the glass version which, interestingly enough, is the most expensive of the trio.

DZi beads of the Himalayas are among the most sought-after and valuable of stone beads, and therefore subject to much copying. This was practiced in the past and is still being done, with some of the contemporary imitations in agate being among the best and most difficult to detect. Until very recently, this was one of the most active areas of bead collecting, especially in Asia, accompanied by concomitant numbers of publications (Chang 1993, 1995; Jones 1996; Lin 1997; Tsering and Tenzin 1998). The examples shown in Pl. IIIB (bottom) are easily detected, ranging from a hard plastic (left), often with a metal core to add weight, to one in polymer (center) and a painted aluminum example (right).

Chinese beadmakers, who rank numerically just behind the Czech and related bead industries as a source of simulations, will go to great lengths to make imitations which, when measured by Western values, hardly seem to warrant the effort. Ceramic imitations of stone beads are not common; in Pl. IIIC (top), the right-hand specimen is a porcelain imitation of turquoise, real examples of which are represented by the spherical bead and balustrade bead combination comprising the counterweight of a court necklace. While the latter may be made from pressed turquoise and thus lack any veining, the imitation has painted glaze representations of these features. In Pl. IIIC (bottom), a contemporary carved jadeite pendant (left) is compared to imitations in glass (right) and dyed walrus tusk (center). There is some question as to whether the latter are copies of jadeite or malachite. The wax seal on the glass *pi* was supposedly applied to all Chinese exports over 120 years old.

Further examples of labor-intensive simulations are found in Pl. IIID (top). This shows a carnelian

imitation in drawn glass of a Chinese cane bead (left), a drawn, molded, and ground glass panel bead (center) and another panel bead made by molding and grinding (right). The amount of labor expended to produce the two panel beads is comparable; it is undetermined if any one method is faster or less laborious. Such imitation panel beads are about 1.5 cm long. Chinese glass archers' rings, made to imitate jadeite, other hardstones, and tortoise shell, were also copied in glass (Pl. IIID bottom). One of the difficulties in judging fidelity in such Chinese artifacts is the lack of knowledge of the stone prototypes.

Malachite is another semiprecious stone that has been well simulated. In Pl. IVA (top), real malachite beads (right) are compared to Japanese glass imitations (left). The fidelity of these copies is very good, although the banding in the glass is slightly more prominent than in the real stone. Japanese glass *ojime* often provide good examples of stone simulations.

Africa

Africa is one of the richest sources of imitation stone beads. Unusual simulations from Africa include silicon rubber or Silastic imitations of agate beads, imported from Burkina Faso (formerly Upper Volta); purchased over twenty years ago, these are now becoming sticky as this compound ages and deteriorates (Pl. IVA bottom, left). Czech molded-glass copies of chalcedony beads are more common. In Pl. IVA (bottom, center) they are strung on the same strand as real chalcedony beads, probably products of the Cambay industry. The glass versions exhibit diagnostic longitudinal mold seams. The latter strands are probably from the Ivory Coast. On the right-hand side of Pl. IVA (bottom) is a strand of ancient chalcedony beads from Mali, many in tabular or lenticular forms.

Among my personal favorites are the copies of gneiss and granite beads from Mali. Pl. IVB (top) shows real stone beads, as well as European and African-made copies in crumb-glass or powder-glass, often in colors that do not resemble the real material. Most of the crumb-glass simulations are European, although there are also some made in Africa. The glass crumbs are often only sintered, but imitate well the coarse grains of the rock (Liu 1988).

The economic competition between bead-producing nations vying for the African trade is well-illustrated by the stone beads and their copies in Pl. IVB (bottom). Comparison of the tabular carnelian pendant from India (right) with its Czech molded-glass imitation (left) shows poor congruence, so this particular form of pendant may not have been the exact model for its European glass copy. The latter is from Mali, which has been the source of the greatest number of various Czech molded-glass pendants.

In Pl. IVC (top), the faceted-spherical carnelian bead from Idar-Oberstein (top left) compares well with the competing Czech molded-glass copy (top right), both from Morocco. The considerable difference in hardness between carnelian and glass provides a good clue for differentiation, as the facets wear and dull much faster on glass examples. Most molded-glass ornaments are identified as Czech in origin, but they could also be French or German (Picard and Picard 1995).

The lower row in Pl. IVC (top) depicts date-shaped carnelian beads from India (left) versus a molded-glass imitation of European origin (right), all probably from West Africa. These beads are the products of three countries' bead industries, the earliest being India, then Germany, and finally Czechoslovakia which won this economic war (Liu 1984, 1987b).

Pl. IVC (bottom) compares dyed agate pendants from Idar-Oberstein (bottom row) to the smaller molded Czech glass copies (2.5 cm long) in the upper row. Note that the harder stone pendants wear better and thus still retain their polish, in contrast to the almost matte surfaces of the glass ones. With these examples, the match between prototype and copy are fairly reasonable, except for size and the exact contours. While the Bavarian stone industry's ornament output was prodigious, we know fairly little about the specific types that were produced or their possible Indian prototypes (Ruppenthal n.d.; Trebbin 1985).

REPLICAS

Individual archaeologists like J. Mark Kenoyer and government institutions, such as in China, are now

encouraging the production of replicas of ancient beads in an effort to satisfy the demands of the collecting market, reduce illegal digging for prototypes, and sustain the local craftspeople.

Carnelian

Pl. IVD (top) shows two carnelian replicas of ancient long bicone beads made by Inayat Husain of Khambhat, India, compared to the authentic piece in the center which is from Afghanistan. The two are practically indistinguishable. However, although the perforations of both have been drilled from either end, those of the modern beads are very small, having been produced using diamond drills.

Polymer Clay

Except for its light weight and softness, polymer clay is one of the best materials for simulating stones and other bead materials. A number of contemporary artists now make their own interpretations, not to copy but to demonstrate their skills. The jade, lapis, turquoise, coral, and hardstone versions in Pl. IVD (bottom) are by leading polymer artist Tory Hughes, who has developed most of the imitative techniques in polyvinyl resin (Cuadra 1993).

CONCLUSION

Collectors and professionals, such as archaeologists, ethnologists, and museologists, share a common problem: there is no easy way to distinguish real from imitation beads, no matter what the material, except by experience and trial and error. Because there are so many bead types and materials, with a sizeable portion still undescribed and new techniques constantly being developed, the learning curve for the detection of simulations is quite long. But with exposure and guidance from a mentor, one can quickly learn enough to begin identifying and differentiating very adequately, especially if one also undertakes a vigorous reading of the bead literature. Thorough knowledge is the best protection.

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MELANAU BEAD CULTURE: A VANISHING WORLD?

Heidi Munan

Settled on the South China Sea coast of Sarawak, the Melanau comprise an aristocratic society which used to have a strong bead culture, tied to animist religion. Developments in the 19th and 20th centuries have influenced the traditional way of life so that today, only a few Melanau still keep a significant number of beads. Nevertheless, shamen and healers, adherents to the old religion, continue to use beads in healing and purification ceremonies. Bereaved families protect themselves by wearing special beads and by providing the deceased with beads according to his or her status in the traditional hierarchy. Specific kinds of beads are also prominent in traditional marriage ceremonies. Beads continue to adorn blouses and to serve as personal ornaments. Handicrafts embellished with glass seed beads are also produced, but mostly for the souvenir market.

INTRODUCTION

Borneo, the world's third largest island, covers an area of 750,000 km² and is more than three times the size of Great Britain. The major rivers flow towards the sea from the mountainous interior, building up wide alluvial plains along the coast. The island is so big that the various inhabitants did not, in the past, know very much about its extent, or about the mixture of peoples that lived on it (some of this ignorance persists to this day). But they knew and had names for their nearest neighbors up and down the river with whom they were on trading/raiding terms. A rugged interior and vast coastal swamps kept people asunder more effectively than the sea did; there was more regular traffic between south Borneo and Java, west Borneo and Sumatra, and north and east Borneo and the Philippines, than between the opposite coastal areas of the island itself. The coasts were indeed linked by routes, up the main rivers and across the watersheds, but these were not regularly traveled by large numbers of people. Farming communities migrated from time

to time in search of fresh lands, but most of them only moved about 50-100 km every few generations.

The great island of Borneo has not remained untouched by the political, social, and religious currents that swept the Insulindies. A Sanskrit inscription found in Kutei, concerning a prince Mulavarnam, indicates that enterprising Indian traders or temporary settlers had reached the southeast coast of Borneo in the 5th century (Ave and King 1986:19). The 8th-century Srivijaya empire, based on Sumatra, had its trading and cultural connections with neighboring islands, as did Majapahit in Java in the 14th century. After the collapse of these larger groupings, river-mouth chieftains along the Borneo coast acquired considerable regional influence; the principalities of Sambas, Banjarmasin, Kutei, and Brunei were among the most powerful.

The history of the Southeast Asian peoples is based on oral tradition and the written accounts of outside observers. A few early Chinese and Indian seafarers have left us their impressions. In some cases travelers' tales were recorded by other writers; Chau Ju-Kua, ca. 1234, is a famous example (Hirth and Rockhill 1911). Interesting though such works are for the overall picture, they are second- or third-hand evidence filtered by the observers' and recorders' cultural biases.

EARLY BORNEO BEAD TRADE

India and China are the earliest known sources of the semiprecious stone and glass beads that reached Borneo in the days before European contact. Some European beads probably reached the island before the Portuguese sailed these seas, brought by Arab, Indian,

and other traders who had obtained them in the great emporia of India or the Malacca Straits.

Sarawak derived beads from the India-China trade, some of which passed along the northern shore of Borneo. South and east Borneo were better served by various routes from Java and Sulawesi, but merchandise was carried up the rivers and into the heartland of Borneo from the north and west coasts, too.

While it is convenient in this context to talk of a "bead trade," it is unlikely that there ever was a class of traders who dealt in beads and nothing else. Traders carried all sorts of merchandise, including beads which they exchanged for goods. The larger traders bought up small goods in places like Malacca, Palembang, Sukadana, and Bantam and retailed them all over the region, supplying maritime peddlers in their turn. A.R. Wallace's (1869:329 ff) picture of the mart in 19th-century Dobbo on the Aru Islands is probably typical of the general manner of inter-island trade as it was carried on over the centuries.

EARLY SARAWAK BEADS

The earliest imported beads found in Sarawak are not very impressive-looking artifacts. About the size of peppercorns, they come in plain shades of white, turquoise, yellow, red-brown, blue, and sometimes black. Such beads have been recovered from Santubong, Niah, and Gua Sireh in Sarawak, and from Sungei Lumut and Kota Batu in Brunei. They are common in archaeological sites throughout the region.

Santubong, an 8th-14th-century trading town on Sarawak's west coast, was a center of all kinds of commerce including the bead trade and beads were possibly manufactured here. Nineteenth-century entrepreneur H.H. Everett, who lived in Santubong for some time, collected half-finished beads and deposited some in the Sarawak Museum (Everett and Hewitt 1909). Unfortunately these samples have been lost.

Everett's concise account of the beads he observed and his thoughts on their origin remain, however:

There is a great variety in the beads found at Santubong....

... beads in all stages of making are found, some roughly shaped, some not bored, and others only half bored, and one or two have been drilled so badly from two opposite ends that the holes crossed without coinciding.

... All the other kinds of beads may be of foreign origin but many are so crude that we think this improbable. Glass beads of various colors, yellow, red and blue are numerous. Many of these are asymmetrical and peaked at one or both ends as if the plastic glass had been twisted spirally round a wire.

... It seems very probably then that Santubong was once the scene of a bead making industry, but we are in complete ignorance respecting the makers. Natives of Sarawak have now no knowledge of such an art, and beads of the type in question are not affected by the Chinese. The red and yellow beads are often worn by poorer Milanos on their clothing [cf. Bead Tunic section further on], and the few large and handsome beads are of the same type as is treasured by the Milanos; yet these were almost certainly never made by Milanos (Everett and Hewitt 1909:7-9).

THE MELANAU

The people called "Milano" or Melanau (an exonym) account for about 5.8% of Sarawak's population. Most now live between the Rejang delta and the mouth of the Baram. They are related to the Kanowits and some Orang Ulu peoples of the mid-Rejang. Ethnographers consider them to be an indigenous people who moved down the Rejang River into its delta, and then up and down the northwest coast of Borneo. If the evidence of place names may be accepted, the Melanau were more widely dispersed in the past.

At present, the Melanau are divided into the Mukah/Dalat/Balingian, the Matu/Daro (Rejang), and the Bintulu sub-groups. They all speak related Melanau languages with strong dialect variations; a research assistant from Mukah could communicate with the people of Matu and Daro, but her "funny" accent and choice of vocabulary were often commented

upon. To point out the perceived distinction: a lady in Mukah stated that bead-decorated hats are "Igan style –we Melanau don't wear them!"

Even if the Melanau originated in Central Borneo, they evolved into a seafaring people. Settled near the coast, they were exposed to outside influences which hardly touched the people of the interior. As succeeding waves of travelers found, the Melanau were not "simple natives" in the sense that more sophisticated outsiders could cheat or bully them. The Melanau knew the commercial value of things as well as any foreign trader did.

Today, it is difficult to say what the "original" Melanau culture was like. Their animist religion was linked with a complex system of laws which regulated all aspects of life. Some Melanau still follow the "old religion," but it has become strongly modified by the combined influences of new religions, education, and the profound socio-economic changes of the 20th century. For the purpose of this paper, adherents of the animist religion will be referred to by the somewhat imprecise term *Melanau Likou*, commonly used among the Melanau themselves; the literal meaning is "people (of one river system)" (Bonadventure Hamdan bin Buyun 1998:5)

Living as they did along the coast and on the lower reaches of the major rivers, the Melanau had to be on good terms with the ruler of the day. Until the 19th century, the official overlord's sway didn't effectively stretch beyond the river-mouth settlements, and even there it was only intermittently enforced. The Melanau were within easy sailing distance of the royal town of Brunei, under the suzerainty of its *Yang Dipertuan* or sultan. Melanau headmen and chief traders, or anybody else who wanted to get ahead in life, had to stand in well with such representatives of political power as dwelt among them or dropped in from time to time. Some Melanau converted to Islam during the time of Brunei rule, or to Christianity during the Brooke and Colonial eras.

Until quite recently, the Melanau followed the accepted Borneo convention of considering every Muslim as a "Malay" regardless of ethnicity. According to the former Curator of Sarawak Museum, Tom Harrisson (1970:155-159), many local Malays are the descendants of ethnic Borneans who converted to Islam. This is not an imposed definition; converts

adapted their lifestyle, habitation, and clothing to the Malay pattern, and described themselves thus *vis-à-vis* the authorities. In 1939, no Melanau were reported to be living in Sibu which is, in fact, a main concentration of "urbanized" Melanau. Muslim Melanaus called themselves "Malay" *because* they were Muslims. One elderly villager in Matu in 1998 stated:

Melanau culture used to be simple. We just ate vegetables and fish, sparingly; people didn't get cancer then. Now we eat *belachan* [fermented shrimp paste], *kechup* [soy sauce], all these new things. Today's young people don't care if they get rain on the head—a very dangerous thing! In the old [Colonial] days the Malays looked down on the Melanau; they said we eat raw fish "just like cats do," and "dirty" sago worms! [i.e., two foods deemed delicacies by the Melanau].

Maybe sneers of this kind moved a Muslim Melanau to opt for "Malay" in the census 50 years ago. Today there is a much stronger ethnic consciousness among all indigenous Borneo people. In 1980, Matu-Daro, in the Rejang/Igan delta, was inhabited by 12,207 Melanau, the majority of them Muslim, and 227 Malays (Department of Statistics Malaysia 1996).

The Melanau convert's immediate and extended family accepts a change in religion quite equanimously. Reasons vary. Marriage with a Muslim makes conversion of the non-Muslim partner mandatory, but considerations of career or political advancement are acceptable. Very few Melanau don't have Christian, Muslim, and Likou relatives, and are on normal terms with all of them—a situation that tends to puzzle Muslims from other parts of Malaysia.

Religion and politics regardless, Melanau culture and lifestyle were shaped in part by geography. By the end of the 18th century, most Melanau lived along the coast (Fig. 1). Their staple food was sago (Fig. 2), a tree crop of the slightly brackish coastal swamps which—unlike rice—grows permanently. The Melanau didn't have to migrate in search of arable land. Superstitions and taboos hedge about the cultivation, harvesting, and processing of sago. It is no coincidence that the fetishes required for rites of passage, healing/cursing, and propitiation are carved from sago pith or plaited from sago leaf.

Proximity to the river mouths meant that the Melanau had "first choice" of any merchandise that



Figure 1. A Melanau village: Kampung Tellian Ulu (all photos: H. Munan).

arrived on the northwest coast of Borneo: textiles, ceramics, and beads. The people of the interior had to adapt their tastes to what reached the mountain fastnesses. The downside of a coastal domicile was that the Melanau were subject to pirate attacks, and more exposed to the attentions of their overlord and his minions than may have been strictly desirable. Seafarers and fishermen themselves, they nevertheless built strong, tall longhouses for the protection of their families, especially if they lived in easily accessible locations.

The Melanau “tallhouse” was more than just a strong house; it was the spiritual home of the community. Building a new house was not lightly undertaken—the magician was as necessary as the carpenter. Great importance was attached to the main pillars of the house which were, and still are, credited with curative powers. The main pillar of an old house may be preserved after the building itself has fallen into disrepair; a new house can be built around the old pillars. In the last surviving Melanau longhouse, Sok Matu, the otherwise unremarkable “mother post” is pointed out to visitors.

A “Rajah’s Servant” (official of the Brooke regime) saw the Melanau thus:

The Melanaus are conservative, not open to quick friendships, rather suspicious and generally improvident. 75% of the crews of coasting vessels are Melanau; they have no superior in sea and fishing lore... a people with a fondness for litigation, and of peculiar morals. They are the best fishermen, the best sago workers, the best basket workers, the best paddlers, and best boat builders, and (to my mind) the prettiest women (*Sarawak Gazette* 1929:68).

Until the quite recent past, the Melanau were a strongly stratified society. Rank gradations are expressed in a unit of weight, the *picul* (about 60 kg). This is a reference to the amount of dowry due a bride, payable in brass cannons. Fifteen *picul* is the highest rank possible in the Rejang area; nine *picul* the highest in Mukah/Dalat. Seven *picul* is “middle class;” the slave class had no *picul* ranking. No special insignia of rank were worn as within a village everybody knew the aristocrats. At times of festivals—particularly betrothals, weddings, and funerals—old beads served to indicate rank.



Figure 2. Sago grove; the Melanau settled in the coastal wetlands so they could cultivate this, their dietary staple.

MELANAU BEADS

The Melanau distinguish between ritual beads and “common beads.” Common Melanau beads are, by preference, small, daintily, decorated polychromes. They are usually worn in single-strand necklaces or wristlets, often with a central pendant of embossed silver or silver-gilt. Beads may be used to decorate clothing (*see* Bead Tunic below). The Melanau taste in clothing and ornament tends towards small, exquisite items rather than massed or showy displays. A lady wears one or two strings of beads, but they have to be select!

Common beads are colorful, pretty, and worn for ornament only. Any woman who has them can wear them. After a period when beads were not in fashion at all, younger people began to wear grandma’s treasures again in the 1990s.

Where are the Melanau beads from? Some, particularly the highly prized small, monochrome, opaque yellow glass beads (“peanut beads”), may be from India. The majority of common beads are of European manufacture (Venice, Bohemia, and the Netherlands), a source that dried up 50 or more years ago. New beads are coming in from Indonesia, but there is never any question of confusing them with the old ones. The Melanau share in the common Borneo bead stock; it is the way they are strung or stitched that identifies them as *Melanau beads* (Table 1).

Two beads used by the Melanau have special significance:

1. *Manik tilek*: large undecorated blue beads with a large perforation. They are about the size of a cherry, spherical or flattened spheres, of black-blue to greenish-blue glass, some of them of matte “vaseline glass.” Some *manik tilek* are irregularly shaped, pitted, or otherwise rough, but this is seen as a sign of age and considered to make the bead more valuable.
2. *Manik kahat (kahet)*: long (up to 50 mm) rounded black or deep brown beads with white stripes or spirals, made of onyx, agate, or glass in imitation of these stones.

“Good beads,” the old Melanau ladies agree, “cannot be bought any more. They came to us by inheritance.” Beads may be left to daughters, granddaughters, or daughters-in-law. There is no fixed rule. A woman could bequeath or give her beads to an outsider if she liked. The family wouldn’t like such a proceeding, but neither would they query the owner’s right. She may even sell them. Collectors will pay good prices for old beads, and most Melanau sell beads long before they would part with silver or antique ceramics.

A grandmother may give a string of beads to a first-born baby girl, or any favorite grandchild. Small children often have beads put around their wrists or necks, partly to show the family’s fondness for the little ones, partly as protection; this depends on the type of bead used (*see* Ritual Beads below). Little girls used to wear no clothing other than coconut shell or silver “fig leaves” to cover the pubic area; this modesty shield could be suspended with a plain cord, or a string of beads.

Table 1. Glossary of Melanau Beads and Bead-Related Terms (*m.* = *manik* = bead).

<i>Adat</i>	Customary law, custom.
<i>Baju baben</i>	In Mukah-Dalat, a long loose blouse or tunic (<i>baju kurong</i>) fitted at the waist with long front tails (<i>kebaya panjang</i>), silver gilt buttons at the neck, front, and sleeves.
<i>Baju senahak</i>	In Matu, a long loose blouse or tunic (<i>baju kurong</i>) fitted at the waist with long front tails (<i>kebaya panjang</i>), silver gilt buttons at neck, front opening, and sleeves.
<i>Bomoh</i>	Traditional healer, magician.
<i>Buah benah</i>	Name used in Kampung Sekaan, Matu (see <i>m. tilat</i>).
<i>Buah blud</i>	Long black-brown onyx bead; set in gold and worn as a brooch, ring, etc.
<i>Buah bukuk</i>	Small silver gilt buttons for female formal attire.
<i>Buah lipas</i>	Seed used as bead (?).
<i>Buah pasin</i>	Seed (used as bead), very hard; symbolizes strength of marriage.
<i>Burong tiong</i>	Minah bird with bright yellow dewlaps; also the name of a bead.
<i>Dukun</i>	Traditional healer, magician.
<i>Jerunai</i>	A long carved pole to which were attached human burials.
<i>Kahet-type</i>	Long black glass bead, white spiral: <i>kahet</i> bead of a kind not suitable for weddings.
<i>Kahet-type</i>	Long banded onyx bead with band of gold; "made by <i>jins</i> ."
<i>Lugi</i>	In Mukah, a woven gold brocade cloth.
<i>M. belidei</i>	Long black glass bead with white stripes (<i>belidei</i> means edible grass).
<i>M. burong tiong</i>	Small barrel bead, black glass, yellow zigzag; "Melanau bead."
<i>M. jelu'it, jeluyut, jelu'ut</i>	<i>Jaluyut</i> in Matu; small polychrome (non-ritual) beads.
<i>M. kahat (kahet)</i>	Long black onyx beads with white stripes; also faceted glass beads; for weddings.
<i>M. kahat lilin</i>	Long (30 mm) dark brown (amber?) bead; "good," but not for weddings.
<i>M. lida anjing</i>	Leaf-shaped flat onyx bead, perforated at the tip; "dog tongue."
<i>M. lilin</i>	Similar to <i>pasin</i> , but flattened or four-faceted (Matu).
<i>M. mata lelamaih</i>	Small spherical black, white spot(s); "caterpillar" (<i>lelamih</i> is a larva).
<i>M. mata tatin</i>	Black with white-red-green "eye;" "dragonfly eye."
<i>M. pasin</i>	"Peanut"—opaque yellow glass bead, pitted; part of wedding gifts.
<i>M. tajok kahat</i>	Hexagonally faceted spindle-shaped carnelian bead; "palm heart."
<i>M. tilat (tilek)</i>	Spherical "vaseline glass" bead, 10mm diameter, deep blue to turquoise-grey.
<i>M. timei</i>	Short fat oval carnelian bead; <i>timei</i> means shellfish.
<i>Mata utei</i>	Black/white flat onyx hexagonal bead, for bracelets; "honeycomb."
<i>Naga uling (nikah)</i>	"Wedding dragon"—silver comb (with beads); beaded headband.
<i>Naga</i>	Dragon; plays an important part in Melanau mythology.
<i>Pahe', pahet</i>	Offering (at healing ceremony).
<i>Pangkat</i>	(Ceremonial) rank.
<i>Picul, pikul</i>	Unit of weight, about 60 kg.
<i>Seraong (terindak)</i>	In Matu, a hat occasionally decorated with pendant strings of beads around the edge.
<i>Seraong Sambas</i>	Hat of fine bamboo with applique glass seed-bead embroidery.
<i>Suk</i>	Fishing fetish carved from bone or horn.
<i>Tali tengeng, tingang</i>	Creeper (bark?) fiber.

BEAD TUNIC (*BAJU BABEN*)

The bead bodice or tunic worn by Melanau ladies is unique to this ethnic group. Various known as *baju baben*, *bab'n*, or *baban* (*baju* means tunic or blouse), it is a black satin or velvet tunic, buttoned with chunky silver-gilt buttons, and decorated with a variety of small polychrome beads threaded along the hem, and seed beadwork sleeve yokes. A chain of finely worked silver platelets may also be used as hem decoration. These embellishments are usually unstitched before washing the garment, and sewn on again after drying, though some very careful owners wash the *baju baben* with the beads on. It is seldom worn so it never gets very soiled.

There are two main styles, with the following features in common:

1. The bead tunic is always black, made of satin or velvet.
2. The lower hem is decorated with a string of beads (peanut-sized monochromes and polychromes) stitched in place so that, should the stitching come undone in places, the main string will still hold the precious beads.
3. A sleeve yoke consisting of an inch-wide strip of beadwork is inset between the top of the sleeve and the armhole. The patterns, made of fine seed beads, may be flowery, zigzag, blocks of color, or anything the lady wishes to make; there is no restriction on beadwork designs. Some Melanau informants compare it to "snake skin; that's where our ancestors copied the patterns from." *Dipa ngauen (pemalei)*, the snake that changes into a dragon, is an important figure in Melanau mythology.
4. The close-fitting sleeves are twice too long, slit open from the elbow downwards, and decorated with large silver-gilt buttons. The dangling ends of the sleeve are looped back and tied around the wearer's wrist (*mukah*), or tied around the arm just below the elbow (*dalat*) so the silver buttons hang around the wearer's arm.

Most bead tunics seen today follow the style of the Malay (Muslim) *baju kurong*, which dictates that a woman's garments must not emphasize her figure. This type of tunic has a round neck and a frontal slit,

about three inches deep, buttoned with heavy silver buttons or fastened with a silver-gilt brooch sometimes called "Melanau gold." When unbuttoned, the neck opening is just big enough to permit the wearer to slip her head through it.

The tunic called *baju senahak* was closely fitting like the *baju kebaya* (Malaysian Airlines stewardesses wear *kebaya* as cabin uniforms). This tunic is open down the front, and buttoned with common beads threaded through cloth loops like buttonholes. Silver-gilt buttons or colorful beads decorate the sleeve hem. This style is only seen at "costume parades" nowadays.

The Melanau bead tunic is black because, according to one elder, "this is more serious and official." Ladies used to wear bead tunics for formal wear, on occasions such as meeting important guests or going to the *astana* (palace) to receive an award. It was worn by the bridal party at a traditional wedding; this fashion has recently been revived (Pl. VA). New bead tunics are occasionally made for weddings, and worn during one of the wedding dinners; these are decorated with newly imported Indonesian beads which are acceptable substitutes for the old "common beads." Bead tunics with authentic old beads are sometimes lent as a special favor; everybody in the village knows who has one.

RITUAL BEADS

Beads are worn by Melanau women and children. Men shunned such ornaments until quite recently. One class of men, however, was outside this rule: the traditional healer, locally known as *abayoh* (*bomoh* or *dukun* in Malay.) His role as a mediator with the spirit world gives him a special, semi-defined status between the genders. He (or, less commonly, she) wears beads as part of his professional clothing, the way a medical doctor wears a white coat, and a stethoscope around his neck. An *abayoh's* necklace may include beads of any kind including the "common" types, those preferred by women for ornamental wear. This is why one female Melanau informant considers the use of beads "a womanish thing to do—but for a *bomoh* I suppose that's all right...."



Figure 3. Access to Kampung Tellian Ulu is by a precarious one-plank bridge over a black peat river.

Healing

The Sarawak Museum collection contains a string of beads described as: “70/101. A glass bead necklace with two boar tusks, long glass bead, formerly used by Datu Pengiran of Matu *for smoking* (author’s italics). Presented by Dr. Wong” (Pl. VB). The *Datu Pengiran* of Matu was a community leader and a traditional healer. He did not wear beads while smoking a cigar, but while performing a healing ceremony involving smoke (fire and incense) inside a patient’s house.

This is not the place to describe the Melanau “smoking ceremony” in full (for details, see Buck 1933:168-172; Chong Chin Seng 1987:38-49). There is a graduated system of healing ceremonies, ranging from *bebayoh* to *bejiji*; the officiating *abayoh* decides which is appropriate depending on the patient’s condition. For some a tent-like *payun* structure is built. To strengthen the framework, beads and hawks’ bells are added where the rods meet at the top or where supports are attached to the ceiling beams. This concept of strengthening something by means of a powerful token extends to (or is taken from?) daily life: the carved *suk* images that Melanau fishermen attach to their nets are not meant to catch or lure the fish, but to strengthen the lines.

A traditional healer can do both “black” and “white” magic; i.e., he can help and heal, or harm, usually at the instigation of somebody seeking revenge. His social position is uncertain; people respect and possibly fear him, but many *abayoh* are quite poor. “Respectable” families would not wish their children to marry an *abayoh*’s offspring. This attitude may explain the caption “Melanau witch” which appears with a Sarawak Museum field photo taken in the 1960s; one must assume the term was obtained from a village informant, and not intended to give offence. The officiant sits on a swing on which she rocks herself into a trance. The swing is decorated with dragon figures, little umbrellas, dangling strings of beads, and “frog-head bells” which tinkle with each movement.

In the past, the patient paid the healer in beads, gold, and iron (knife blade) or brass. The fact that an appropriate reward is given is more important than the reward itself. Today the debt is usually settled in money.

The healer, acting as an intermediary between the human and the spirit world, protects himself by wearing or holding beads. “Each person has his or her own style,” says respected *abayoh* *Ketua Kampung*

(village elder) Peteran bin Libai of Tellian Ulu (Fig. 3; Pl. VC top), one of today's best-known Melanau healers. He not only wears his own beads when engaged in a ceremony, he also puts beads on his patient; he stressed that not all *abayoh* do this.

One cherry-sized blue glass bead or three opaque black glass beads (depending on the case) are tied to the patient's wrist before the ceremony starts. "These beads show that he is my patient," K.K. Peteran says. "The spirits will recognize him by the beads, and know whose patient he is." He points to a government officer who wears the standard name tag: "The beads are like a government officer's badge! People respect the master he serves." Beads serve to appease the more irascible spirits who may resent being called up: "They say, 'Why do you call us all the time? Who are you, anyway? What's in it for us?' Well, the beads are food for the spirits. We also put beads among the offerings and gifts which are laid out for their refreshment." After the healing ceremony is completed, the patient continues to wear the beads for three to seven days, then they may be taken off as the *abayoh* directs.

K.K. Peteran got most of his beads from his grandfather, who was an exceptionally powerful healer. His father, also an *abayoh*, added more beads to the string; K.K. Peteran in turn affixed a few items. The villagers consider Peteran as his grandfather's successor and heir to some of the elder's power.

K.K. Peteran's heirloom necklace consists of mixed beads, strung in no apparent order (Pl. VC bottom). While the majority are small polychromes of European origin, there are a few larger monochromes and recognized Orang Ulu value beads, including a fine specimen of the Kayan *batang uma*. The French Indochina silver piaster is one of three such coins which the old gentleman gave to his grandsons. A pretty pink shell washed up on Damai Beach near Sarawak's capital Kuching was added to the necklace "because the color is pleasant." It was found while K.K. Peteran was a consultant during the construction and outfitting of the Melanau Tallhouse in Damai Cultural Village. His expertise was sought both on traditional building and furnishings, as well as on how to conduct "tourist shows" of ceremonies in such a way that they would not harm anybody. As a visible token of the trust even the government puts in him, the little

shell was an appropriate addition to a powerful necklace. K.K. Peteran put a tin whistle on the string for a similar reason: he was formerly in charge of the grass airstrip in Mukah, and used to blow this whistle to clear the landing area each time a plane arrived. In its way, this whistle is a symbol of authority, though the healer says he never blows it in connection with healing.

An *abayoh*'s beads may be borrowed by relations qualified to perform the appropriate ceremonies, but they have to be paid for. The usual price is a gold ring or the monetary equivalent. This is necessary for the safety of all parties: "You can't just take beads out anyhow!" Beads have a spirit which is very strong both to protect, and (if not properly appeased) to harm. After my last interview with K.K. Peteran, I asked for permission to photograph his beads. It was politely pointed out (but not by the *abayoh* himself) that a token payment would be required, a *sagu hati*. This is partly as compensation for the owner's trouble, partly for taking the beads out needlessly, and partly to protect the "outsider" who came to talk about and touch them but did not require their actual healing services.

Protection and minor healing can be performed without an *abayoh*. Any woman—mother, midwife, or grandmother—may tie a string of *tengang* fiber around a baby's wrist to check that the infant is gaining weight and size; it is loosened and re-knotted as the child grows; if necessary a new bit of string is added. This string may have a bead tied to it, though this is not invariably done. A lot depends on the mother (and grandmother) of the infant. Excessive drooling may be cured by putting a necklace of white beads on a baby. Some Melanau children wear bead necklaces "for protection" until they are six or seven years old. After this age boys would refuse to be seen with beads.

When a baby is brought to its grandparents' house for the first time, the grandmother ties a set of two *tilek* beads and one silver button to the baby's wrist. These beads are getting rare. One elderly lady in Matu was asked how she could keep up supplies for a growing family of grandchildren and great-grandchildren. A quiet chuckle passed around the assembly of aunts and grandmothers. "We ask the parents to return the beads after a day or two, and use them for the next grandchild!"



Figure 4. *Ketua Kampung* Peteran bin Libai at an old burial site; bodies were formerly laid to rest above ground.

Death

After a person has passed away, immediate family members put a few *manik tilek* on their wrists. Then the body is washed by pouring water over it from antique plates; this last office should be performed by close relatives. After washing, the body is laid out. The chin is tied into a seemly position with a string of small beads. Mourners and helpers note (and remember) if this string was long enough to pass twice or even three times around the head, or only once. The “yellow peanut” is preferred for this purpose, but other common beads, including monochrome glass “seed” beads, can be used.

Beads of the *manik tilek* type, not necessarily the very good ones, are tied to the wrist of the corpse. After the deceased has stiffened and is dressed, the string of beads holding the chin is taken off and laid on the pillow. Antique plates are placed under the body’s neck, hands, knees, and heels, depending on local custom and the family’s ability to furnish such valuables. Similarly, the string of beads may be laid in the coffin and buried as “passage money” to the underworld (Morris 1997:109), laid beside the coffin but put aside after the wake, or laid on the coffin in its final resting place. The last option relates to the time

when the Melanau deposited their dead above ground, usually on platform-like structures (Fig. 4), at some distance from the village. No villager would have dared to remove any of the valuables from these repositories, not even long after the bodies had crumbled to dust. When earth burial became the accepted norm, many Melanau families still went to the trouble of erecting a hut over the grave where the necessary gifts could be deposited.

In the case of a high-ranking woman, particularly if she had no children, her blue wedding beads may be put on her wrist. If she specifically asked to be buried in her bead tunic, or with *manik tilek*, the family will respect her wish. A framework may be erected over the body where it lies in state, decorated with beads and sago leaf plaitings. The leaf decorations are taken to the cemetery, but the beads are put away for future use. The generally stated reason for burying the dead without traditional provisions is the danger of tomb robbery. Christians and Muslims also state that the “passage money” of beads, to be handed to a “heathen deity” at the gate of the pagan paradise, is not needed by members of their faiths.

While the body is still in the house, family members have *manik tilek* tied to their wrists; this

custom is observed, sometimes surreptitiously, by many Muslims and Christians. The beads are kept on until after the funeral party has returned from the graveyard, then the family has to take a bath in the river. According to Morris, in some areas this is an occasion for dirt-smearing and horseplay of a kind not usually seen among the Melanau (Morris 1997:131-132). In some areas beads are only put on for the ritual bath; the ladies in Dalat stress that these beads must be from the family's own store, or borrowed from very close relatives.

In Matu, bereaved family members wore an opaque black glass bead decorated with a red-and-white zigzag on a string while the body was still in the house (2-4 days, to give the chief mourners time to get there if they were absent from the village). A bird shape, *manok siau*, was plaited of palm leaves. Friends held the leaf bird and pretended to "peck" the mourners' beads with it. The bird, having been sufficiently "fed" on a valuable old bead, was then placed on the new grave, or discarded in the cemetery. This bird protected the departed from bad graveyard spirits which might disturb his rest and haunt his former abode and next-of-kin. A widow or widower was considered to be at particular risk, and was, therefore, subject to restrictions and taboos for a set period of time. The real danger appears not to be from the spirit of the departed (who was, after all, a beloved family member) but from a tribe of evil graveyard spirits which haunt the place, and menace not only the living who invade their space, but also the (souls of the?) newly buried or deposited dead.

The time between death and burial is fraught with ritual danger and taboos which have to be washed away in the prescribed manner. Madam Mary Sibew of Medong (1998:pers. comm.) relates:

After my grandfather's funeral, the mourners returned to the house. Then they put on *bomoh* beads [i.e., large blue-black glass beads] and took a bath in the river, with all their clothes on. We all poured water over ourselves with antique plates. After this, the beads and the plates were kept in a special sago leaf basket, called *jahai*.

This is a basket with four reinforced corners, no lid, and designs worked into the sides, generally used for storing ritual objects.

After a death, an elder or an *abayoh* could advise the bereaved family to continue wearing the blue beads for the period of mourning (40 days for a parent). The mourners had to wear black clothing without jewelry other than the blue beads. A widow in particular wasn't allowed to dress her hair smartly lest she be suspected of trying to attract men. Men wore black armbands in mourning, a custom probably picked up from the Chinese or the Europeans. During the period of mourning, people couldn't go to their farms or to sea. Neither were they allowed to make music or attend parties.

Some aspects of the old culture have slipped into today's Melanau Muslim and Christian funerary rites. The religious authorities are on the whole tolerant, only objecting if the "heathen practices" get too ostentatious. The coffin of a dear friend and distinguished bead expert, Harriet Brodie of Mukah, was carried through the streets under a canopy of umbrellas in 1998. This structure was left on the church porch during the requiem mass, but was later reassembled over the grave. "*Adat is adat, religion is religion*," an authority on Melanau traditional law says to that. "There's no reason why they should disagree. Just don't mix the two!" (Madam Rose Laga of Kampung Tellian Tengah 1998:pers. comm.)

Occasionally, building or agricultural activity uncovers beads and ceramics in the ground. If the digger does not know where these things are from (i.e., a burial so old that no trace remains), and if his soul is strong enough to take the risk, he may keep them. Today, the fear of the unknown is driven out by the obvious commercial value of "antique finds." Melanau elders lament the fact that unscrupulous persons systematically plunder and even excavate old grave sites in the jungle—mores and manners are changing!

WEDDING BEADS

The customary laws or *adat* from different Melanau areas show considerable variety. All agree, however, on a rank system based on *picul* (weight) valuations, which has to be observed particularly during wedding and funeral ceremonies. Bride wealth was formerly reckoned in brass cannon of the appropriate weight, though nobody remembers having

seen such payments actually made in kind. An old Brunei cannon may indeed form part of a dowry, but the normal thing is to present other valuables, or money. In 1900, one *picul* was fixed at 25 Sarawak dollars.

Besides regulating the details of engagement and marriage gifts, a person's *picul*-status conferred rank and power in the old days. A high-ranking person could commandeer the services of the lower classes (not just his slaves) to help with tasks like building a boat or a house. The people feared to disobey him openly because of his rank, considered to be under supernatural protection. As recently as the 1950s, an aristocrat in Mukah could punish offences against tradition (excavating and selling antique ceramics found at a building site) by fining people he caught in the act.

Rank was normally acquired through birth. A 9-*picul* girl should marry a man of equivalent standing. If she married "down," her children would normally acquire their father's status. In some cases, however, it was possible for a lower-ranking but ambitious and wealthy man to "buy" himself, or at least his children, into his bride's level by making a higher dowry payment. Much depended on the families involved, and the headmen and elders, to sanction such proceedings; society accepted but never completely forgot them. Even in Muslim areas like Daro or Matu, where rank is hardly regarded today, people know very well who was "truly 9 *picul*" in the past and who wasn't, or who descends from the very select 15-*picul* clan of the lower Rejang.

Besides the symbolic cannon, engagement and bridal ceremonies and gifts were elaborately prescribed. There could be much haggling over the actual value of gifts—how much cash for one *picul*? How much for one *amas* (a unit of gold)? The Native Customary Laws Council of Sarawak has recently published a summary of betrothal and wedding gifts (Bonadventure Hamdan 1998:Tables A-F). Opinions vary, however, and an elder from the same village as the report's author queried three of the listed items and added one which he described as "very important."

It is not intended to describe a Melanau wedding ceremony here in full (for this, see Morris 1997:87-104), but to look at the essential wedding beads. These are listed by Bonadventure Hamdan (1998), mentioned by every person I interviewed, and

described by earlier writers. Among the upper classes, beads of a carefully prescribed kind and in the appropriate number had to be tied to the bride's wrist by her mother-in-law upon first entering her new husband's home. This may be done on the doorstep, after the bride has ascended the stairs and has had her feet washed in antique celadon bowls on every step. It could be done at the bottom of the steps, or (in a longhouse) in the doorway of the bridegroom's family rooms, before or after the mother-in-law has put a drop of oil from a celadon bowl on the bride's forehead. Even in Matu, some elderly ladies insist on bringing the "wedding beads" out of some bottom drawer and placing them on the young woman's wrist. The correct number is no longer an issue in this Muslim community; the protection offered by the beads is.

W.S.B. Buck (1933:164-165) observed in Oya in 1929, that beads were attached to the bride's wrist *after* she had stayed for three days with her new husband's family and was about to visit her own. The beads and other gifts were then kept by her mother, and would eventually descend to her children.

If the right beads are not available, money might be accepted as a substitute (Bonadventure Hamdan bin Buyun 1998:pers. comm.), but many families (read: grandmothers) insist on beads. It is generally known in a village who has beads; they can be borrowed for a wedding ceremony against a token payment (i.e., RM 5.- or 10.-) to "appease their spirits."

In a traditional ceremony, the number of wedding beads has to correspond to the bride's *picul*-status, or—if she is marrying upwards—the groom's and thus her new family's status. According to Hamdan's (1998) list, a 9-*picul* bride requires 9 *manik kahet* and 7 *manik tilek*; he also lists the numbers for 7 and 5 *picul*. This prescription was queried by other elders in Mukah; one stated that "*Kahat* and *tilek* beads are of no use to lower-ranking people, because only 9 *picul* and 7 *picul* need beads as wedding tokens!"

The wedding beads may be threaded on a string and tied to the bride's wrist, but (especially in Mukah) this is not enough. There, the beads are tied to a brass bangle, together with a chip of a broken *kwali* (large iron cooking pan) wrapped in black cloth; this bangle is put on the bride's wrist.

A traditionally dressed Melanau bride wears a silver or silver-gilt head comb (Pl. VA). This could be

decorated with small beads though most informants agree that this *naga nikah* or *naga uling* (wedding dragon) is "not the fashion nowadays." Another style no longer seen is a beaded headband, resembling that worn by some of the Central Borneo people, and possibly one of the clues to the Melanau's origin.

The bride also wears a string of old beads around her neck, with a filigree silver box on it, and a silver belt buckle with or without the matching belt. This bead necklace, however, is "for decoration" and to show that the family has such ornaments.

The wedding beads proper—blue glass and brown onyx—are for protection. A young girl, entering into a new life as a wife and eventually mother, needs the strength the blue beads will give to her spirit. She has left her mother's tutelage; her mother-in-law offers symbolic shelter and welcome by placing powerful beads on her hands.

These wedding beads have to be worn for three nights and three days. During this time the bridal couple may not leave the house, and are under numerous taboos: they may not nap in the daytime, they may not scratch themselves except with the rib of a coconut frond, and so on. On the third day "the mosquito net is opened" and the taboos are at an end.

In the old days, a resin candle was kept burning in the bridal chamber for the first three nights, guarded by an old woman. This meant the couple could converse and get to know each other (or sleep) in the partial privacy of the mosquito net, but the marriage was not consummated. If the bride decided, before or on the third day, that she didn't wish to get married to this man after all, she could go back to live with her parents. The union was "annulled" and her status was that of a woman never married, not a *divorcée*.

BEAD ORIGINS

Wedding beads are totally unlike the dainty artifacts of Venice and Amsterdam otherwise favored by the Melanau. The white-banded onyx beads and their glass imitations may be in a good state of preservation, or chipped and worn. Many of the blue glass beads look sand-scratched and worn; visually they resemble beads from the Ban Chiang excavations in northern Thailand to a remarkable degree. Their

origin cannot, however, be verified without chemical analysis.

How old are Melanau wedding beads? A bead found in an undisturbed site, a grave for instance, may be dated by association with other recovered articles. This fixes the time when the bead was deposited, but *not* the time when it was made. It could have been traded up and down the Malacca Straits and the Insulindies for a few hundred years before that. It could have remained in the possession of one family for generations before it was laid to rest with a respected elder.

Beads collected in the field are almost impossible to date. Family histories may fix a bead at "ten generations," but is one generation to be considered twenty years or fourteen? In an orally related family history, ten *generations* may actually mean ten *owners*. It is necessary to know whether the bead changed hands after each owner's death (70 years), or whether it was handed over by a fond parent to the first child of the family who got married (18-20 years).

Trade within the land mass of Southeast Asia and from island to island has been going on since people set foot here. Few Borneo tribes have a recognized "trader" but few Borneo tribesmen have not gone on at least one trading trip. Young men in particular like traveling about, taking up work here and there, and returning laden with treasure: jars, cannon, gongs... and what commodity is more portable than beads?

Where do the Melanau think their beads came from? Generally, this was not considered a very interesting point by my informants: "The beads are here, they're ours—what else is there to worry about?", or "Beads used to be bought from shopkeepers and traders, 'long ago'." Ladies refused to be drawn on this question, but if pressed, a man would say "100 years ago;" i.e., beyond anybody's personal memory.

One community elder in Kampung Seka'an, Matu, was more forthcoming:

Beads always come from outside, from far-away countries. Our ancestors went trading as far as Brunei [about 300 km], Selat [Singapore], Sambas [West Borneo], they bartered other items for beads. Some of the sago trade was conducted in beads, brass, and similar items. Brass hawks' bells from Brunei are very popular, they were traded together with beads. *Hajis* [pil-

grims] brought beads back from Meccah, especially the banded agate which is still available there today. One type of banded agate has stripes of gold inlay instead of the white bands, these are very potent beads, and were made by *jinn* [spirits], my friend Hj. Ismail has got one (Penghulu Hj. Wasli bin Taha 1998:pers. comm.).

Beads were always prestige or value articles; they were not used for bartering inside the community. Pilgrims to Mecca still bring back bead rosaries (onyx, carnelian, jasper, and other semiprecious stones; lapis lazuli is very popular just at present) and necklaces for female relatives. Such items are not for bartering or reselling, but as mementoes of a very important event in a Muslim's life.

K.K. Peteran says that "you can tell old beads from new ones, the old ones have bigger holes. In the old days, *tali tengeng* (*tengeng*) was used to string beads, this cannot be made into a thin thread because it would be too weak. *Tengeng* is the root fiber of a plant, people used to cultivate it; it's stripped, then beaten to make it pliable." Other informants claim *tengeng* is the stem of the creeper; I have seen the twisted string but not the plant. This is the same fiber that is used to make the wristlet intended to gauge a baby's growth.

CONCLUSION

What is the future of Melanau beads? Their value as necessary protective or ritual objects is practically nil today; people sell old beads to raise money long before they sell other valuables. The commercial value of beads, however, is constantly rising. More than one informant states ruefully that "my mother sold a string of beads for just 20 dollars in 1950, today it would be worth RM 500.-!" (Harriet Brodie 1996:pers. comm.)

"People thought beads weren't very important. They sold beads very cheaply to collectors who came to the village, or they took them to an antique shop in Sibu that was known to buy such items. Sometimes they gave them away to anybody who asked," said one old lady from Sok Matu, adding that she feels sad that all these old things have gone, and will never come back. Some elderly Melanau, especially those living in the villages, fear that a wave of new things is threatening to overwhelm their old culture.

At Matu, a man offered us some beads for sale: a string of badly worn small polychromes, including some monochrome yellow "peanut" beads; a string of two mauve and one blue hexagonally faceted glass spindles; and three opaque blue glass barrels/spheres, and transparent amber and white glass spheres. According to the seller, these beads were "found in the ground" at known sites of old settlements, platform burials, or cemeteries, but he was not keen to give exact details. My assistant, Diana Rose, though a keen student of her people's culture and a collector of Melanau artifacts, declined the proffer of very worn-looking *manik tilek* "because they're beads of the dead."

It was mentioned in Sok Matu that children playing under the house occasionally find beads, or ceramic sherds. My visit may have stimulated an interest in beads to the extent that all the boys are digging for treasure in the soft mud under their longhouse now!

Beads are kept, and used for traditional purposes (like weddings) in some culturally aware families. Melanau who live in towns are aware of a new "ethnic chic" which enables them to wear grandmother's jewelry with modern clothing (Pl. VD). This is a *young* people's fashion, encouraging for the future of beads. In the villages, however, beads tend to be regarded as "something grandmothers keep," a magical resource that might be resorted to in moments of stress.

Traditional glass "seed" beadwork fares better. The large conical palm-leaf hat formerly worn outdoors was usually decorated with colored or cut-out leaves only, but included a fringe of beads around the edge for holiday wear. Such hats are made again for use at traditional festivals which, after a few decades of neglect, are actively fostered today. At the *kaul* sea-blessing festival, young men kitted out in the sober black Melanau suit and maroon sarong wear their elders' beads without any ritual intent, just for decoration. Even new seed-bead necklaces are worn on this occasion.

A smaller, woven-bamboo version of the hat is still made in the area of Matu. It is known as the *seraong Sambas* (after the west Borneo Sultanate of Sambas from where the style originates). This hat is decorated with small motifs of seed-bead embroidery, and much sought after by handicraft and souvenir shops in Sibu and Kuching.

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A HISTORY OF GEM BEADMAKING IN IDAR-OBERSTEIN

Si Frazier, Ann Frazier, and Glenn Lehrer

Located at the southwestern edge of Germany, Idar-Oberstein is the historic stone-cutting center of Europe. The origins of the industry go back at least 500 years. The industry was originally based on local deposits of agate, jasper, rock crystal, and amethyst but beginning in the 19th century, all kinds of rough gemstones began to be imported from around the world. The industry grew very rapidly from the middle of the 19th century. A great deal of this success was based on the manufacture of agate beads ("African money") for export to Africa and the Middle East. This article not only discusses the history of the industry, but also provides in-depth information concerning the techniques and tools used in beadmaking and drilling.

INTRODUCTION

Idar-Oberstein is a small town of roughly 50,000 inhabitants in a narrow, picturesque valley in the Hunsrück Mountains on the very western edge of Germany. It is located in the state of Rheinland-Pfalz, about 110 km southwest of Frankfurt am Main.

Idar and Oberstein were originally two separate towns, each conducting its own unique business in the gem and jewelry industries. Idar was the gem cutting center and Oberstein was known for its jewelry manufacturing. Oberstein has long been only one of many jewelry-manufacturing centers in Europe, but Idar has had few rivals in the gem-cutting field. In 1933, Hitler consolidated the two towns into one. The gem-cutting region of Idar-Oberstein is now made up of the city itself and many small hamlets that dot the surrounding hills.

Idar-Oberstein is widely recognized within the gemstone industry as the most significant European cutting center for gemstones other than diamonds. Records show that gem cutting in the general region dates back to the 14th century (Wild 1998). In fact, the city officially celebrated the 500th year of the

gemstone industry in Idar-Oberstein in 1997. Its history is almost certainly older than that, but there is a paucity of records due to the extensive destruction that took place in the region during various wars and upheavals. Destruction of property and lives was especially severe during the 30 Years War (1618-1648) when the population of the area was reduced to one-third of the pre-war figure.

The depopulation was so severe that the local dukes imported colonists from Switzerland and other places. The nearly 100 years between the beginning of the 30 Years War and the end of the War of the Spanish Succession (1714) saw a seemingly endless series of wars affecting the general area of Idar-Oberstein (Brandt 1980:36-40). As various armies went to and fro through the region, what they could not steal and haul away, they usually burned. The reason for the wholesale burning of villages was because the peasants and townspeople usually kept what money they had in the form of silver and gold coins which they often hid in the walls of their houses. When a house burned, these caches of coins would melt and the metal could often be recovered from the ashes (Dieter Jerusalem 1996:pers. comm.). It really did not matter if an army coming through the region was friend or foe, the results were the same. The armies of that time basically lived off the land and one of the major rewards of being a soldier was the ability to participate in plunder.

One of the many unfortunate consequences of these terrible wars affects us to this day. Records of all types also fell victim to the ravages of war. This makes the historian's job very difficult, and for our purposes here, presents a difficulty in trying to trace the exact history of the gem industry in Idar-Oberstein.

Virtually unknown to Americans outside the gem business, this region has been one of the major

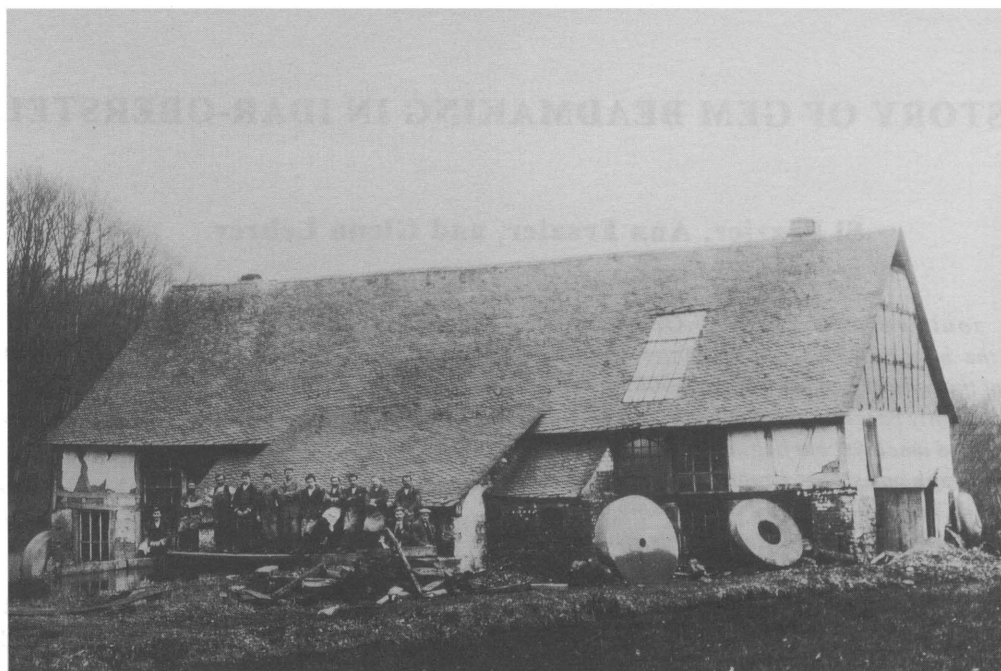


Figure 1. A typical old agate-cutting mill. The large multi-paned windows were a typical part of the highly specialized architecture. Then as now, the agate cutters needed adequate light. Note the spare sandstone cutting wheels leaning against the building (all photos courtesy of Dieter Jerusalem).

gemstone processors and trading centers of the world. Until quite recently, Idar-Oberstein was the colored-gemstone cutting capital of the modern world. However, during the 1970s and 1980s, its dominance slipped as competition from countries with lower labor costs increased. These include Thailand, Brazil, Formosa, Hong Kong, Korea, India, Sri Lanka (Ceylon), and, even more recently, mainland China.

It is easy to understand why Idar-Oberstein has remained so obscure for centuries. Gems have always been traded in secrecy and their sources were often obfuscated in order for people in the trade to protect their interests. The techniques of gem cutting have also been closely guarded, being passed on from father to son, master to apprentice, or have been kept so secret that they went with the gem cutter to his grave.

CUTTING MILLS

For centuries, the *Edelsteinstadt* ("gemstone city," a term frequently used by local boosters and politicians) has been characterized by the unique

agate-cutting mills that thickly lined the small stream (*der Idarbach*) that flows through Idar. They were rather crudely built, half-timbered (*Fachwerk*) buildings with slate roofs and large multi-paned windows (Fig. 1). These provided light for the cutters who were grinding gemstones inside on huge sandstone wheels powered by a large water wheel on one side of the building. The earliest mill for which there is documentary evidence is the now-vanished *Schultheise-Schleife* (literally "the mayor's cutting mill") which dates back to 1531 (Herbst 1978:14). The record notes the selling of rights to one-third of a grinding wheel to Wirich Poller who apparently was the illegitimate son of the local duke. It was common practice for individuals to own the rights to use one half or even smaller fractions of one of the huge wheels. Herbst (1978:14) believes that the transaction in 1531 indicates that the earliest mills must have been erected at least as early as the first two decades of the 16th century.

The oldest cutting mill to have survived into modern times is the *Au-Schleife* which was built in 1603, in what is now downtown Oberstein. It had to be torn down in 1985, to make way for an on-ramp for the



Plate IA. *Jade:* Giant cylindrical bead, Tomb A-1/1, Altun Ha, Belize, ca. A.D. 550; length: 13.2 cm (all photos by D. Pendergast and Photography Department, Royal Ontario Museum, Toronto).

Plate IC. *Jade:* Sawn-slab pendant with figure seated on cushion, Burial E-54/7, Altun Ha, Belize, ca. A.D. 850; height: 8.3 cm.



Plate IB. *Jade:* Objects from Altun Ha, Belize. **Top:** Contorted human-figure pendant, Tomb A-1/1; length: 4.4 cm. **Bottom:** Unusual full-face pendant, Tomb B-4/2; width: 7.1 cm.



Plate ID. *Jade:* Human-figure pendant in "dancing pose," Cache B-4/13, Altun Ha, Belize, ca. A.D. 500-550; height: 10.5 cm.





Plate IIA. *Jade:* Objects from Altun Ha, Belize. **Top:** Jaguar(?) head pendant, Tomb B-4/6, ca. A.D. 650; height: 4.0 cm. **Bottom:** Mythical-animal pendant with both beak and mouth, Tomb A-1/1; width: 4.2 cm.

Plate IIC. *Jade:* Giant plaque pendant with hieroglyphic text on reverse, Tomb B-4/6, Altun Ha, Belize; height: 20.3 cm.



Plate IIB. *Jade:* Deity-head pendant with reverse hollowed out, Tomb A-1/1, Altun Ha, Belize; height: 6.1 cm.

Plate IID. *Imitations:* **Top:** Ancient beads—amazonite, lapis; chalcodony, carnelian, rock crystal; onyx, agate (photo: S. Mays). **Bottom:** Ancient Egyptian glass and faience simulations, and real Afghan lapis (right).





Plate IIIA. Imitations: **Top:** Ancient Egyptian amazonite beads (right) and their faience copies; longest is 1.8 cm. **Bottom:** Ancient Egyptian faience copies (upper row) versus their stone prototypes (except for Egyptian glass bead substituting for real turquoise).

Plate IIIC. Imitations: **Top:** Chinese balustrade bead versus porcelain copy with glaze veins (courtesy: Leekan Designs). **Bottom:** Contemporary Chinese jadeite pendant, dyed walrus tusk links and *pi*, and glass *pi* and cabochon (courtesy: M. Liu).

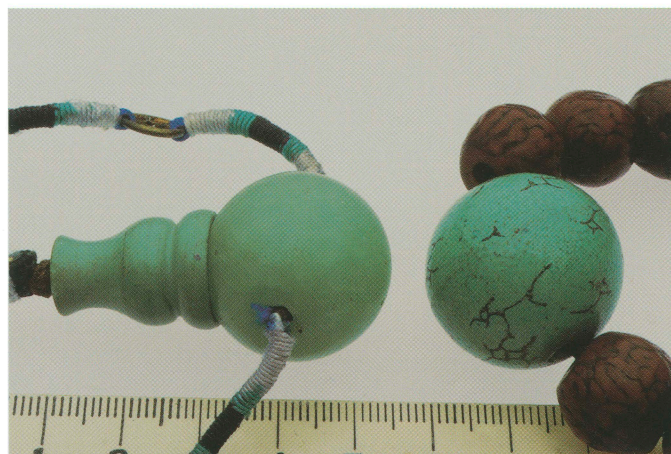


Plate IIIB. Imitations: **Top:** Bead of fossil dinosaur bone (left) versus possible Chinese glass copy, both from Indonesia. **Bottom:** Unusual dZi bead simulations—plastic with metal core, polymer clay, painted aluminium (5.2 cm long) (Art Expo, J. Janes, A. Keeper).

Plate IIID. Imitations: **Top:** Chinese carnelian simulations in glass: a drawn cane bead and two panel beads, ca. 1.5 cm long (courtesy: E.J. Harris). **Bottom:** Chinese glass archers' rings simulating jadeite, other hardstones, and tortoise shell (courtesy: J.L. Malter).

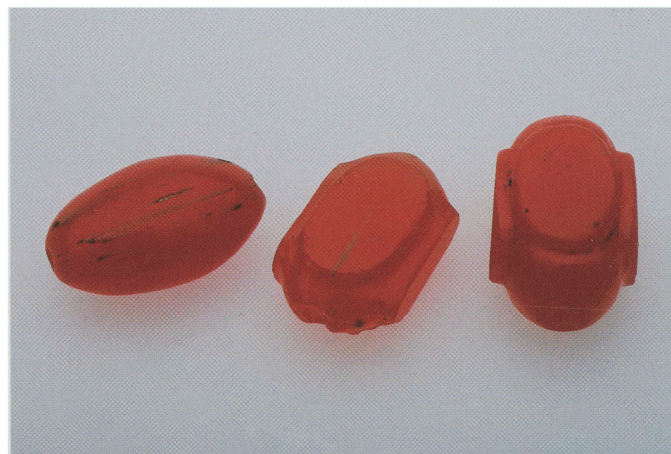




Plate IVA. Imitations: **Top:** Real malachite beads (right) versus Japanese glass copies (J. Callender). **Bottom:** Silicon rubber copies of agate beads (left); agate beads and molded Czech glass imitations; and ancient chalcedony beads (right) (A. Maurice Imports).

Plate IVC. Imitations: **Top:** Faceted carnelian bead from Germany (upper left) and Indian carnelian beads (lower left) and their Czech glass counterparts (L. Wataghani). **Bottom:** Czech molded-glass drop pendants (top) versus dyed-agate ones from Germany (S.M. Cohn).

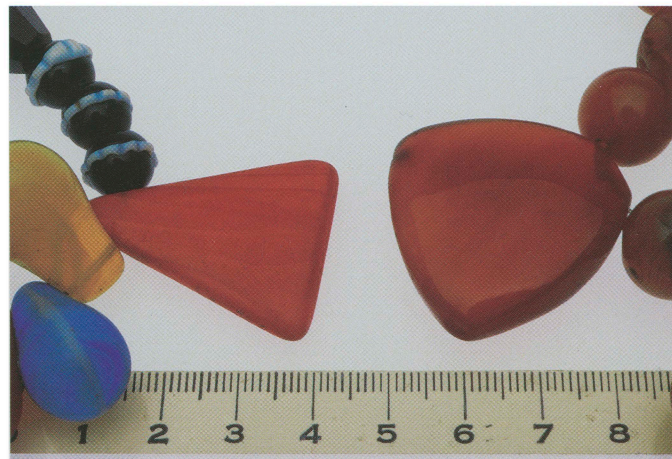
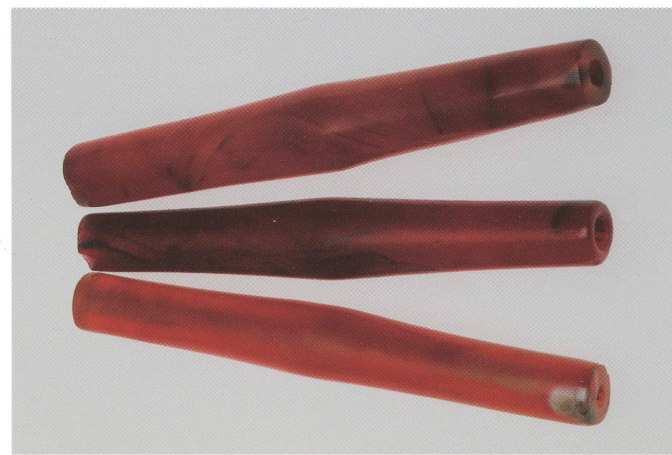


Plate IVB. Imitations: **Top:** Granite beads from Mali, mixed with European and African-made copies (courtesy: Picard Collection). **Bottom:** Czech molded-glass pendant (left) versus possible Indian carnelian prototype (courtesy: R. Okrent, R. Pecker).

Plate IVD. Imitations: **Top:** Replicas of long bicone beads made in India, versus an ancient specimen (6.7 cm long) in the center (courtesy: J.M. Kenoyer and J. LaFortune). **Bottom:** Polymer simulations of jade, lapis, turquoise, coral, and other hardstone by Tory Hughes.



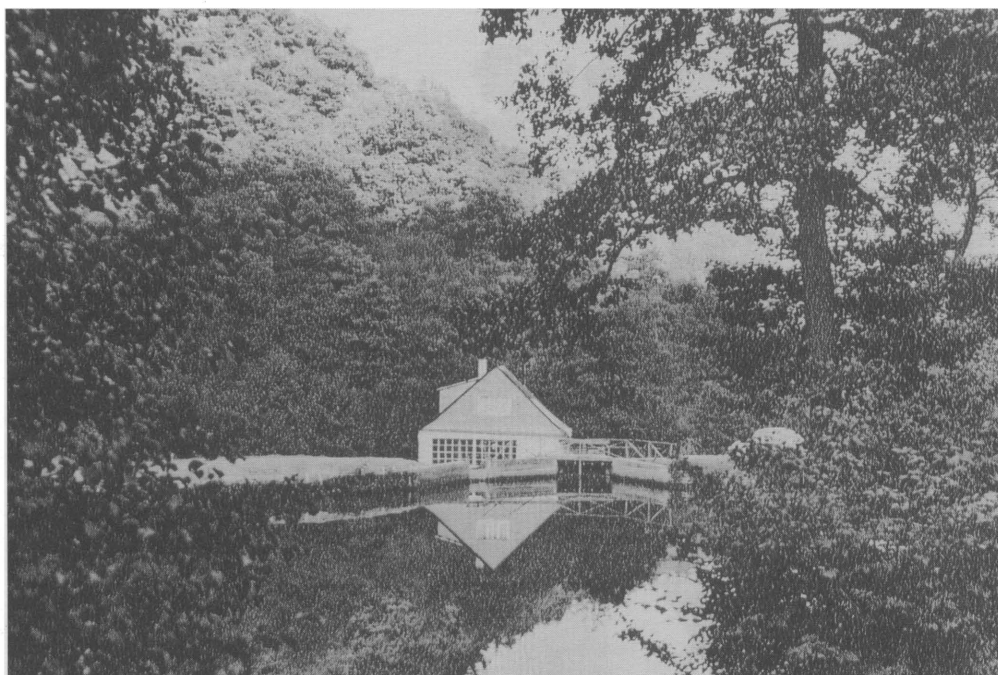


Figure 2. This is the only cutting mill still in operation in the Idar valley. After falling into disrepair, it was purchased by the city of Idar-Oberstein in 1953, renovated, and put into working condition by a group of public-spirited citizens. Today it sits in a lovely small park and is operated as a tourist attraction to show visitors how agate was cut in times gone by. It is now known as the *Weiher-Schleife*. It was originally built as the *Kallweisweiher-Schleife* in 1754.

new freeway that was built to bypass the medieval heart of the city. This caused a great outcry and the building was dismantled with care with the intention of reassembling it a short distance away in a small history park. So far this has not come to pass.

Most of the mills were abandoned and fell into disrepair during the 1930s. Although the gem-cutting industry expanded during the first part of the 20th century, especially in the 1920s, electricity had made water power obsolete. Some mills were converted to dwellings or other purposes, but most just disappeared. One remains as a tourist attraction on the northern edge of Idar (Fig. 2).

During a visit to Idar-Oberstein in 1774, Cosimo Alessandro Collini, a Florentine polymath who was a former secretary to Voltaire and the director of the Cabinet of Natural History in Mannheim, found 26 agate-cutting mills employing 130 persons in operation on the Idarbach (Collini 1776:231). What he en-

countered was a nearly unique and very-well developed and sophisticated quartz-gem cutting industry in full bloom. Although Collini does not say as much, it is doubtful that there was a more sophisticated and technologically advanced gem-cutting industry elsewhere in the world. Collini, who was quite knowledgeable about gems and minerals, described exactly how gem cutting was carried out in the mills and published a widely reproduced, detailed drawing of the interior of a typical one (Fig. 3).

A smaller but similar industry had developed in the vicinity of Freiburg im Breisgau in the upper part of the Rhinegraben, probably even earlier than the one along the Idarbach, but it never grew anywhere near as large or as important as the one in Idar. The cutting technology at both locations consisted of a technically sophisticated water-wheel driven combination of gears, belts, and shafts that turned sandstone wheels for grinding and wooden cylinders for polishing.

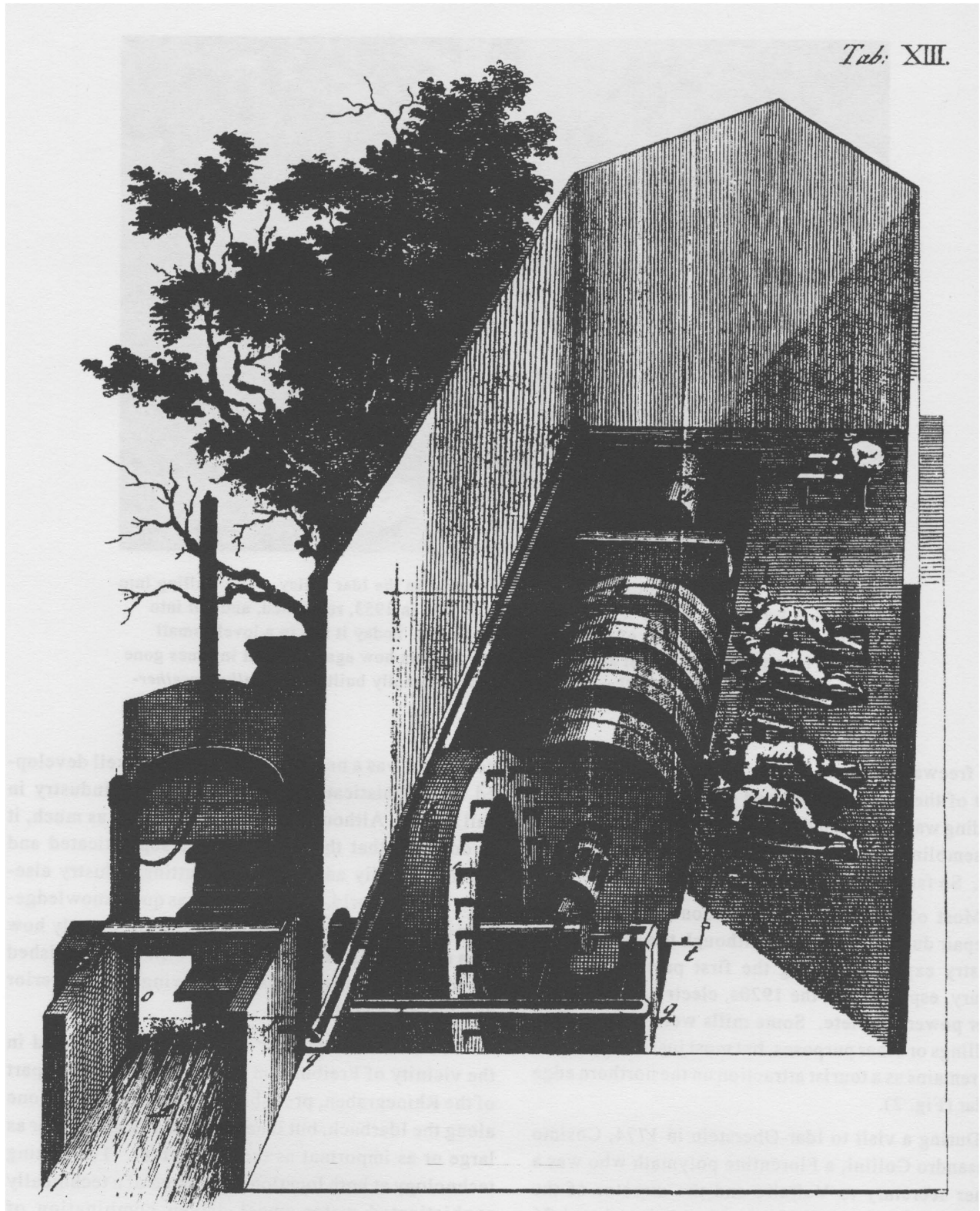


Figure 3. The interior of an Idar agate-cutting mill as sketched by C.A. Collini (1776:Pl. XIII).



Figure 4. An agate auction in Idar. This was the way most Brazilian agate was sold there until quite recently. The large nodules were of gray agate suitable for staining. Small chips were knocked off well beforehand and subjected to the ordinary staining process, usually using red, green, and blue dyes. In this way the cutter bidding on a particular lot would know how suitable the agate was for his purposes.

SOURCES OF CUTTING MATERIAL

As far as we know, at the time of Collini's visit, the Idar industry worked exclusively on local agates, jaspers, and, perhaps to a minor degree, on crystalline quartz from the surrounding hills and from similar gem occurrences a short distance to the west of Idar-Oberstein. By the turn of the century, there were limited imports of gem materials, such as carnelian, from India. In the 1820s, German emigrants from the Idar-Oberstein region to southern Brazil discovered unbelievably rich deposits of agate in the state of Rio Grande do Sul, and the first shipment was made to Idar in 1834 (Wild 1963:223). The art of staining agate developed between 1813 and about 1860, by which time a whole spectrum of colors had been developed. It was found that certain types of Brazilian agate were eminently suited for staining (Fig. 4). The agate could be turned red, white, blue, green, black, or yellow using inorganic chemicals, colors which would not fade in the harsh sunlight of Africa or the Middle East. The recipes were regarded as highly important trade secrets. Indeed, to this day, there are certain staining

processes about which their practitioners refuse to divulge any details.

The Idar stone-cutting industry bloomed and expanded, reaching a maximum of 56 mills on the Idarbach in the mid-1860s. This averaged one every 165 meters, making it the most intensively used stream in Germany (Herbst 1978:28).

The water-powered mills enabled gems and beads to be cut at minimum cost as long as it was not a drought year. This, coupled with the abundant supplies of Brazilian agate (Fig. 5), enabled Idar to supplant the Cambay region of India as a supplier of agate beads to Africa and the Middle East (Frazier and Frazier 1993, 1994).

It should now be evident that the historical roots of the Idar gem industry do go back very far indeed, but the further back one goes the more difficult it becomes to trace those roots with any degree of certainty. A great deal that has been written about the history of the industry in the German literature has been pure speculation and wishful thinking disguised as fact. Unfortunately, what little has been written in English

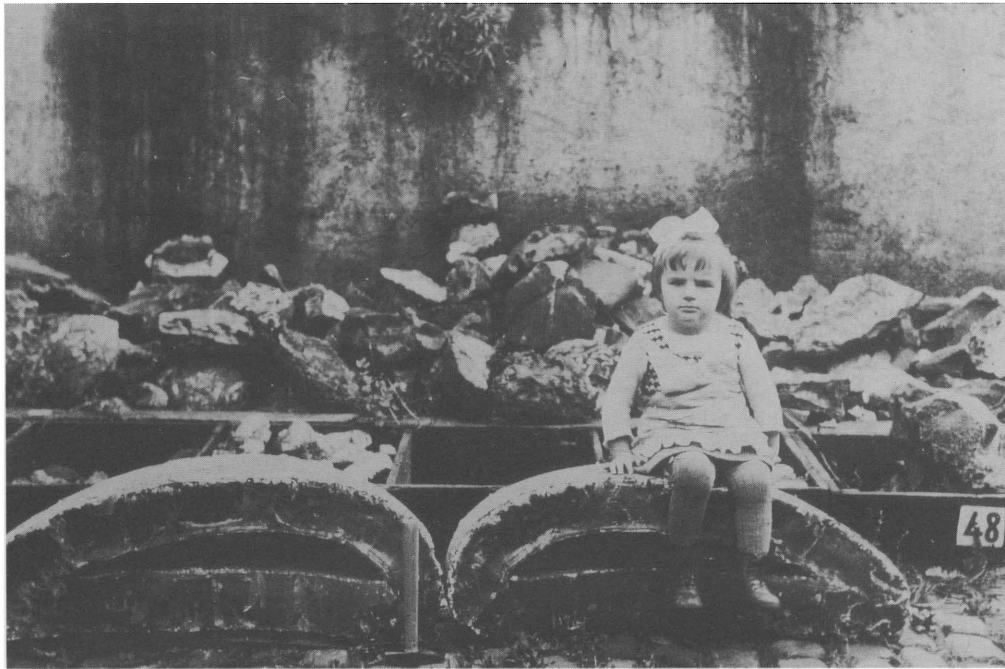


Figure 5. The agate nodules imported from Brazil were enormous by European standards and, indeed, have seldom been exceeded in size any place in the world. A massive geode that has been split in half occupies the foreground.

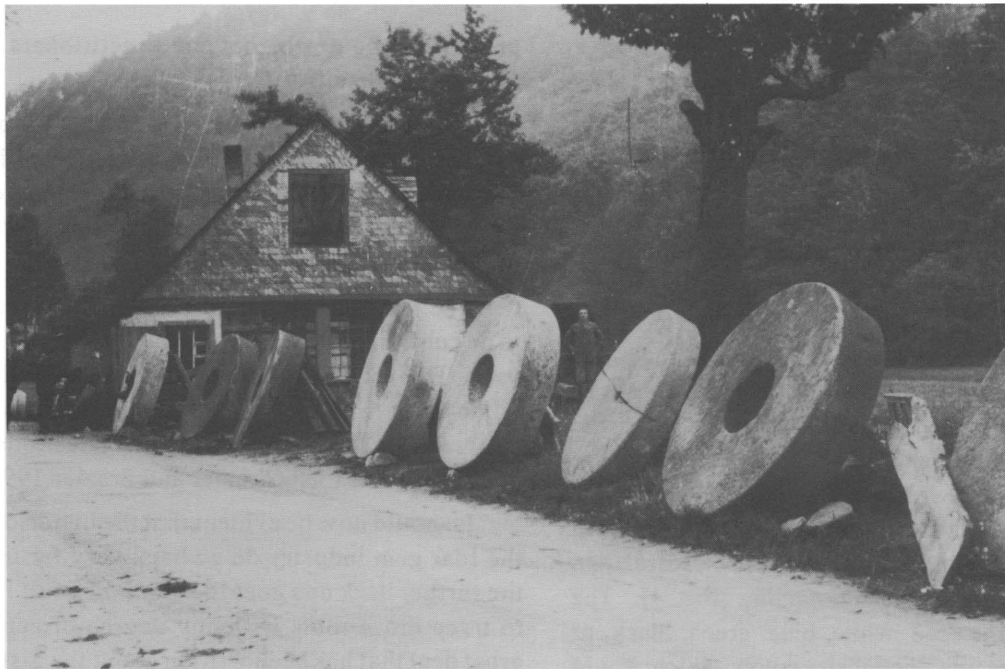


Figure 6. A selection of sandstone wheels for sale around 1900. That these wheels have not been used is evidenced by the lack of grooves in the working face of each wheel.

on the subject has been, almost without exception, based on questionable German sources, naively translated, and published, more often than not, without proper attribution. We have tried to avoid these sources and all those cited herein are believed by us to be careful and objective scholarly works.

THE VERY EARLY HISTORY OF IDAR

The history of Idar dates back to Roman times, and ruins still stand in Oberstein which are nearly a thousand years old. Records reveal that an agate-cutters guild existed in the 15th century in the Saarland which lies a short distance to the west of Idar-Oberstein (Wild 1991:41). Many of the people of Idar would like to believe that gem cutting in the region dates back to the Roman period. While there is no substantial evidence for this, certain facts can lead one to theorize about the Romans and their possible involvement with gemstones in the region.

An old Roman settlement called Hidera was located above the valley where Idar now stands. It was here that an engraved cameo was found 6.7 m below ground level in a sewer excavation. Experts on Roman gem engraving at the University of Bonn have concluded that it is unquestionably of Roman style (Prof. Dr. Hermann Bank 1994:pers. comm.). It is still unknown, however, if it is of local manufacture.

Another interesting fact is that an old Roman road ran very close to the Steinkaulenberg, a hill above Idar where an important agate mine operated for many years (Frazier and Frazier 1988:23 ff.). The road ran from the city of Trier to Frankfurt. In its day, Trier was the Roman capital north of the Alps and, next to Rome, the second most important city in the Roman Empire. However, whether or not the Romans mined agate in the region is still awaiting scientific verification. So, although many Germans would like to trace their local gem industry back to Roman times, there is currently only enough evidence to say that it is an intriguing possibility.

Existing documentary evidence establishes the presence of an important gem-cutting industry in Idar-Oberstein by 1500 (Bank 1997:131). For the next three centuries, the industry grew slowly but steadily. Its success was based on three factors. First, there were

substantial agate and jasper deposits in and near Idar-Oberstein. Contrary to nearly all English-language articles and most German-language reports, these deposits were never exhausted, but merely made uneconomical by the importation of large quantities of inexpensive and abundant Brazilian agate around the middle of the last century (Bank 1984:37). The agate was transported as ballast on sailing ships so the transportation costs were low. Today, the visitor can easily confirm this by visiting the Steinkaulenberg. This old agate mine has been carefully cleaned up and made accessible to the public. Agate nodules, masses of jasper, and large geodes lined with amethyst or smoky quartz crystals encountered during the renovation were left in place in the gallery walls and spectacularly lit to show them off. The result is the nearest thing to the gem mine in Snow White and the Seven Dwarfs that one can possibly visit without Walt Disney's help.

The second factor in Idar-Oberstein's early and continuing success as a gem-cutting center was the presence just to the south of Idar of a type of sandstone that, when fashioned into wheels, was perfect for working quartz-family gems. It was nearly pure quartz sandstone (quartz arenite) with quartz grains of an ideal size and roughness. The degree of compaction and the small amount of clay binder made it too soft for milling flour or sharpening swords, but perfect for lapidary work. To this day, many Idar cutters believe that the local sandstone wheels produce better results on large crystalline quartz objects than any modern formulations of silicon carbide or diamond. Others disagree, of course. The stone for the wheels was quarried near Landstuhl in the Pfalz region. It occurs in a geological formation known as the Rotliegend, a sandstone deposited during the lower Permian period.

The sandstone wheels (Fig. 6) measured up to 2 m in diameter and up to 50 cm in width, and weighed up to about 3,000 kg. Each was wide enough so that two cutters could work on one wheel (Fig. 7). These large wheels were set with a shaft in bearings for turning. Each wheel was driven by elaborate gears, turning at a specific speed, that are all connected to a single bearing shaft on the water wheel. Several large and many small grinding and polishing wheels were also run by means of belts powered by the shaft of the waterwheel.

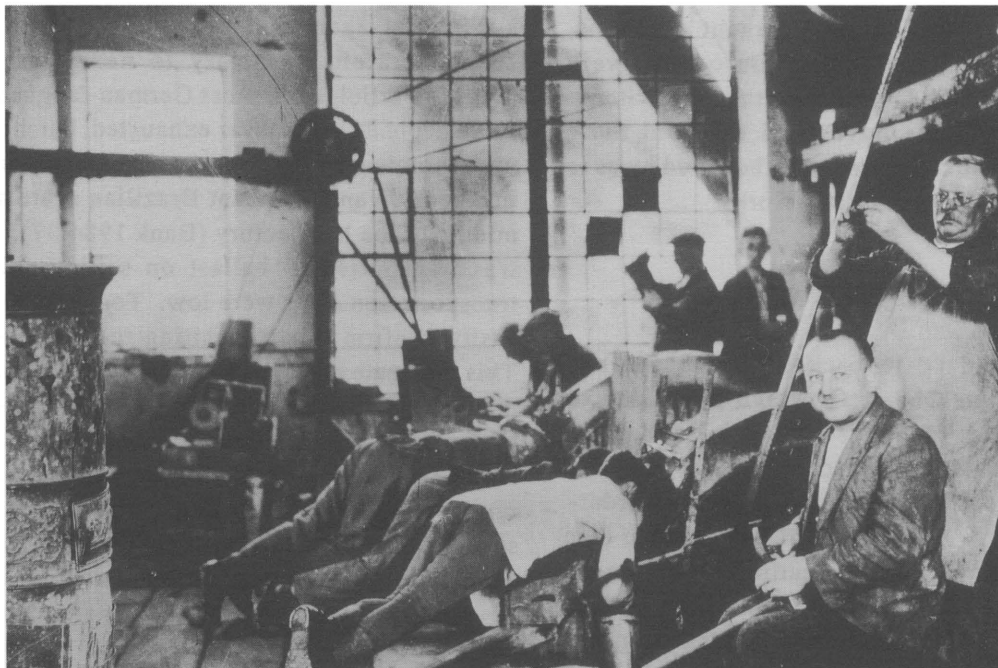


Figure 7. The interior of an agate-cutting mill. The sandstone wheel in the foreground is being shared by two men. The man in the lower right, possibly the owner, is trimming rough gem material to size and shape using a small hammer and a steel rail. This was much cheaper and faster than sawing.



Figure 8. Polishing gems on a beechwood cylinder. Part of the elaborate gear-and-belt system which transferred power from the water wheel to the equipment is visible in the background.

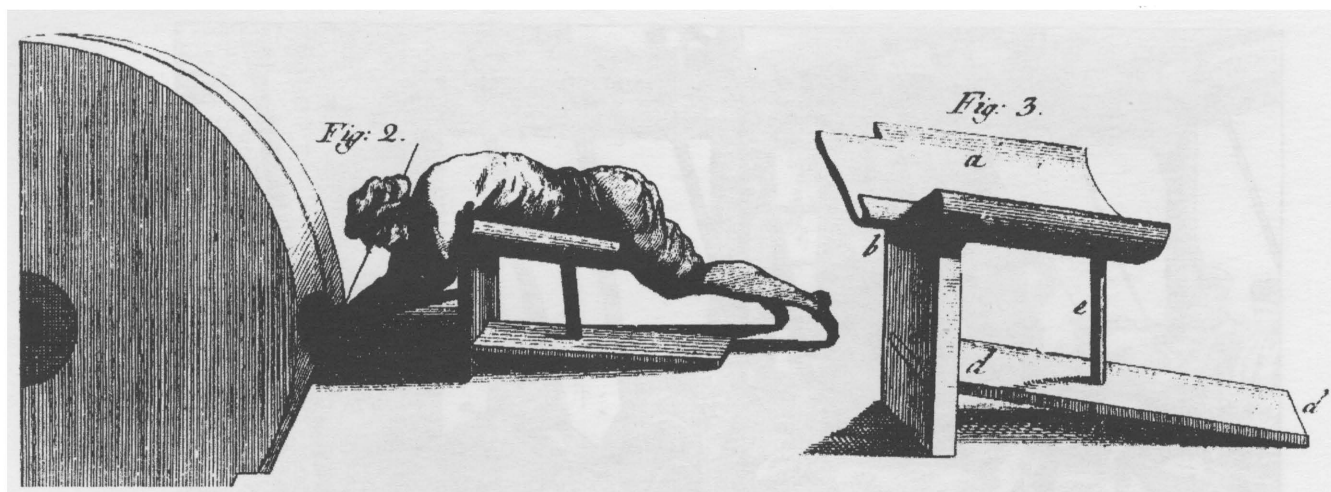


Figure 9. The cutter at work, with a detailed view of the special stool he uses (Collini 1776:Pl. XIV, Figs. 2-3).

The third factor in Idar-Oberstein's success was the negligible cost of the water power. Once the mill was built, the wheels ran at minimal cost.

MAKING BEADS IN IDAR-OBERSTEIN

Bead Cutting

The hand cutting of fine beads as performed today in Idar-Oberstein is very similar to how it was done in centuries past. It is an accepted fact in Idar that if one wants a very fine bead made, then it should be done by the traditional hand methods on a sandstone wheel and not by a bead machine, which has become the common commercial practice.

Since sandstone is relatively soft, the face of the wheels could be carved with various negative shapes. For shaping a bead or sphere, the cutter used a wheel which had a semicircular groove cut into it. He held a cupped wooden implement whose end duplicated the shape of the groove in the wheel. The roughly shaped bead rotated between the wheel and the stick, and all the projections were quickly ground off. The huge inertia of the massive wheels was an important factor in the success of this method. A round agate bead could be formed with great speed and accuracy using this technology as the laws of physics dictate that a bead will become a perfect sphere when turned in this manner. Oval beads were made in the same way by using a wheel with a broad shallow groove, and even bicones were efficiently produced by this method. If

the bead was to be faceted, this was done on the flat part of the wheel, the cutter holding the bead in his hand to form each facet. Because of the nature of the sandstone, beads of agate, jasper, and crystalline quartz came off the wheel with a dull surface that is actually a very good pre-polish. The beads were given their final polish on beechwood cylinders (Fig. 8) using diatomaceous earth from the Schwarzwald (Black Forest) to the south in Baden (Dieter Jerusalem 1993:pers. comm.). The process is amazingly fast when utilized by an experienced cutter, and a good cutter could turn out many, many dozen beads in an hour with great proficiency. Unfortunately, it is a skill that is dying out.

The manner in which the agate cutter worked was unique. He would lie on a wooden bench that had been hollowed out to fit the contours of his chest (Fig. 9). He would then push his feet against a wooden rail nailed to the floor behind him in order to bring his full weight against the wheel (Fig. 10). The power driving the wheel lasted only as long as there was water in the storage pond or water-supply ditch, so the cutter had to work with great speed before the water ran out.

Gemstone cutting in this manner was a very cold, hard, and life-shortening profession. An individual would start his apprenticeship at the age of fourteen while the bones in his chest were still developing. Consequently the chest cavity became deformed. Lying for several hours a day in this position put great strain on the lungs, chest, stomach, and intestines. Being in a very cold, damp environment and inhaling the dust from the wheel on a daily basis was also

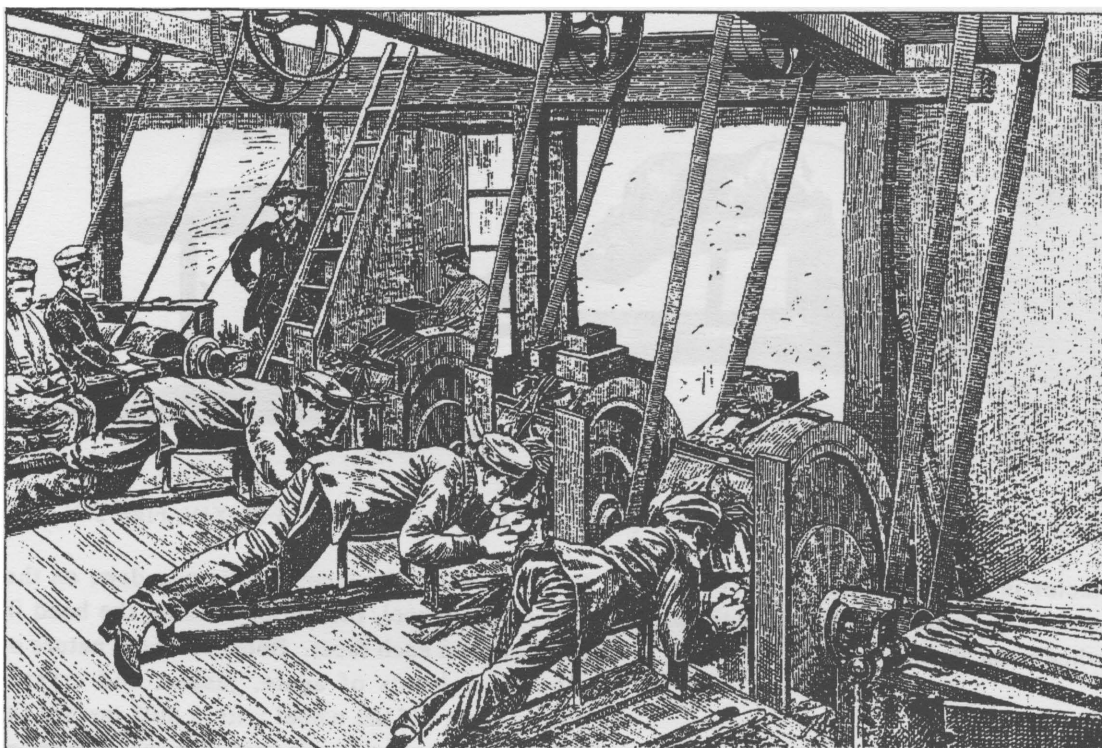


Figure 10. Agate cutters at work in Idar-Oberstein in the late 19th century. The majority of the men are cutting gems on sandstone wheels in the traditional manner. At the far left, a man trims a rough piece of agate with a hammer and a small rail. The person next to him is polishing stones (Hisserich 1894:frontispiece).

deleterious to the cutter's health. Tuberculosis was endemic to the Hunsrück region (Roth 1986:160-170).

Another added risk in cutting was having one of the large wheels explode which meant certain death. A flaw might be hidden in the interior of the stone, causing it to fly to pieces under the immense centrifugal forces generated by the rapidly revolving wheel (Fig. 11). It is a tribute to the skill and knowledge of the quarrymen and the cutters that only a few such accidents have been recorded during the industry's long history.

For all this, the cutter was paid very low wages, usually on a piecework basis. The result was that the average agate cutter did not usually live past the age of about 40.

Drilling

Once the bead was formed, next came the drilling process. This was accomplished for centuries using

the ancient bow method, a technique that can be traced back to ancient Egypt and one that the Germans, being excellent mechanics, refined to a very high level. The process consisted of turning a drill rod charged with abrasive grit back and forth using a bow powered by hand. It was at least as early as the beginning of the 19th century that the use of two diamond chips set in the drill's tip was adopted in Idar, and part of the skill of being a borer was to be able to set the diamonds in the drill rod. The diamonds used were usually carbonados from Brazil.

It is the authors' experience that when one attempts to drill all the way through a bead from one side, the drill rod tends to drift, often leading to a crooked hole. What distinguished Idar beads from those of other localities was the high development of the drilling technique that allowed the production of a straight hole up to 20 cm in length! Hard gemstone beads from other bead production centers generally followed the more usual practice of drilling the hole



Figure 11. A group of cutters with the remains of a cutting wheel that exploded. Such an accident usually resulted in fatalities. The absence of military caps on the workers suggests that this picture was taken before World War I. The death toll on the cutters in that war was much higher than for the population in general since nearly all cutters ended up either in the infantry or the artillery.

from two sides, hoping that the two segments would meet in the middle. These beads usually have a ridge at the point where the two segments meet that can abrade the beading cord. Idar beads generally did not suffer from such problems.

The gemstone driller (*Edelsteinbohrer*) worked at home and generally lived much longer than the agate cutter. During boom times there were as many as 1,000 bead drillers active in Idar-Oberstein (Ruppenthal n.d.:33).

There were two types of hole drillers. The largest number were called *Spitzbohrer*. They drilled holes up to 4 mm in diameter using a steel rod set with two diamonds that were up to 0.5 mm in diameter. The rod was turned by a bow which was about .75 m long and 10 mm thick. The bow cord was wrapped around the rod, and the bow was moved rapidly back and forth with the right hand. A drill press with a long wooden handle (*Schwengel*) that rested in the left armpit of the driller was used to lower or raise the drill by slightly moving the left shoulder (Fig. 12).

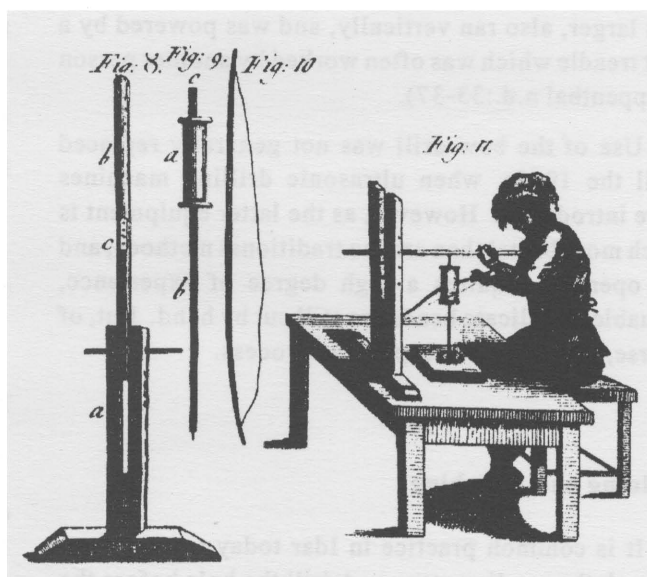


Figure 12. A bow driller at work. His tools, illustrated from left to right, are the drill press, the drill, and the bow (Collini 1776:Pl. XIV, Figs. 8-11).

As a first step in the drilling process, an initial depression was made with a special drill bit called an *Anbohrer*. The worker then switched to the main drill. Round beads were glued into appropriate grooves in an iron plate so that when the drill came through, the area around the hole would not spall. Oval beads and those of other shapes that could not be glued down in this way were held in special wooden clamps. Very long holes were usually drilled from either end. In order to keep the drill perfectly straight, its shaft rotated in a hole in an agate block which had many long straight holes of different sizes drilled through it. By choosing the appropriate size hole for his drill steel to pass through, the driller could minimize the inevitable wobble, thus producing a better and straighter hole. Once drilled, the hole was subsequently smoothed and widened using a larger "white" diamond, thus eliminating irregularities which might abrade the string on which the beads were to be strung.

The other type of driller was called a *Röhrenbohrer* (tube borer). He drilled holes from 4 to 100 mm in diameter using tubular core drills. These were made of brass with small diamonds hammered into the leading edge. The *Röhrenbohrer* kept his work immersed in oil to cool and lubricate it. His apparatus was larger, also ran vertically, and was powered by a foot treadle which was often worked by another person (Ruppenthal n.d.:33-37).

Use of the bow drill was not generally replaced until the 1950s, when ultrasonic drilling machines were introduced. However, as the latter equipment is much more brutal than are the traditional methods, and the operator requires a high degree of experience, valuable or delicate beads are still cut by hand. But, of course, this is a more expensive process.

Staining and Polishing

It is common practice in Idar today to shape, go through the sanding steps and drill the hole before the bead is stained. After the bead is stained it is polished. The cutters believe that polishing reduces the natural porosity of the agate. In some cases, the agate seems to be more brittle after staining. This can be a problem when one is carving something delicate into the stone.

EPILOG

It is estimated that between 1830 and 1980, more than 100 million agate beads were made in Idar-Oberstein and exported to Africa and the Middle East (Frazier and Frazier 1993).

Electricity was introduced to the Idar area between 1900 and 1905, which meant that gem cutting was no longer limited to the creekside. A lapidary shop could be set up anywhere. A farmer living in a village in the surrounding hills could put a lapidary studio in his farm house.

A major bead boom occurred in the 1920s, and Idar bead production reached an all-time high at this time. America was the principal customer, with Great Britain in second place. When the crash of 1929 came, most New York gem dealers went bankrupt and, since long-term credit was the usual practice, many Idar businesses were ruined. In the 1930s, Hitler had all strategic businesses moved away from Germany's borders, with the result that companies involved in optical polishing left Idar. This further forced Idar into a deep depression. By the start of World War II, most of the businesses in Idar were closed. It was not until after 1948, that Idar began to recover and start to prosper once again as a center of gemstone production.

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A BRIEF HISTORY OF DRILLS AND DRILLING

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A microscopic examination of silicone impressions of the perforations of beads, sealstones, and amulets has produced a data base of characteristics that help to define what type of drill was used to make them. This article outlines the various types of drills that have been used from the Palaeolithic period to the present day, and notes what microscopic features characterize each one. Scanning electron micrographs illustrate the minute details that are revealed by the silicone impressions.

INTRODUCTION

Among the first objects to be perforated by ancient humans were shells and teeth (Braidwood 1967). By perforating them, the hunters and gatherers of the Upper Palaeolithic period (ca. 25,000-12,000 B.C.E.) could string and wear these objects which served as amulets. These objects were perforated by means of hand-held lithic borers which preceded clockwise/counterclockwise rotational drilling. Generally made of flint, the borers were pressed against the object to be perforated and then twisted back and forth at low speed and relatively high torque. The method was very effective on soft stone (Mohs' scale 1-3) but ineffective on harder stones.

While it is reasonable to speculate that drilling technology had its roots in the Upper Palaeolithic, it is a matter of record that our knowledge of the early history and development of drills and drilling is woefully incomplete. Other than flint artifacts, tools of wood and metal, particularly drills, have rarely been found in a lapidary context. Consequently, we must seek other sources of information.

In an effort to overcome the relative lack of drills and their components from archaeological contexts, we devised a method for determining the type of drill (i.e., metal, stone, or wood) that had been used to

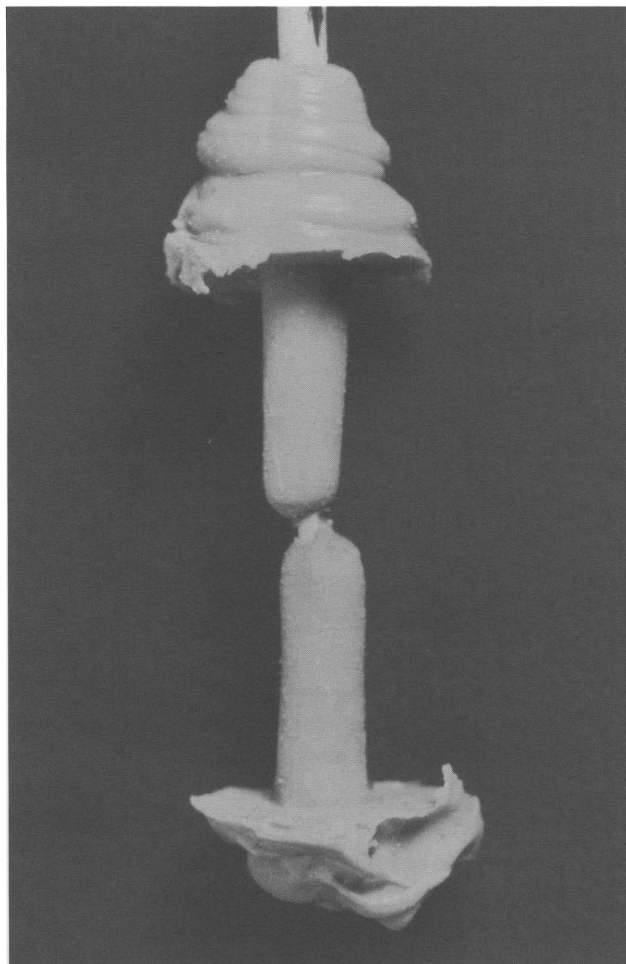


Figure 1. Silicone impression of the parallel-sided perforation of a cylinder seal which was drilled from either end. Consequently, the two segments do not align perfectly. The central constriction necessitated the removal of the impression in two pieces which were then reassembled (all photographs by the authors).

perforate an object by analyzing the drill marks (Gorelick and Gwinnett 1978). The process is an

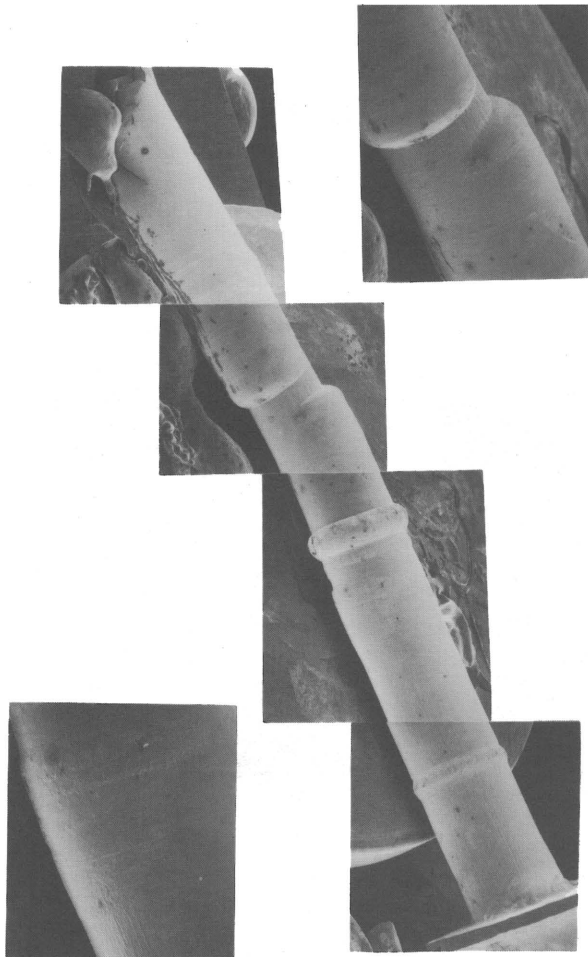


Figure 2. A composite scanning electron micrograph of an impression taken from a cylinder seal reveals a number of features of a drill hole, including its shape.

extension of a method first described by Semenov (1976) and referred to as functional analysis. Semenov studied the wear patterns on ancient tools, reconstructed similar tools and used them in a variety of ways. Whenever a match in the wear pattern occurred, he was able to deduce the use to which the ancient tool had been put.

In our method, we start by making an impression of the drill hole (Fig. 1) using vinyl polysiloxane, a substance sold under the trade name of Reprosil which is produced by Dentsply Caulk of Milford, Delaware. When this material hardens, its surface records every microscopic mark of the perforation and, being pliable, is easily removed from the hole. The casting is then examined using light optical stereomicroscopy and scanning electron microscopy to determine the

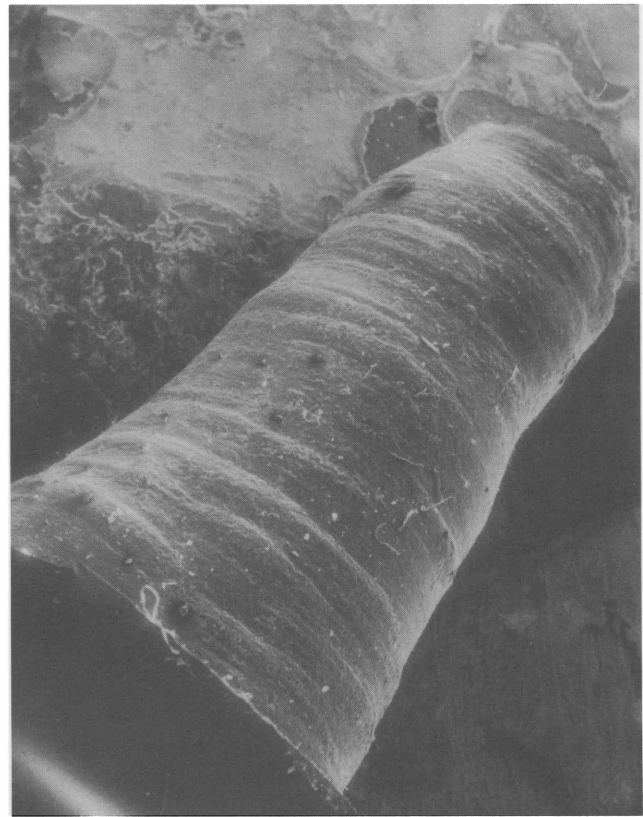


Figure 3. Scanning electron micrograph of an impression showing the sidewall characteristics of a drill hole. Note the concentric grooves of various sizes and depths.

nature of the drill marks. This is followed by experimental duplication of the observed drill marks (abrasions and cutting anomalies) using a variety of drills, abrasives, and lubricants. Three attributes are central to the proper identification of the type of drill that was used: 1) the shape of the drill hole; e.g., tapered or parallel-sided (Fig. 2); 2) the side-wall pattern; e.g., concentric grooves (Fig. 3); and 3) the marks, if any, left at the leading edge of drilling; e.g., a raised central elevation or a pattern of conchoidal fractures (Figs. 4-5).

A CHRONOLOGY OF DRILL USE

The Epipalaeolithic Period

Our research began with objects from the Mesolithic Period, which began approximately 12,000 B.C.E. in western and southern Asia. In the early part

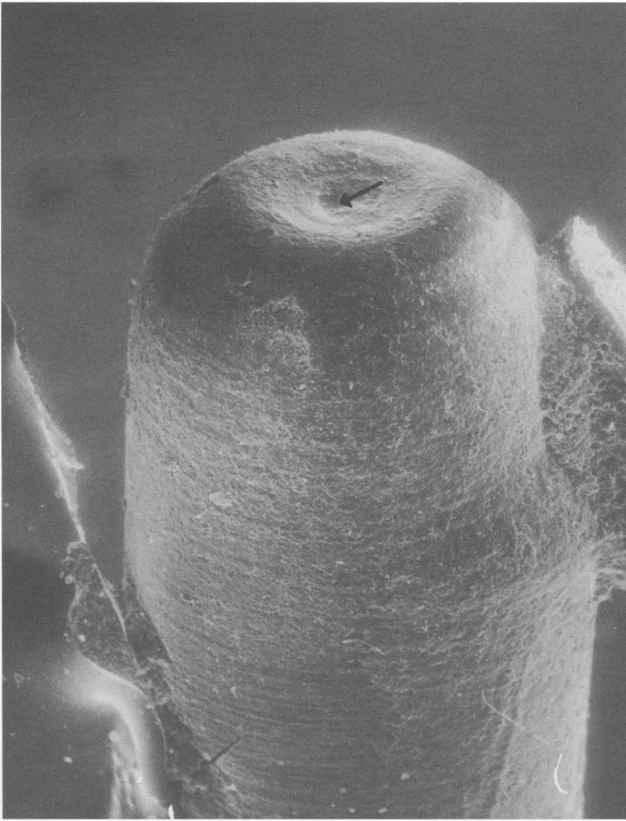


Figure 4. Micrograph of the impression of the leading edge of a severely misaligned drill hole. The depression (arrow) was created by a slight elevation in the substrate and represents the region of greatest wear in the end of a solid rod-shaped drill (i.e., the shape of the leading edge of drilling frequently reflects the shape of the drill itself).

of this broad period, flint perforators were common. Compared to the Palaeolithic era, the drills were smaller (microliths) and probably hafted in bone or wooden handles. Held by hand, these tools were less cumbersome and more efficient than their Palaeolithic predecessors. The drills became more rhombohedral, thereby increasing the number and angle of the drilling edges (Fig. 6). This modification foreshadowed the raking angle of contemporary burs.

The application of the palm-driven wooden fire stick to the microdrill significantly increased rotation speed. Drilling technology underwent another ingenious

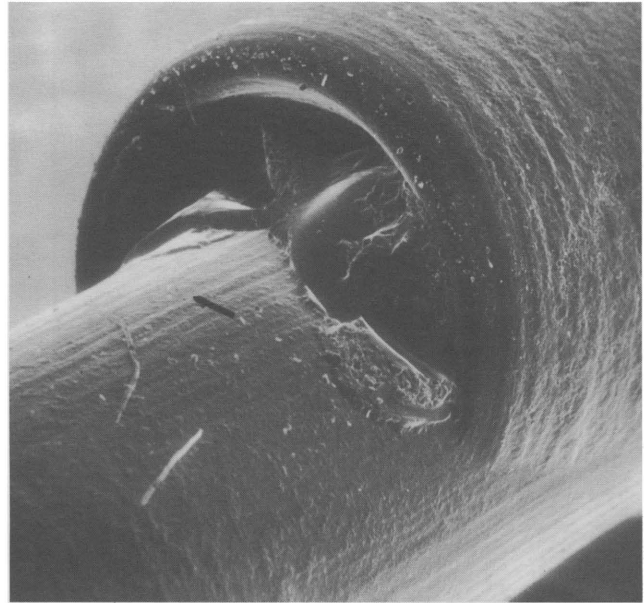


Figure 5. Micrograph of the leading edge of a drill hole made using a tubular drill. The semi-lunar shape shows a rounded, relatively smooth periphery representing the thin wall of the drill. To the inside of this can be seen the typical conchoidal fracture pattern that results in rock crystal following the fracture and removal of the "core" that occupied the interior of the tubular drill. Some longitudinal file marks (arrow) are in contrast to the circumferential grooves created by the drill and abrasive.

and momentous change with the adoption of the bow drill (Fig. 7). Rapidly moving the bow back and forth rotated the drill at approximately 850 revolutions per minute (Knobloch 1939). The bow drill requires that a palm rest be placed on the upper end of the drill shaft to exert downward pressure. Such drills are still in use among various groups worldwide—for example, the bead drillers of Cambay in India (Possehl 1981).

The microdrill—whether flint or obsidian—was breakable, could not be easily reused, and was confined to drilling relatively soft substances. The shape, sidewall pattern, and leading edge characteristics of microdrills are easy to recognize (Fig. 8), though variations are common based on the shape and wear of the drill.



Figure 6. Micrograph of a flaked-flint microlith. The object is arrowhead-shaped, polyhedral with distinctive cutting edges.

The Neolithic Period

The limitations of microdrills were eventually overcome by developments in the Neolithic period (ca. 8,000-4,000 B.C.E.), also known as the New Stone Age or “ground stone age.” A change from hunting and gathering to agriculture required the clearing of fields, the cutting of trees, and the building of shelters. New types of tools were needed to meet the changing demands of evolving societies. Thus, chipped flint tools gave way to those shaped by pecking and grinding. Neolithic craftsmen learned about different types of loose abrasives and developed shaped-stone drills to work the abrasives against a substrate. The experience gained reflected itself in new lapidary techniques which permitted hardstones such as quartz to be formed into elaborate and decorative beads.

Drill holes produced by stone drills and loose abrasives vary in profile from tapered to parallel-sided. The side-wall pattern, when present, is comprised of concentric grooves of various depths,

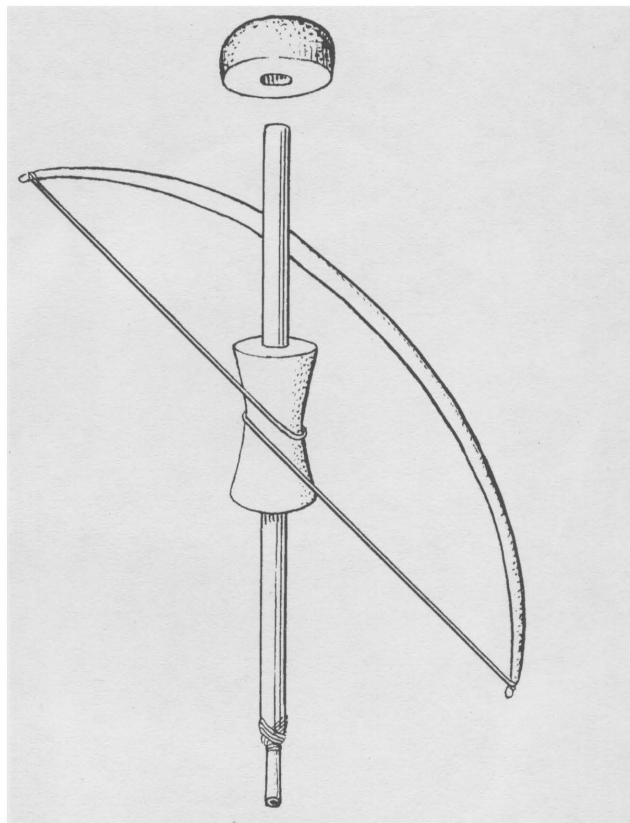


Figure 7. A typical bow drill. The palm rest is used to apply pressure to the drill during reciprocal rotation.

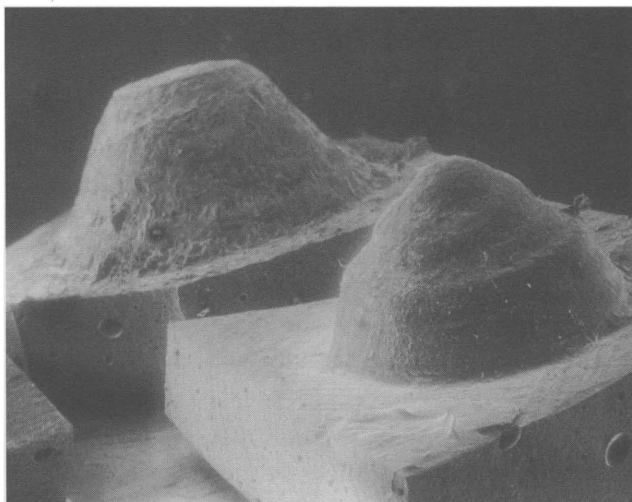


Figure 8. Micrograph of typical conical drill holes created using flint drills. The shape may vary according to the shape and wear characteristics of the drill itself. The terraced appearance represents the various cutting facets on the flint.



Figure 9. The leading edge of a drill hole which was probably made with a rod. The central depression (arrow) represents a slight elevation in the stone caused by a depression in the end of the drill. Shallow concentric grooves in the side wall can be attributed to abrasive which would have been used with a rod-shaped drill.

and the leading edge commonly shows a small central elevation in the drill hole (Fig. 9) due to localized wear in the drill itself.

The Chalcolithic Period

Further changes to drilling technology occurred during the Chalcolithic period approximately 4,000 B.C.E. and reached their zenith in the Bronze Age. A major innovation centers on the apparent realization that a chipped-stone drill was not an efficient carrier of abrasives. This led to the introduction of a flat rod of soft metal which allowed the abrasive to be temporarily embedded or charged. Copper was ideal for this purpose because it was not easily broken, could be reused and was soft enough to permit the embedding

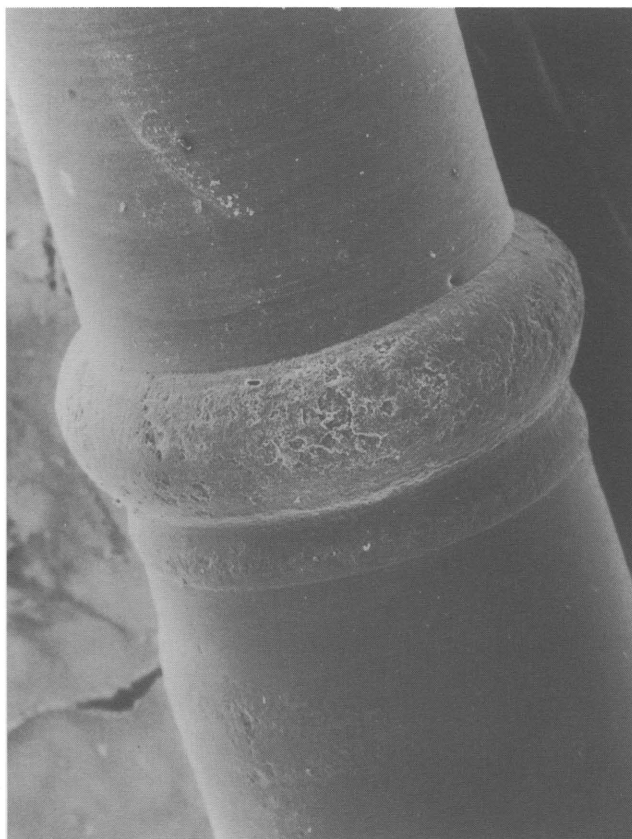


Figure 10. Micrograph showing the "collar" phenomenon characteristic of a copper drill.

of an abrasive. Another important consideration was that the rods could be mass produced. We have been able to demonstrate and document the change from stone to copper drills (Gorelick and Gwinnett 1987).

Archaeological excavations have not yet produced copper or bronze drills in a lapidary context. We have been able, however, to provide evidence for the use of copper drills through several serendipitous findings. The first occurred during an examination of quartz cylinder seals whose drill-hole impressions disclosed a peculiar anomaly on the sidewall (Fig. 10). We produced this same phenomenon, which we called a collar (Gorelick and Gwinnett 1989), quite accidentally while drilling on glass using a copper rod, quartz abrasive, and water (Fig. 11). We hypothesized that this occurred through plastic deformation of the copper rod's leading edge as a result of frictional heat and downward pressure on the rod. The ancient craftsman created the collars unwittingly during the course of

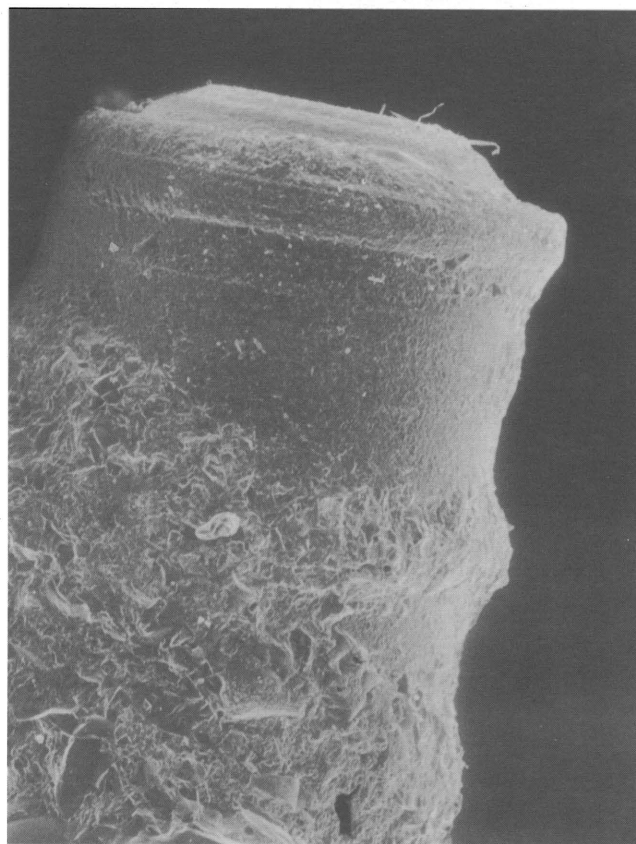


Figure 11. Micrograph of an impression taken from an experimental drill hole in which a copper rod and abrasive were used on a glass slab. The recreation of the "collar" phenomenon is evident.

drilling. If he added loose abrasive and lubricant in inadequate quantity, the drilling advanced slowly. Aware of this, he may have consequently applied greater pressure on the palm rest, thus distorting the drill. As he continued to add abrasive, the flare on the drill disappeared, but not before it produced a characteristic groove in the sidewall of the drill hole (Fig. 10). This phenomenon is unique to copper and the presence of a collar in the perforation of a bead is evidence of the use of a copper drill.

While bronze, a mixture of copper and tin, was used by craftsmen, it is speculated that it was rarely used in early metal-drill technology. The cost and scarcity of tin (Moorey 1982) would probably have precluded its use. Our unpublished experimental studies on drilling efficiency show no significant advantage of bronze over copper.

An increase in drilling efficiency occurred in the Bronze Age, however, because of another important discovery, namely emery. With a Mohs' hardness of 9, this material afforded a major increase in abrasiveness and was particularly effective on quartz (Mohs' hardness of 7). We have been able to document its use during the Middle Bronze Age, ca. 2,000 B.C.E. (Gorelick and Gwinnett 1986), and suggest that the increased use of hardstones for beads, seals, and amulets stemmed from the awareness, availability, and use of emery as a loose abrasive.

The Iron Age

The ancient use of iron for drilling has been poorly documented. One notable find—an arrow-shaped drill—was made by Flinders Petrie (1917). We have found by experimentation that other shapes could have been used as well. The use of the arrow-shaped iron drill is a derivation of the chipped-stone drill, both of which are effective on softstones. Iron, however, is more durable and could easily be reshaped and reused. For stones harder than 4 on the Mohs' hardness scale, an iron rod in combination with loose abrasive would be very efficient.

Other Developments

The eventual invention of the drill brace provided a method for unidirectional rotation of a drill. While more efficient than bow or pump drills, the drill brace did not entirely replace them. Further developments which would lead to the development of contemporary drills had to await the innovations of the Industrial Revolution and steel technology. Major changes in the use of loose abrasives required the development of ceramic and electroplating technology to create bonded abrasives. Abrasives changed from quartz and emery to silicon carbide and diamond.

DISCUSSION AND CONCLUSION

While this hypothetical reconstruction of a history of drills and drilling has evolved from evidence derived predominantly from the Aegean and ancient Near East, it generally applies to other cultures as well. Drilling variations that are encountered in other

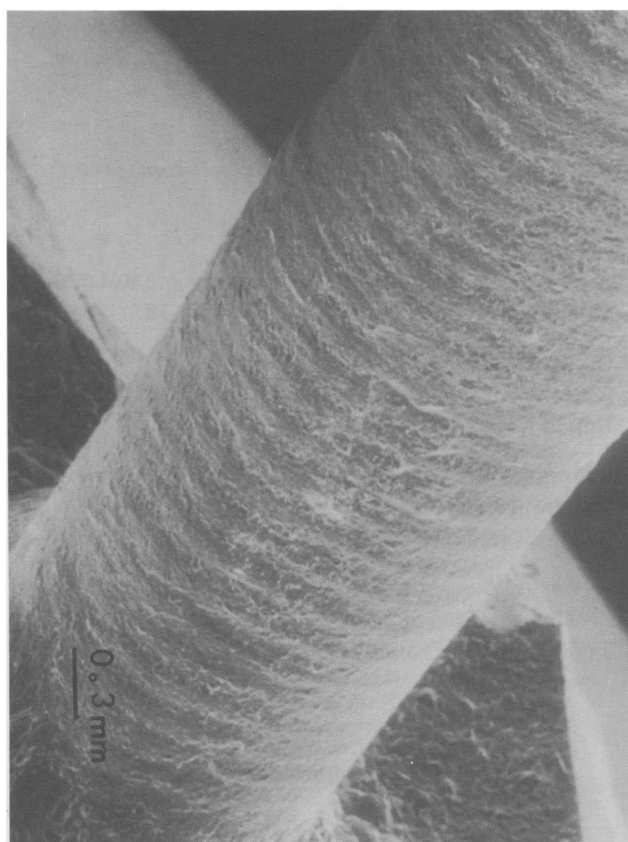


Figure 12. The sidewall of a drill hole in a rock-crystal bead showing the pattern characteristic of a twin-splinter diamond drill. Regular, concentric, and uniformly spaced grooves are characteristic of this type of drill.

cultures relate to their particular history and cultural development, as well as the methods of technology transfer and trade. The ancient Maya, for example, did not have metal tools, but they developed specialized techniques for drilling nonetheless (Fastlich 1976; Gwinnett and Gorelick 1979).

More recently, we have uncovered preliminary evidence for the use of a drill utilizing diamond splinters as cutting points (Gwinnett and Gorelick 1986). These were used in ancient South Arabia, Iran, and Sri Lanka. It is known that diamonds were abundant in ancient India and that craftsmen learned to haft and use them for drilling. Indeed, the practice is still carried on in Cambay, India. The regular, concentrically grooved sidewall pattern of the parallel-sided perforation (Fig. 12) and a small, central conchoidal-fracture pattern at the leading edge of drilling (Fig. 13) are characteristic of this type of drill.

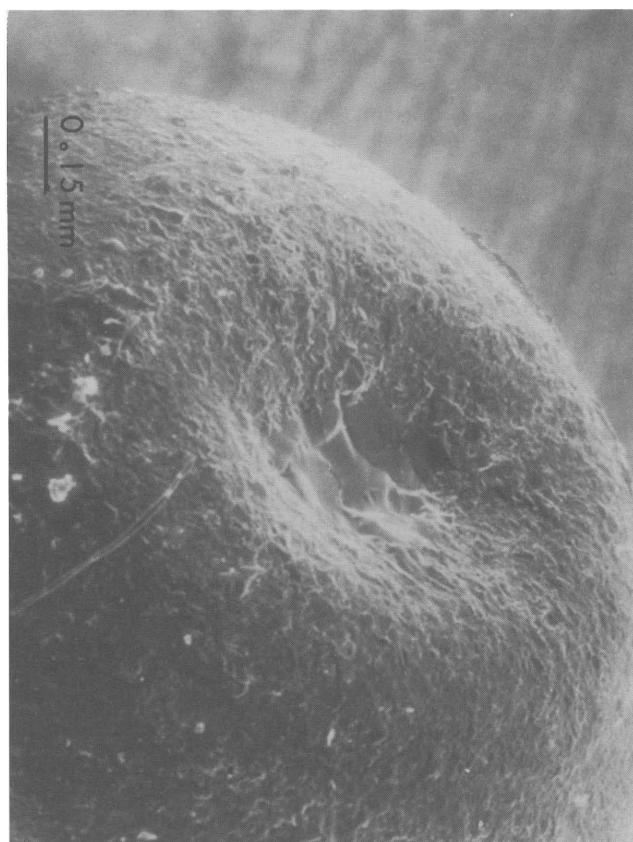


Figure 13. The leading edge of a drill hole created with a twin-splinter diamond drill. In the center is a small depression showing a conchoidal fracture pattern. This is characteristic of diamond drilling and contrasts with the size and smoothness of those created by a rod and abrasive (*see* Fig. 9).

In conclusion, functional analysis is a simple means of gaining insight into the evolution of drills and drilling, as well as engraving. The method we espouse is non-destructive and permits the capture of telltale drilling characteristics from an artifact which, when compared with a data base of standard drilling shapes and sidewall and leading-edge patterns, help to identify the type of drill that was utilized.

ENDNOTE

1. This paper was originally presented during the Stone Bead Symposium at Bead Expo '96 in Austin, Texas. It is sad to note that both authors have since passed away.

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A. John Gwinnett
Leonard Gorelick

VENETIAN BEADS

Frank Hird

Interesting accounts of the manufacture of Venetian glass beads turn up in the most unlikely places. The one reproduced here was published in The Girl's Own Paper for February 1, 1896 (Vol. 17, No. 840, pp. 292-294). In addition to presenting a decent description of the manufacture of drawn and blown beads during the latter part of the 19th century, Mr. Hird gives us details concerning the setting in which the beadmakers and bead stringers worked. Paint peels from the ceilings of the rooms where women make blown beads, and half-dressed men sweat in the heat from the glass furnaces. It brings the scene to life, something most other accounts fail to do. As the photographs that illustrate Hind's article lack captions, these have been added by the editor.

There is an instinct in human nature, whether it be hypercivilised or whether it be still primitive, to which beads appeal as strongly as do gold and fine jewels. The Egyptians used them in lavish decoration of their dead, and modern travellers and traders in Africa are but imitating the example set thousands of years ago by the Phoenicians in using them as current coin in all dealings with the natives. Which of the ancient civilisations discovered the method of manufacturing beads has never been faithfully determined, but as the Egyptians were famous for their manufacture of glass, it is almost certain that the invention belongs to them, being copied by the adventurous Phoenicians. The Romans were great admirers of Egyptian glass, and during the reign of the Caesars the works at Alexandria were kept busily working to satisfy their love of glitter and personal adornment, it being the fixed idea of the ancients that the sand of this part of the Mediterranean shore was absolutely essential to glass-making. But nearer to Rome was a small island in the Adriatic, which was afterwards to become one of the greatest seats of the manufacture of beads, and which, to-day, has almost regained its old monopoly, lost for a period after the downfall of the Venetian Republic, of which it formed part.

It was in the thirteenth or fourteenth centuries—historians do not agree upon the exact date—that bead-making was established at Murano, and through all the years during which Venice exercised her almost imperial sway, the glass manufacture, on this ugly and dirty little island, was one of her glories. The Venetians, with that painstaking, and passion for the beautiful that are to be traced in all they have left behind them—in their palaces, their pictures, their jewels, their lace, in the mystic splendour of their churches—improved upon the models of the Egyptians, evolving colours and combinations of colours, of which they alone held the secret, with the consequence that beads rapidly became as beautiful as finely-cut jewels, and almost as valuable.

Steam, electricity, and the thousand-and-one inventions given by the nineteenth century to all manufactures, have been applied to the making of beads, and to-day the processes followed at Murano differ very little from those pursued in Birmingham, the chief seat of the industry in England. But there is a glamour of history at Murano that is lacking in the great Midland city, for hard by loom the campaniles and domes of Venice, with their bells tolling ceaselessly across the intervening lagoon.

Murano lies near the island cemetery of the Venetians, where the Palladian church of San Michele stands desolate, yet impressive, at one extremity. As the gondola sweeps past the high red walls of this island of the dead, a cloud of blackness, hanging immovable in the clear blue sky, shows where the glass-foundries, working night and day, belch forth a ceaseless stream of smoke from their tall chimneys.

A narrow canal flowing past some squalid houses, the upper storeys of which are raised on pillars of Istrian marble, once cream-coloured but now stained

and grimed with the soot of centuries, leads to a broader canal, where the majority of the glass-manufactories are situated.

Some barges laden almost to the water's edge with grapes, whose rich purple bloom was in strange contrast to the murkiness of the Muranese sky and the squalor of the Muranese quays, were moving slowly through the sluggish water, as our gondola glided up to a small doorway set in a modern red-brick wall, behind which is the bead-factory. On the other side of the canal, old palaces, now turned into tenements for fisher-folk and beadmakers, frowned down upon this product of a manufacturing age, their carved stone balconies and decaying hatchments striking inharmonious notes with the electricity, the steam-power, and the human industry incessantly at work around them.

Through the little door we entered a flagged courtyard, from whence ran paths of beaten cinders leading to the various workshops, busy with the hum of countless wheels, and full of merry, chattering work-people.

Our guide first took us to a loft, where the colouring mixture as well as the component parts of the glass were mixed and made. Piles of sacks filled with sand were standing against the walls, whilst round tubs, arranged in two rows down the centre of the floor, contained the materials, that only required fusion by heat to turn them into glass. The colours were marvellous—greens, reds, and yellows of every imaginable shade, their iridescence being the closely-guarded secret of the manufacturer. Having vainly questioned the guide as to the cause of the golden lights in all Venetian glass, and being met and defeated by his sudden ignorance of French—which was rather remarkable, as he had become extremely voluble when he discovered that our Italian was a practically non-existent quantity—we were taken downstairs to a long narrow alley, divided into two equal halves, each one hundred and thirty feet in length, by immense furnaces in which the glass was being melted. The heat from these furnaces was intense, the molten glass standing in the clay tubs, that we had seen above, in their midst, seething and bubbling like liquid fire. It was almost dark in these narrow, ill-lighted alleys, but when the two swarthy glass-blowers thrust long iron bars into the quivering mass, a glow of colour, of red from the furnace and

iridescent green from the glass, transformed the place for a moment into fairyland. The men, half-dressed, seemed to be transformed into golden creatures clothed in lurid green; the floor of hard-pressed cinders became crimson, flecked with strange shadows, as the blowers twisted their tubes in the shining mixture. After slowly turning their tubes round and round in the liquid glass they suddenly withdrew them, the molten matter at the end looking like honey upon a spoon. With great skill they manipulated the tubes between their fingers, so that the glass did not fall. When it was sufficiently cool, they rolled it gently on an iron stand, backwards and forwards, until it was completely round and in the shape of a hollow bulb. This was opened by the insertion of a piece of iron, and the two men placing the two bulbs together whilst they were still hot, they became amalgamated into one in a few moments.

It was at this point that the great interest of bead-manufacture came into play. The two men were standing, each with his tube in his hand, joined to that of his fellow by the soft green glass. Suddenly both ran swiftly in opposite directions down the narrow alleys, the glass stretching out behind them in an ever thinning line, until when the extremities were reached it lay along the ground in one piece, two hundred and sixty feet in length, the centre being of the same thickness as the two ends, and the hole running through the centre also being of the same diameter from end to end. Every six feet there were pieces of metal upon which the glass rested; when it had become perfectly hard and brittle, it was cut at each of these resting-places, and taken away to the next department in trolleys running upon wooden wheels. Here the six-foot lengths were handed over to girls, working at a long row of vibrating cutting-machines on one side of the room. The operator put several of the glass rods into an iron trough slightly raised at one end, and closed at the other by a knife of fine steel and exceptional sharpness. Arranging the rods evenly, she pressed them slightly under the knife with her right hand, then touching a lever with her left, the knife descended, and a shower of beads fell into the waiting sack beneath. The girls worked with incredible swiftness, and from every machine a ceaseless stream of beads were falling, the colour-effect being magical. This was heightened by the picturesque dresses of the workers themselves. On the other side of the room men were

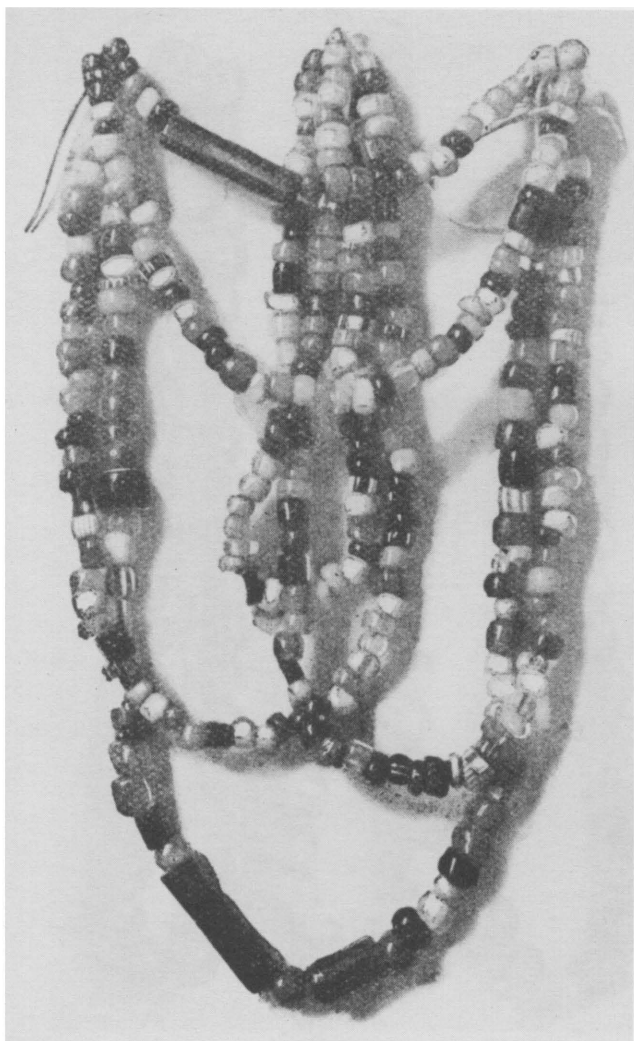


Figure 1. Tubular and globular to barrel-shaped glass beads made from segments of glass tubing.

busily at work sifting the beads into various sizes, as it is absolutely impossible for the girls to get the rods under the knife in equal lengths at every time of cutting; nor is this necessary. After being sifted, the beads are shaken with bran or sawdust in a machine which removes all dirt and dulness from the glass.

It is in this manner that the ordinary glass beads with square edges are made, but the round bead with smooth edges goes through another process.

After the beads were taken from the guillotine they were thrown into an iron drum containing wet sand, and were shaken until all the centres of the beads were filled. The drum was then placed in a furnace and turned rapidly round several times; on its being

opened, to our surprise the beads were hard and round. It was explained that the glass being softened by the heat was rounded by the motion of the drum, the sand preventing their individual centres closing up, or the beads sticking together. As in the case of the ordinary beads, the round ones were then cleaned by being shaken in bran in an irritating machine which jumped backwards and forwards along a rail. The old method was to put the beads and sawdust in a sack and shake them thoroughly together, but the machine has entirely superseded this, and the effect is certainly incomparably better.

The whole process seems very simple, but its effect upon the visitor is difficult to describe; for the marvellous and varied colouring of the glass is most bewildering; and the cutting-room with its unceasing stream of falling beads glittering in the sunshine with all the hues of the rainbow, must be seen to be appreciated and understood.

One more department remained when we had examined the sifting machines—they are worked upon much the same principle as the winnowing machine used by an English farmer to separate the corn from the straw in place of the flail—and that was the room in which the beads were threaded.

The majority of this work is done away from the factory, as only a comparatively small portion of the beads are threaded before being sent to the buyer. At every house-door in Murano, women, young and old,

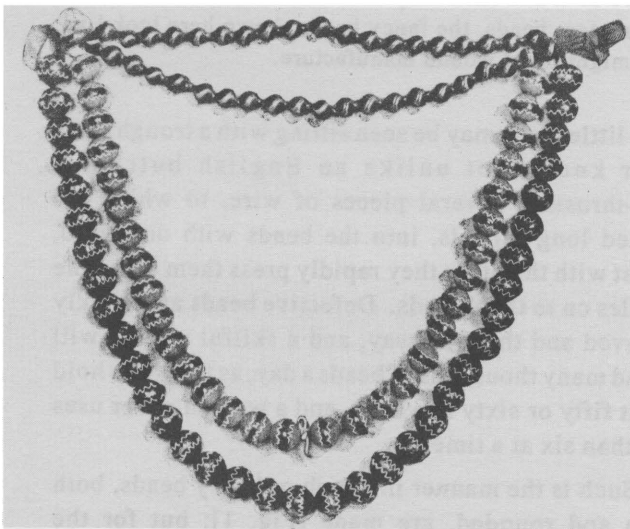


Figure 2. Necklaces of possible blown-glass beads.

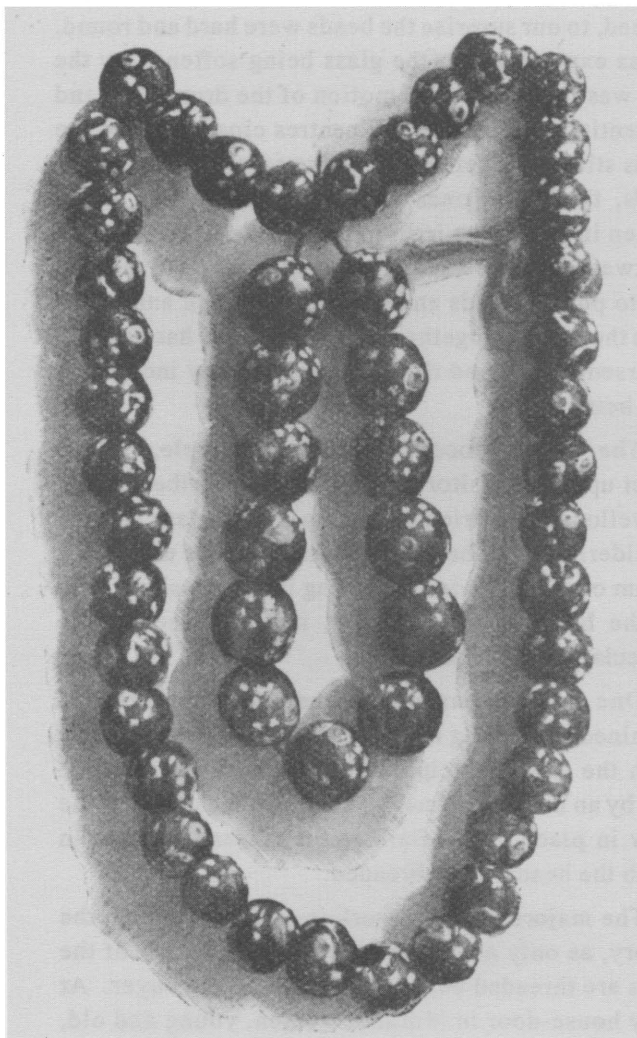


Figure 3. While Hird only describes the manufacture of blown glass beads, the fancy beads shown here look like they might be of wound manufacture.

even little girls, may be seen sitting with a trough upon their knees—not unlike an English butcher's tray—thrusting several pieces of wire, to which are affixed long threads, into the beads with one hand, whilst with the other they rapidly press them down the needles on to the threads. Defective beads are quickly removed and thrown away, and a skilful worker will thread many thousands of beads a day, as the wires hold about fifty or sixty at a time, and a woman never uses less than six at a time.

Such is the manner in which ordinary beads, both plain and rounded, are made [Fig. 1]; but for the manufacture of the real Venetian beads, such as are

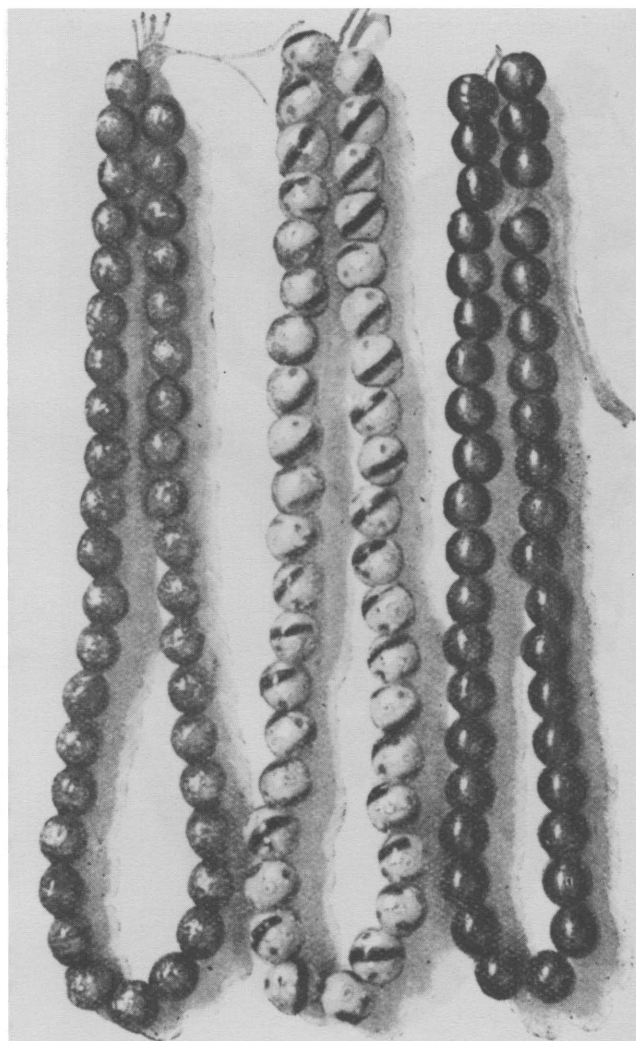


Figure 4. Several strands of glass beads that look like they might be wound as well.

shown in the illustrations [Figs. 2-4], it was necessary to return to the City of Canals, where that branch is chiefly carried on.

Our gondola, after leaving the cemetery and crossing the intervening stretch of lagoon, entered one of the canals in the back part of the city, and after many twistings and turnings through apparently impassable waterways, we found ourselves under the Bridge of Sighs; a moment later we were in the Grand Canal, dashing through the limpid water towards the railway station, to the accompaniment of unintelligible cries and much gesticulation on the part of our gondolier to others of his craft.

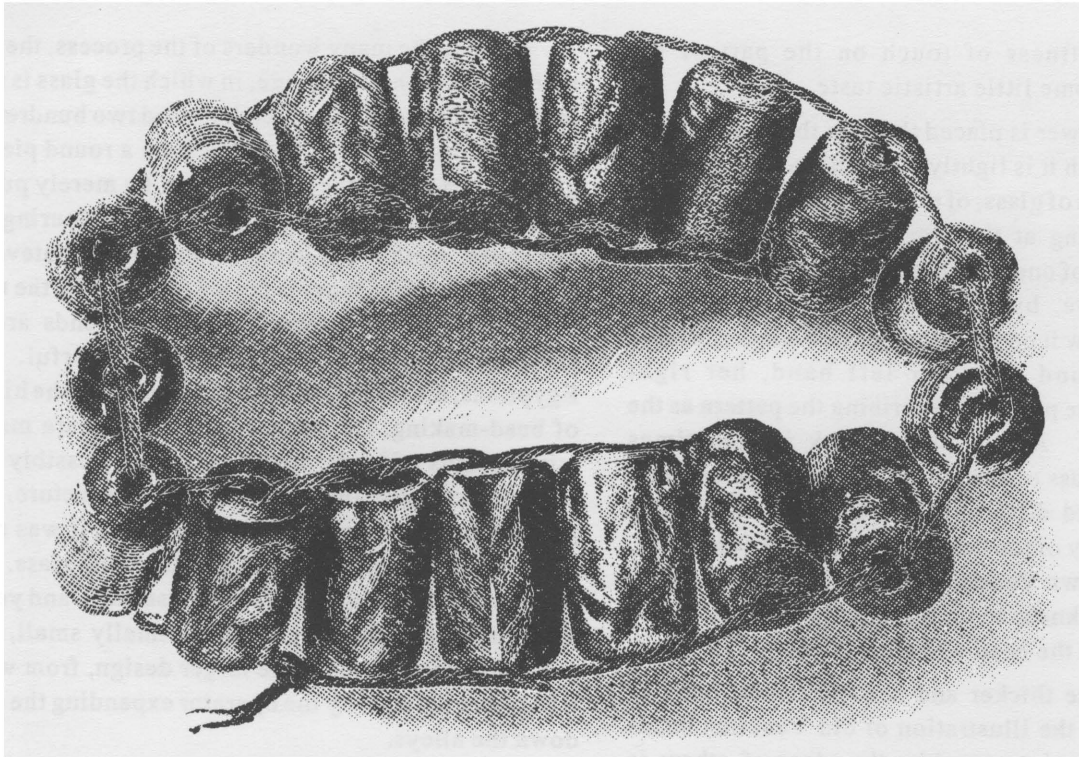


Figure 5. What appears to be a bracelet, possibly from Africa, composed of wound cylindrical beads of Venetian origin.

The manufacture the larger beads does not require the space nor the number of work-people necessary to the industry at Murano, the actual making being carried on in one room in an old palace on a side canal beyond the Rialto.

It was very strange to see six women seated at a bench, surrounded with the most modern appliances, in a vast room with frescoes of the sixteenth and seventeenth centuries peeling from the damp and neglected walls and ceiling, whilst rats and mice had eaten large holes between the carved walnut dado and the marble floor. But these children of Venice are too accustomed to the atmosphere of decayed magnificence, in which they are born and reared, to pay the faintest attention to the blotched Cupids on the walls, or perhaps even to note that the frescoed lady on the ceiling, immediately over their heads, was holding a string of beads in her hand, identically similar in design and size to those which they themselves were making with such skill and laborious care. The artist who painted the lady in her frescoed bower, sitting at a table heaped with fruits in golden bowls, and toying with a string of gilded beads, is forgotten, and his work

falls daily in large flakes upon the bead-makers below; but the facsimile of the beads which he copied so faithfully, are still made by them in the City of Waters and Palaces.

These women sat at some distance from each other, each in front of a tiny gas jet, that burnt immediately over a raised piece of iron, a screen of tin protecting their faces. Taking a small rod of glass similar to one of those which we had seen carried from the smelting alley to the cutting-room at Murano, the operator held it a few seconds in the gas-flame picking off the heated end with her blower. Putting the other end of the blower in her mouth and keeping the piece of molten glass near the gas, she began to blow very gently. Slowly the piece of glass grew rounder and rounder, until at length it took the shape of a large hollow bead. Then it was put aside, and another was made with equal rapidity. If plain beads are needed, the operation is complete, but the majority of these large hollow glass ones are marked with elaborate patterns made of another coloured glass, and these are made in the following manner, a manner which necessitates not only great technical

ability and deftness of touch on the part of the operator, but some little artistic taste.

An iron skewer is placed through the centre of the bead, with which it is lightly rolled up and down a pad of felt. The rods of glass, of the colours required for the pattern, are lying at the worker's side, and having taken a portion of one on to the end of her blow-pipe, as described above, by heating it in the gas-jet, she proceeds to blow it on to the completed bead, rolling it round and round with her left hand, her right manipulating the pipe and describing the pattern as the bead revolves. As the super-work is sometimes composed of glass of as many as six different colours, the delicacy and difficulty of the work can be well imagined. Many of the beads are made of gilded glass, or the well-known Venetian evanturine [sic], studded with small blue knobs in imitation of turquoises. These are blown on to the bead when it is completed.

Some of the thicker and heavier beads, such as those shown in the illustration of old Venetian beads [Fig. 5], are run into moulds; the glass of others is grooved in such a manner that the extra pieces super-imposed sink to the same level as the rest of the bead; there are, in short, such an infinite variety that it is only possible to indicate the general method of production.

Despite the many wonders of the process, the most marvellous is the first stage, in which the glass is made into long thin bars. The fact that a rod two hundred and sixty feet in length can be made from a round piece of glass only a few inches in diameter, by merely pulling it out, and that the size, the density, of colouring, and thickness, remain the same throughout, whatever its length—thus, if the mass is pulled forty yards, the rod is thicker, but its measurements at both ends are the same—is as inexplicable as it is wonderful. The Egyptians, however, learnt this fact early in the history of bead-making, for many of their beads are marked with designs of birds, which could not possibly have been placed upon them after their manufacture. The pattern was traced upon the mass before it was made into rods and contracted with the rest of the glass. This is sometimes done at Murano in these days, and yet the small pattern, sometimes infinitesimally small, is as perfect in proportion as the larger design, from which it has been reduced by the operator expanding the glass down the alleys.

The bead-makers of Murano and Venice are copying to-day the legacy of beauty left them by their forefathers, and their industry is one of the most fascinating in all Italy.

Frank Hird

PROGRESS AND PROBLEMS IN RECENT TRADE BEAD RESEARCH

Richard G. Conn

Thirty years have passed since the late Richard G. Conn presented this paper at the conference of the Canadian Archaeological Association in Winnipeg, March 8-9, 1968. It is presented here to show us how far we have come and how far we still have to go.

All over North America, glass beads continue to accumulate in archaeological collections, in museums and seemingly in everybody's laboratory. Although the volume of this material is growing, as is the recognition of its possible significance to archaeology, there is still comparatively little definite information available. What about glass trade beads? Can they be dated? Is anyone studying them? If so, who and what have they learned?

I would like to answer all these questions, but considering the time available today and limitations of my own information, this report will be concerned with the latter two: who is studying the problem and with what results.

Although many people have found glass beads in the course of fieldwork and, therefore, have reason to be interested in the material, only a handful of people concern themselves closely with the subject and conduct research in it. Of these few, I will discuss those who have published significant studies within the last ten years or those who are now conducting important research projects. This choice is admittedly selective and reflects the information available to me. In no sense is there a qualitative judgement.

The principal European contributor to recent bead research is W.G.N. van der Sleen of The Netherlands. This man has spent upwards of thirty years in study and world-wide travel pursuing his subject. Van der Sleen's interests are far broader than those of most of his colleagues, as they include bead types from all time periods, geographical regions, and even beads made of materials other than glass. His treatise, *A Handbook on*

Beads, was published in 1967, by the "Journées internationales du Verre," and it reflects this breadth of interest in reporting bead types ranging in time and area from prehistoric Asia to modern South America. North American scholars are finding van der Sleen's work profitable reading with much that applies to their particular problems. For example, there is a brief discussion of the major European manufacturing centers. Although these data should have been more extensive, they stand as the best we have had to date. There is also the fullest description of manufacturing processes published thus far. This, again, is brief but more complete and accurate than any preceding statements. Perhaps van der Sleen's most useful contribution to his topic lies in his attempt to collate and organize descriptive terminology. Working for precision, he has illustrated clearly what each term means by relating it to a drawing or photo.

Mynheer van der Sleen's counterpart in North America must be Kenneth Kidd. Like the former, Kidd has devoted years of meticulous study to his subject. Kidd, however, has drawn his data principally from Eastern Canada and from a period ending in the mid-18th century. In the last several years, he has been preparing a report that promises to be a major study. Kidd's colleagues in trade bead research would surely join in wishing him well and in looking forward to an early publication date.

John Witthoft has combined careful examination of archaeological and ethnographical collections with intensive historical and archival research in a general study of trade goods in the Eastern United States. He has identified the existence and, to some extent, the products of several Dutch and other Colonial glass workers. Combining these data with documentary references to historic Indian village sites and correlating the associated European trade goods, he

has achieved an unusually refined trade goods chronology. A portion of this sequence was summarized recently in his report at the First Fur Trade Conference, published in *Minnesota History*. Witthoft's work should remind everyone engaged in trade goods research of the necessity to be alert for any archival data applicable to their problem and to avoid the purely object-centered study.

Working in a more localized region than Witthoft, Peter Pratt has published an inventory and chronology of beads from certain Iroquois sites in New York state. This report has attracted attention for its color plates of one hundred and twenty dated bead types. Pratt has also established a repository at the Fort Stanwix Museum where he hopes to gather a complete range of North American bead types.

Other regional bead inventories in recent publication are Gregory and Webb's from Louisiana and Woodward's from the Lower Columbia River. These papers both appeared in 1965, as publications of *The Florida Anthropologist* and the Oregon Archaeological Society, respectively.

Two men who have begun bead research are Roderick Sprague at the University of Idaho, and Wayne Davis, a graduate student at the University of Calgary. Although both are far from publishing at this time, their projects will be important contributions and deserve mention in this summary. Sprague has assembled a sizeable bead collection from sites in the Columbia River Plateau and is currently analyzing his material. Presumably his work will produce a regional inventory/chronology like those cited above. Davis stands at the beginning of a major study dealing with the Northern Plains.

This resume has concentrated on those persons concerned primarily with trade beads and those who have recently published important papers in the area. There is, as we all know, a much larger group interested in the subject but whose primary research commitments lie elsewhere.

In summary, the main recent study of bead technology is van der Sleen's monograph. The important works in bead chronology are the four regional inventories by Witthoft, Pratt, Gregory and Webb, and Woodward. The significant new research facility is the Trade Bead Repository at Fort Stanwix, and the most important research in progress is Kidd's

major study. If there have been any omissions in personnel or publications, please make them known.

The first objective of trade bead research as it relates to North American archaeology is, of course, to provide a complete typology and chronology of foreign, domestic, and native-made glass beads. The purpose of this work would be to offer data for application to anthropological problems of dating and historical inter-relationships. Such a complete typology/chronology should include the dates of introduction and decline or disappearance of every known bead type with full consideration for the temporal discrepancies occurring from region to region. It should also resolve local or areal problems such as pony bead embroidery in the West. Realization of this objective is beyond our reach today. And, in approaching it, there are several basic problems to be studied first. Certain of these are being attacked successfully at present, with others receiving little or no attention. I would like to consider five of these basic problems, noting both the work being done and left to do.

All bead students are handicapped by the meager information presently available on manufacturers. We are all familiar with vague terms like "Venetian" or "Bohemian." But does anyone know precisely to what these apply? Can anyone identify a "Bohemian" bead made before 1900, as distinguished from the contemporaneous Venetian product? If so, let them publish at once! Archaeology has inherited a body of 19th-century bead folklore which includes these bold generalizations, along with other hardy chestnuts like the Russian beads of Alaska and the elusive French beads nobody can really isolate. But even though many now recognize these imprecise terms as being more folklore than fact, they continue to be used. We need careful research directed toward every part of Europe and Asia known or thought to have made beads for North American trade. Ideally, there should be complete accounts of each glass factory, what it produced, and when. Van der Sleen's data on European beadmakers is the most factual work directed toward this problem. In particular, his account of the 17th-century Dutch industry is recommended. However, his remarks are far too brief and much further research is needed. With respect to beadmakers in the New World, Witthoft has investigated the presence and possible products of Colonial glassworkers with good results. This raises a

further question of whether beads may have been made in Lower Canada, Mexico, or elsewhere in the United States. Obviously, there is a great need for extensive study of bead resources: who made them, when were the various manufacturing centers operative, exactly what types did they make, and how can their beads be distinguished from those of others?

Following on the above comes the problem of tracing bead distributions from factory through trading company to the specific regions of North America where they were sold. The point of this study is obviously to see how individual bead types were distributed over this continent: by whom, when, and where. There are two potential sources for attack on this problem: documentary research and historical archaeology. The archives of most fur trading companies—apart from the Hudson's Bay Company records—tend to be incomplete and almost non-existent, and their value in trade good research may well be limited. Kenneth Kidd has made a beginning in this area by studying the London Harbormaster's Office files as well as some factory records in Murano, but no results of this work have been published yet. The second potential approach could be through systematic excavation of those trading post sites occupied by only one owner or company. A good example is Fort Rivière Tremblante in Saskatchewan, occupied only by the Northwest Company and for a known period of seven years. This site, excavated partially last summer, has yielded an important bead collection. Granted more one-occupant sites, it should be rewarding to compare materials thus known to have been distributed by one trading company to those known to have been sold by another. There are perhaps few one-occupant sites, but historical archaeologists should be urged to dig them. Possibly a combination of such fieldwork and more archival research will solve portions of the bead distribution problem.

There is presently a major task in trade bead research waiting to be done, requiring only lots of time and patience. This job is important, necessary, and everyone wishes someone else would do it. It is to make a comprehensive inventory of all beads recovered from all North American archaeological sites. Moreover, it should include an examination of every documented ethnographical specimen known to have been made before some logical terminal date, e.g.

1860. The data in this inventory should be cross-tabulated to show the known occurrence of each bead type by association, by region, and by date as far as possible. The importance of such an inventory is obvious: it would show exactly what bead types were known in North America at a specified time and where they were in use. Now these data exist only in scattered field and site reports, many of them unpublished. At this point, someone is likely wondering why this inventory couldn't be achieved by merely collating all these available reports. The answer to this question brings us two inter-related methodological problems: classification and nomenclature.

The various persons who have written on glass beads over the years have come to their subject from different viewpoints and with different particular interests. While some have seen beads as parts of larger problems, others were interested in the material for its own sake. Consequently, the kinds of data collected and presented in the literature run the gamut from pure typological description to more complex presentations in which every possible association and implication has been considered. This difference in approach is crystallized when we compare two of the suggested classification systems. The first, developed by H.C. Beck in 1928, is based upon physical characteristics of the beads themselves: shape, size, etc. The second, from van der Sleen's recent monograph, considers place, date, and process of manufacture foremost, with physical qualities subordinate. Beck's system doesn't seem to be widely known to archaeologists—in fact, it isn't in general use among bead students; van der Sleen's is too recent to have provoked much discussion yet. Thus, there is no generally accepted bead classification system, and anyone who finds himself with beads to sort must work out his own methods. This means, in turn, that bead data as found in reports range greatly in the type and amount of information presented. Consequently, the proposed comprehensive inventory of North American collections could not be done without direct re-examination of the material. There would be gaps in published data to fill and a consistent terminology to be established.

The lack of a bead classification system used by all is in itself a reason for making the general inventory. Both Beck's descriptive scheme and van der Sleen's historical system have their strengths and weaknesses,

and either could be improved. I suggest that the data assembled by a general inventory of North American collections might provide the necessary basis for a better classification system than any developed so far. And with this possibility in mind, it is apparent that data gathered should be as complete as possible.

If beads are classified in a spirit of individualism, terminology is conceived in anarchy. Like the vague terms used to indicate a supposed European source, many of the words used to describe qualities and characteristics are part of a folklore we have inherited from the 19th-century Keeper of Curiosities. Nothing is semantically wrong with most of these words. They are, in fact, useful terms, but they have never been precisely defined. As a result, everyone adapts or coins his own words in discussing size, shape, or color, and another new dialect is added to the world's only technical jargon with no Mother Tongue. Beck tried to bring order into this confusion by proposing a standard nomenclature in his 1928 paper. Van der Sleen expanded Beck's lists and even worked out equivalents in five additional languages. Unfortunately, Beck's proposals have not had the consideration and acceptance they merit. It is to be hoped that Beck's or some other precise terminology will come into general use and clear the muddle that exists.

The most confusing area of terminology is color designation. Generally, colors are defined by nouns with qualifying adjectives such as "corn yellow" or "royal blue." References like these carry personal associations that make them subject to misinterpretation. Moreover, beads come in shades and tints that have no customary English names. There are, for instance, about forty Venetian blues. Would it not be better to adopt a number designation system for colors as the bead manufacturers themselves do? This idea has been found effective in several museums where pieces of beadwork are described by reference to the numbers on a manufacturer's sample card.

The last problem I would like to mention is the need for more intercommunication between those working on trade bead problems. As we have seen, there are only a few individuals working with basically the same materials and problems. Yet each seems to be working almost in isolation. One wonders, in fact, to what extent each man is aware of his colleagues' existence and interests. By an increased exchange of

data and ideas, most of the problems outlined in this paper could be attacked more effectively. There ought, for example, to be a confrontation of some kind to straighten out terminology. The general inventory of North American collections might also be undertaken by a team of workers, providing they worked according to a pre-agreed methodology and kept contact with one another as the work advanced.

Intercommunication could be stimulated in several ways: a special session at an archaeological conference, a newsletter, or even in a smoke-filled hotel room at the Society for American Archaeology meetings. No doubt there are other means and they should be explored. As trade bead research stands today, we have several dedicated people trying valiantly to invent the wheel on their own. With increased interaction, they stand to do it much sooner.

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BOOK REVIEWS

Beads and Bead Makers: Gender, Material Culture, and Meaning.

Lidia D. Sciama and Joanne B. Eicher (eds.).
Berg, Oxford and New York (distributed by
New York University Press, 70 Washington
Square South, New York, NY 10012-1091).
1998. i-xvi + 317 pp., 86 b&w figs., 2 appendices, index. \$19.50 paper cover (\$55.00 cloth cover) + \$4.00 postage.

Although the main title suggests that this book ought just to be about different sorts of beads with lots of information, pictures, and details about how they are made and who made them (and wouldn't such a book be a wonderful resource to have on our shelves?), the subtitle conveys that it is much more specialized. It is essentially an academic book with a heavily anthropological slant. This is not surprising as it represents the published proceedings of a one-day workshop on "Gender in the Making, Trading, and Uses of Beads" which was held in Oxford, England, in 1995, sponsored by the Cross-Cultural Centre for Research on Women at the University of Oxford. The workshop is a continuation of earlier cross-cultural studies of women and crafts which produced such volumes as *Dress and Gender: Making and Meaning* (1992, edited by Barnes and Eicher) and *Carved Flesh/Cast Selves: Gendered Symbols and Social Practices* (1993, edited by Broch-Due, Rudie, and Bleie), all published in an ongoing series by Berg.

Having set the book in perspective, it is worth summarizing what it aims to do and the various subjects each author covers, since anyone with an interest in studying, collecting, researching, or using beads will find something of interest in this volume. The initial plan before the workshop was to examine the labor conditions of women who make, thread, or otherwise work with beads around the world and to analyze their activities as traders, entrepreneurs, and employers of other women in a number of different

geographical and cultural areas. Other themes to be looked at were present-day uses of beads and a broad historical overview of the processes and trade routes involving large quantities of glass beads mainly made in Europe and traded around the world; beads which are now making their way back to Europe as well as to other markets, their value much increased.

However, the scope of the book was enlarged because the range of knowledge and the variety of approaches presented by the workshop participants and later contributors required it. The book's emphasis shifted from the manufacturers to the exchange, uses, and symbolic meaning of beads, and the questions asked changed from the makers of beads to the objects themselves, with gender as an embracing theme. Thus, the volume covers a range of time from prehistory to the present day, and various aspects of beads in countries as diverse as Chile and China.

Beads and Bead Makers contains twelve chapters and two appendices, each with its own references section, rather than a comprehensive bibliography for the whole book. It is true to say that the depth of bead knowledge covered by most articles is not insignificant; this book should be looked on as a good bead resource, not just as a work of anthropology. Some of the articles are archaeological in scope, others are by ethnographical specialists or social historians.

The main topics covered are: making and exporting beads from Venice from the Medieval period to the present day; gender in the beadwork used in African aesthetic and ritual culture; hand-blown glass Venetian beads which are used as a family emblem on the island of Buguma in Nigeria; making and using *lantana* beads in Nigeria; a history of Christian rosaries in the Andes of Chile; why red beads are important in Ecuador; beads used by African Americans in the U.S.A. before the Civil War; the ways beads are used and perceived in the Mardi Gras festival in New Orleans; beads used by the Kelabit

people of Sarawak, Borneo; Greek beads of the Mycenaean period—the age of heroines in Greek tradition and mythology; archaeological investigations into ancient Chinese beads; what beads mean to craft producers supported by Oxfam; and “Don’t get your Necklaces in a Twist!” or specialist bead terms for researchers and collectors.

The contributions are all packed with useful information, and are illustrated with 86 black and white drawings and photographs. This is where, I am sorry to say, the book is weakest, because somewhere in the scanning or printing of many of the photographs they became dark or overinked and the detail has been completely lost or obscured. I have a paperback copy, so I’m not sure whether this unattractive feature also appears in the hardback edition, but the photographs of Sarawak beads in Figs. 10.3 and 10.4, for example, are atrocious, while the adorned Uduk women in Figs. 1.9a and 1.9b have been reduced to mere silhouettes! I would also have preferred a little tighter proofreading to get rid of silly little mistakes such as “Neckless” instead of “Necklaces” in the Table of Contents. Furthermore, the Gemmological Association is at “Greville” Street, not “Grovile” (p. 305), my address for the Bead Society of Great Britain is “Casburn Lane” not “Cosburn Lane” (p. 305) and, as any good bead researcher ought to know, they are Nueva “Cadiz” beads not Nueva “Cad” (p. xi)!

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Glasperlen Christbaumschmuck/Glass Bead Christmas Tree Ornaments.

Waltraud Neuwirth. Selbstverlag Dr. Waltraud Neuwirth, P.O. Box 11, A-1194, Vienna, Austria. 1995. 320 pp., 167 color figs., 95 b&w figs., ATS 640 (hard bound) + ATS 85 surface postage.

Many people’s happiest memories revolve around Christmas, a joyful occasion to celebrate the birth of Christ and exchange gifts and good cheer with loved ones and friends. At the center of the event was—and

continues to be—the beloved Christmas tree, frequently a scruffy one hacked down in a nearby woods. Yet, even the most lopsided and malformed tree could be turned into a dazzling wonder through the addition of tinsel, garlands, and a variety of ornaments. With so many fond memories attached to them, it is no wonder that many people admire and collect Christmas tree ornaments. If you fall into this category, you will love Waltraud Neuwirth’s newest book.

Written in German and English, the book deals with the Gablonz-industry Christmas tree ornaments collectively produced in Bohemia, Moravia, Silesia, and Austria during the late 19th and 20th centuries. The text is relatively brief, the English portion taking up only 20 pages. It surveys the different forms of ornaments that were produced, as well as the beads and other components that went into their composition. While several kinds of drawn and molded beads were utilized, hollow or blown beads were the principal constituents. Composed of thin, non-transparent glass to obscure each ornament’s wire framework, the hollow beads were ideal for Christmas tree ornaments as their extremely light weight kept even a small tree’s branches from sagging.

For the bead researcher, the section devoted to hollow beads contains useful information concerning manufacturing techniques (including interior ribbing and silvering/gilding) and nomenclature. Another section discusses how to date and determine the place of manufacture of the beads and the ornaments they compose. A list of the principal regional manufacturers and merchants of Christmas tree ornaments during the first half of the 20th century occupies six and a half pages.

An additional 28 pages are devoted mainly to German technical articles concerning the manufacture and marketing of beads and ornaments, especially silver- and gold-lined blown beads, from the late 19th century to the present. There is much valuable information here but the technical language that pervades the material apparently made it too difficult to translate for the benefit of English-speaking readers. This is unfortunate, but understandable.

The concise text is much enhanced by a profusion of excellent color and black-and-white illustrations of a wide variety of ornaments and their components, some on sample cards. German/English captions

describe the objects and provide measurements and probable dates of production. This information will benefit both researchers and collectors.

In case you already own Neuwirth's major work on beads, *Perlen aus Gablonz: Historismus, Jugendstil/ Beads from Gablonz: Historicism, Art Nouveau*, it should be pointed out that there is little overlap in content between the two publications. You will need to obtain *Glasperlen Christbaumschmuck/Glass Bead Christmas Tree Ornaments* to round out your knowledge of Gablonz-industry beads, and to obtain the short list of errata for *Perlen aus Gablonz*.

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Perlen: Archäologie, Techniken, Analysen. Akten des Internationalen Perlensymposiums in Mannheim vom 11. bis 14. November 1994.

Uta von Freeden and Alfried Wieczorek (eds.). *Kolloquien zur Vor- und Frühgeschichte*
1. Dr. Rudolf Habelt GmbH, Postfach 15 01 04,
D-53040 Bonn, Germany. 1997. x + 386, 26
color plates, 197 b&w figs., index. DM 59.00
(hard bound).

A specialized conference on beads was held in Mannheim, Germany, in the fall of 1994. It was attended by over 50 specialists from 14 European countries. The volume under review contains 35 of the presented papers. This profusion makes it impossible to discuss the papers individually, and necessitates a summary review of the proceedings.

The impetus for the Mannheim symposium was provided by a group of German-speaking specialists who, during the 1980s, had been individually working on beads, particularly those of the Early Medieval period (5th-8th centuries). These glass beads derived primarily from strings which had served women as pectoral or neck jewellery and were subsequently placed in their graves together with other artifacts. Many of these graves have been examined archaeologically, resulting in a rich store of material for

analysis. Several of the analysts met in 1990, in order to coordinate their individual studies more effectively. The first aim was to compile a suitable system of attributes to facilitate a universal system for the description and comparison of beads, one which would provide the basis for an electronic bead database, as well as a computer-based program of documentation. These endeavors were quite productive, so that the initial results and the first version of the computer program "ProPer," which is now generally available, could be presented at the Mannheim conference (pp. 117-124, 169-176, 177-186).

In 1994, this small group initiated the Mannheim symposium in order to draw together more closely those European bead specialists who had hitherto been working mainly in isolation or in small groups and, at the same time, to create an awareness among others of the profusion of the studies being undertaken. The symposium papers cover a wide spectrum of time, place, and themes, while providing a representative overview. Three papers deal with Iron Age beads (ca. 8th century B.C.-birth of Christ), five with beads of the Roman Imperial period (ca. birth of Christ-4th century), eleven with the Merovingian period (ca. 5th-8th century), and nine with Medieval material (8th-12th century). The emphasis on the two latter periods effectively reflects what was being investigated and analyzed at the time. The papers cover western and northern Europe in particular, with the focus being on the German-speaking region; several articles discuss material from eastern Europe, including the Ukraine.

Thematically, 23 papers are primarily concerned with overviews of the subject material and attempts at typology and chronology. Three papers consider questions of methodology, two deal with excavated beadmaking workshops, and five discuss glass analysis and its interpretation. Here, too, as far as I can see, the relative frequency of the topics realistically reflects the emphasis of current research. All papers contain footnotes and comprehensive bibliographies. Thus, this volume provides an up-to-date and representative overview of European research on archaeologically recovered beads, and provides the interested reader with an extensive listing of additional literature.

The pioneer studies presented in this volume provide us with a better understanding of various aspects of European bead research. They underline the

necessity of standardizing the nomenclature and attributes of beads to facilitate comparative typologies. The activities of the "Heidelberg group" alluded to above and the proffered program "ProPer" mark an important step in this direction. In the area of beadmaking, tangible finds from excavated workshops, coupled with comparative data from present-day workshops in technologically underdeveloped countries, ensure that if such workshops are found archaeologically, they will be properly identified. As for the chemical analysis of glass artifacts, this is still in the early stages, but the indication is that such work, coupled with tangible finds from workshops and more stringent standards in the area of archaeological documentation, can provide a clearer picture of how beads were distributed over Europe through trade. Unfortunately, insights concerning how prehistoric man viewed beads beyond their purely decorative aspect remain few.

The Mannheim proceedings provide an important companion volume to the proceedings of the Nordic Glass Bead Seminar held in Lejre, Denmark, in 1992 (see *Beads* 7, pp. 100-102, 1995). The latter focuses mainly on northern Europe, allowing one to take stock of the state of research on pre-modern beads in Europe. Thus, there now exists an extensive body of knowledge on the beads of the most important regions and periods. Only the glass beads of the Bronze Age still seem to slumber in a research backwater.

Most of the symposium papers are in German, one in French, and three in English. The non-English ones are followed by informative English summaries. The volume has been scrupulously edited, and is richly illustrated with both black-and-white images and 26 excellent color plates. The production quality is outstanding, something unusual for symposium proceedings. This, coupled with the contents and the agreeable price, should ensure that this book receives the broad distribution it deserves.

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*Das awarenzeitliche Gräberfeld von Halimba.
Das Awarische Corpus. Beihefte V.*

Gyula Török. Debrecen-Budapest. 1998. 254 pp., 11 figs., 87 tables, 3 maps. Available from Harrassowitz Buchhandlung, Taunusstr. 5, 65174 Wiesbaden, Germany. DM 90 (about \$41.00) (paper).

Researchers of the early medieval period of Central Europe have had to wait 30 years for the publication of this work. *Das awarenzeitliche Gräberfeld von Halimba* (The Avar Cemetery of Halimba) provides the missing link in the long-held scientific hypothesis that the Avars were an important component of the autochthonal population which the Hungarians of Árpád found in the Carpathian basin, and later integrated.

In his work "Die Bewohner von Halimba in 10. und 11. Jahrhundert" (The Inhabitants of Halimba in the 10th and 11th Centuries), which deals with the Halimba-Cseres cemetery of the Age of the Hungarian Conquest and the Early Árpadian Age, Gyula Török (1911-1997) clearly wrote that Avars comprised the main component of the common people found there. He defines Phase II as representative of the autochthonal Avar population, and Phase III as representing the homogenous population that continued to use the cemetery. Their remains allow us to trace back the formation of the Hungarian common people. For this very reason, the find-material of the 7-9/10th-century Avar cemetery should have been published as soon as possible after its excavation in 1961-1965 by Török, while an archaeologist with the Hungarian National Museum. The manuscript was already written in 1973. It is very sad that the author has not lived to see the publication of this, the most important work of his career.

The Halimba-Belátódomb cemetery contains objects analogous to those at the cemetery of Halimba-Cseres, as well as evidence for the abandonment of the cemetery at the beginning of the 10th century. Török bases this dating on the presence of segmented beads, D-shaped buckles, and certain types of earrings in the graves. He holds unambiguously that the Avar cemetery of Halimba-Belátódomb preceded the Halimba-Cseres cemetery in which the Hungarians were the definitive element. This contention seems to be reinforced by

some analogous earring types from Phase I at the Halimba-Cseres cemetery, but even more by the fact that here was buried a population with grave goods and burial customs indicative of an autochthonal population such as that represented at the Avar cemetery of Halimba-Belátódomb; e.g., the gathering and placing of Roman bronze coins in the graves. There are, furthermore, strings of beads of similar composition (cf. Grave 20 at the Belátódomb cemetery and Grave 878 at the Cseres cemetery). It is noteworthy that the melon-seed-shaped beads characteristic of the late Avar period and present in great numbers at the Belátódomb cemetery also occurred in Graves 438 and 370 at the Cseres cemetery. In this respect, further study of the bead material from the Belátódomb cemetery would yield even more evidence. (The bead material from the Halimba-Cseres cemetery has been analyzed and published in several articles by the reviewer, including one in this journal [vol. 7].)

Török elaborates on the finds from the well-separable upper and lower chronological phases at Halimba-Belátódomb. Unfortunately, one has to search back in each case from p. 66 to see whether they belong to the earlier or later phases. This is not the fault of the author, but that of the editors who did not follow his instructions. Also contrary to the author's wishes, the editors placed the grave descriptions at the beginning of the book instead of at the end where they are best suited. It is also regrettable that the drawings and photographs were published in a reduced state.

Besides proving an Avar continuity until the Hungarian conquest, the Halimba-Belátódomb cemetery reveals that ten generations of Avars lived in the area continuously. This is an important contribution to our knowledge of the Avar common people, as well as to that of the Hungarians. The Halimba-Cseres cemetery reveals that the two groups initially lived together and then slowly integrated, events that can be traced back to the time of the first Hungarian kings. Therefore, there *were* Avar-Hungarian common-people's cemeteries, an observation that Gyula Török had already made when the official attitude spoke only about Slav-Avar cemeteries. It is regrettable that the editors have hidden this historic conclusion in the last footnote on pages 131-132.

Pages 137-142 list Gyula Török's collected works. An evaluation of these reveals that throughout his

career he remained faithful to his scientific conviction that the Avars living in the Carpathian basin were organically integrated by the conquering Hungarians. He did not deter to speak about separate Avar blocks (Sopronkőhida). Gyula Török has regularly emphasized the importance of the organized settlement of people by might of the ruling class in both the Avar Age and the early Hungarian period. The results of the latest archaeological excavations have justified him in this respect; e.g., the 10th-century common people's cemetery of Ibrány-Esbóhalom in county Szabolcs-Szatmár-Bereg. His opinion, drawn from his excavation experience, that the most important social entity both in life and death was the joint family of Avars, Slavs, and Hungarians as well, has also proved to be durable. His interpretation of the archaeological evidence has resulted in an authentic historical picture of these people.

This volume deserved to be produced by a well-known publisher and placed in wider circulation. Nevertheless, according to standard Hungarian practice, it received only modest support from the Hungarian Academy of Sciences, and is being circulated only in professional circles. It is, therefore, fortunate that the Harrassowitz Publishing Company of Wiesbaden has undertaken its distribution abroad.

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Little Chief's Gatherings: The Smithsonian Institution's G.K. Warren 1855-1856 Plains Indian Collection and The New York State Library's 1855-1857 Warren Expeditions Journals.

James A. Hanson. The Fur Press, 303 Paddock Street, Crawford, Nebraska 69339. 1996. xii + 203 pp., 34 color figs., 47 b&w figs., 3 appendices, bibliography, index. \$75.00 (hard cover).

Among the Smithsonian Institution's vast holdings is a sizeable collection of zoological, botanical, paleontological, and ethnographical specimens donated in 1856 by Gouverneur Kemble Warren, a lieutenant in the U.S. Corps of Topographical Engineers who was known to the

Western Sioux as Little Chief. The ethnographical material is of especial interest as it comprises one of the largest and earliest assemblages of Plains Indian artifacts. As many of the items are beaded, there is much of interest to those researching Plains beadwork or analyzing and interpreting beads recovered from mid-19th-century archaeological sites in the Great Plains region.

Based on 20 years of research, the present volume brings together all that is known about G.K. Warren and his superb collection. In Part I of the book, Hanson chronicles Warren's life (1830-1882) with emphasis on his exploits during the Civil War, a time that saw his greatest achievements... and his greatest humiliation. The author then presents background information on the ethnographic material, concluding that it was collected following the Battle of Blue Water Creek in what is now western Nebraska. Here, on September 3, 1855, General William S. Harney's Sioux Expedition attacked and plundered a Lakota (Sioux) village of some 42 lodges. While much of the material left by the fleeing Indians was either destroyed or appropriated for use by the Army, Warren was able to collect a representative sample of Lakota material culture. Apparently because he was subsequently ashamed of his participation in the looting, Warren never officially informed anyone of the circumstances under which the collection was made. All that was previously known was that the material was "Sioux." Hanson's findings make the Warren collection even more valuable for researchers as we now know exactly when and where the artifacts were collected, as well as the cultural groups that were involved (Brule, Oglala, and Miniconjou Sioux, as well as the Cheyenne).

The final section of Part I is a detailed catalogue of the artifacts, most of which are beaded to some degree using "pony beads" (defined by Hanson as over 2mm in diameter). Described in the order they were accessioned by the Smithsonian, the beaded objects include garments such as dresses, shirts, leggings, moccasins, and a sash. Accouterments consist of a knife sheath, pouches, hair ties, a deer-hoof rattle, a bow case and quiver, and a horned headdress. There are also paint and storage bags, as well as strings of

pony beads, and beaded bands which were apparently being recycled. Of an unusual nature are two miniature objects (a baby carrier and a storage bag), several bladder bags filled with quills, and a doll, the oldest one known from the Plains. An entire outfit for a horse completes the inventory of beaded objects. Among the non-beaded artifacts are Pueblo blankets, stone pipe bowls, a pipe stem, bison robes, feather ornaments, a lariat, a whip, and a bow and arrows. The detailed descriptions of the artifacts are supplemented by both color and black-and-white photographs.

Part II of *Little Chief's Gatherings* presents the verbatim transcripts of the Warren expedition's journals for 1855, 1856, and 1857. Never before reproduced, they are a valuable source of information on the geography, history, and anthropology of portions of what are now the states of Nebraska, North and South Dakota, Wyoming, and Montana. There is information on the size and distribution of the various tribes, as well as on the Battle of Blue Water Creek and the cholera epidemic of 1856. Also dealt with are the fur trade, the steamboat system on the Missouri River, and the various trails that crossed the region.

While the book is a bit expensive, it is well worth the money as it thoroughly documents one of the earliest and most significant assemblages of Plains Indian artifacts in existence, an assemblage derived from a known village over a space of only a few days. One cannot ask for a better provenience. When the artifacts are viewed in tandem with a reading of Warren's description of the events that took place at Blue Water Creek on September 3, 1855, the outcome is a poignant picture of what Lakota life and material culture was like at a time when their traditional ways were beginning to crumble as America advanced westward, pushing them from their lands.

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Plate VA. Melanau: Melanau girl in bridal costume; she wears a bead tunic (photo: H. Munan).

Plate VC. Melanau: **Top:** *Ketua Kampung* (village elder) Peteran bin Libai (center) wearing his beads. **Bottom:** Detail of the beads (photo: H. Munan).

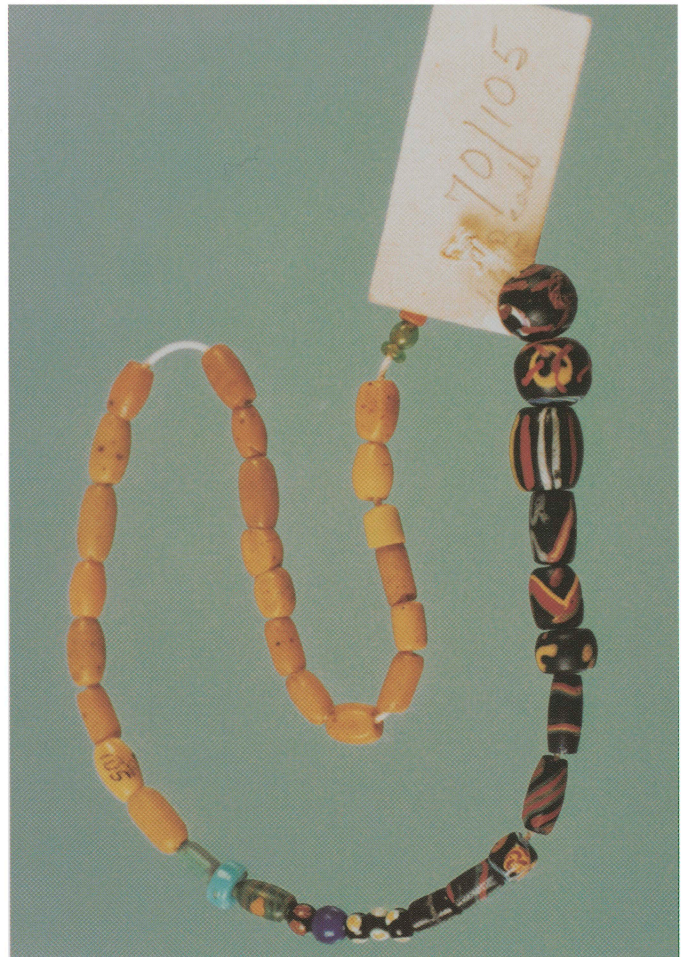


Plate VB. Melanau: String of Melanau "magic" beads (photo: Sarawak Museum).

Plate VD. Melanau: Young man dressed for a festival; he wears his grandfather's beads and some new ones "just for fun" (photo: H. Munan).

