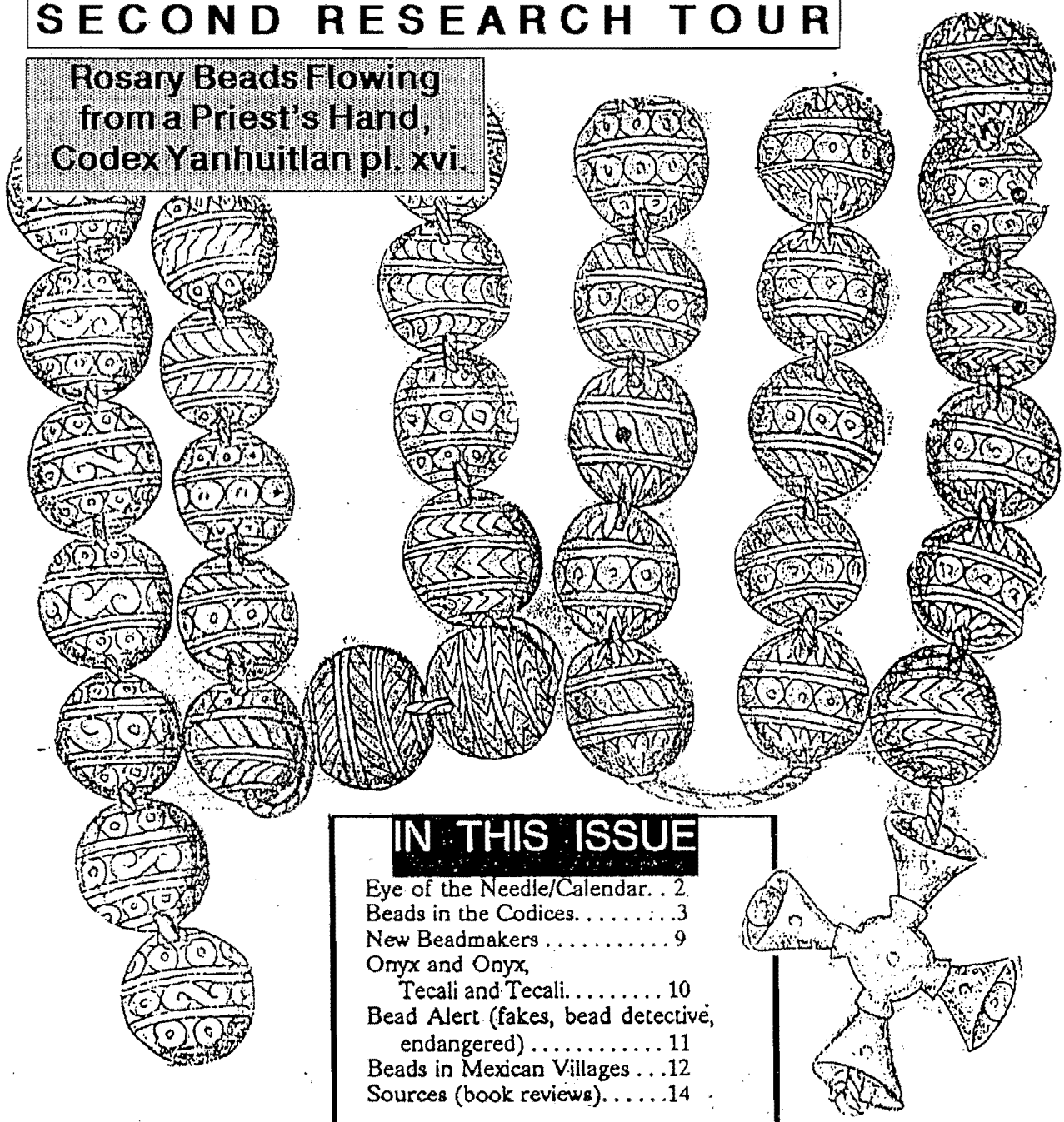
The MARGARETOLOGIST

Journal of the Center for Bead Research

Volume 7 Number 2 Issue 18 1994

BEADS IN MEXICO: SECOND RESEARCH TOUR

Rosary Beads Flowing from a Priest's Hand, Codex Yanhuitlan pl. xvi.



IN THIS ISSUE

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Through the Eye of a Needle

There have been lots of changes around here. Ten new storage units, more volunteer help and a remodeling have altered our look and make us more efficient. Several new cabinets are devoted to the Bead Sample Card Collection, which has nearly doubled since the last issue. New steel shelving holds my other obsession: playing cards (and you thought I could only play one tune). One department is gone; the Bead Press is no longer efficient for us. A new one has been added: The Horace C. Beck Experimental and Analytical Laboratory.

The Beck Lab has permanent quarters. Recent donations include an excellent scale and financial support. A short/long wave UV light and some other equipment have also been added. More apparatus is needed, so if you have good used equipment or would like to donate in other ways, let me know.

Beads of the World is selling well. A second printing is coming soon, and I hope to iron out errors that crept into the first.

No one has advertised, so I am dropping that section for now. There is so much material for this issue that it has been expanded to 14 pages.

Our focus this issue is Mesoamerica (an archaeological term for southern Mexico and adjacent Central America). It is the results of two months of bus trips, hiking and music in the parks in Mexico, a first foray into Belize and a few weeks of library work in the U.S. and Mexico. Sorry, there was no room for a map in this issue; I have tried to explan where things are; get out your atlas for state borders.

Beginning this issue references to previous issues are abbreviated. [1994 7(1):2] refers to Vol. 7, No. 1, page 2 of the MARGARETOLOGIST from 1994.

I know, I know, I promised you the results from the beads of the slave ship; it is coming next -- really.

Enclosed is a flyer for our Bead and Art Tour to Indonesia next year. I am very excited about it; hope you will feel the same.

REMEMBER

*** If the last digit on your mailing label reads 7:2, its time to renew.**

*** Notify us before you change your address.**

*** Memberships make wonderful Holiday and other gifts.**

*** Encourage your Bead Society and bead shops to support us and all research groups.**

The Margret A. Carey "Gotcha" Award

This is not a joke. Spot a typo and get a point. Spot a factual error and get 3 points. Send in your list within a year of publication (end of 1995 for this issue). The most points win a bead sample card from our collection. We will print corrections as they are found.

Calendar 1994 - 1997

***November '94 - February '95 Exhibiting Type Collection in the Philippine National Museum**

***March - May '95 Research in East and South India**

***May - June '95 Bead and Art Tour of Indonesia**

September '95 Lectures in Chicago area

October - November '95 Czech Bead conference; East Europe research

November '95 - January '96 West African research

***March 7 - 11 '96 Bead Expo '96, San Antonio Texas**

***Late '97 Excavation of Roman Period Egyptian Red Sea port**

[starred dates are rather firm]

SHORT NOTES

TREATY OAK REVISITED

We have commented several times on the large oak tree in Austin, Texas, under which many councils were held and treaties signed. The 600 year old tree was poisoned by Paul S. Cullen with the herbicide Velpar in 1989, and we reported soon afterwards [2(4):8] that among the offerings made to help heal it were beads.

In the last issue, Molly Ivans was quoted that the tree had died. Shame, Molly! You have misled us. The tree still lives. Cullen has recently been rearrested on a parole violation after serving about a third of his nine year sentence. The tree is not what it used to be, having lost more than half its limbs, but has stabilized.

Thanks to Beth Barringer for showing me the tree again and sending information about its current status. It must have been the beads that saved it after all.

THE BEAD MUSUEM

The Bead Museum and the Bead Society of Greater Washington have announced plans to move the Museum to the Washington, D.C. area. The exact date of the move has not been determined. An estimated 3 to 5 million dollars will be required.

To begin with, profits from the Third International Bead Conference, to be held in Washington 17-19 November 1995 will be earmarked for the move and settling of the Museum.

BEADS FOR CHRISTMAS

Lilly's Kids is a special Christmas catalogue put out by the mail order house of Vernon Lilly. The 1994 edition has no less than 9 gifts that involve beads. Some are not unusual, including a charm bracelet, two bead stringing kits and a kit of pop-in beads. Others are more imaginative: a kit to make paper beads, a bead loom, a kit for beading shoe laces and large wooden beads for the very young.

BEADS IN THE CODICES

BEFORE THE COMING OF THE SPANISH, there were writing systems of various complexity throughout Mesoamerica. The most sophisticated was that of the Maya, recently deciphered [M.D. Coe 1992]. It consisted of glyphs or little pictures which represented words and phonemes. Other Mesoamericans used combinations of glyphs and pictures to record their thoughts and actions.

The pictures and writing were painted on paper made from maguey (Agave americana and relatives, that also yields sisal and tequila), animal skins, and later on cloth. Long rectangular ones were often hung on walls as murals in houses. Today they have either been rolled up and are known as rolls or fan-folded into book-like pages and misnamed codices (sing. = codex). Large cloth productions are called lienzos (canvas), and there are also maps, historical sheets and manuscripts made in the manner of Spanish books. The corpus of pictorial manuscripts is often referred to as codices.

Hernando Cortés sent "two books such as the Indians have" to Charles V in 1519 (which may have been Codex Nuttall and Codex Vienna), but later Spaniards burned as many as they found, considering them to be the work of the devil. Some scholarly churchmen immediately saw the loss, and later so did the administration. While some codices were concerned with ceremonial rites, most were either historic or genealogical in nature, lists of tributes obtained or maps delineating land ownership, all of which was useful to the Spanish.

Only sixteen codices exist that were likely produced before the Conquest: two from Central Mexico (Aztec), three Maya and eleven Mixtec-Zapotec. Glass [1975:15] counted a total of 434 Mesoamerican pictorial manuscripts. Obviously, the vast majority were drawn after the conquest; production continued through the 16th century.

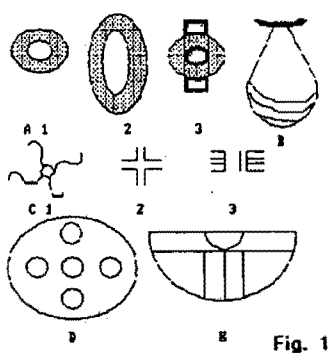

Fig. 1

These manuscripts are invaluable for the study of the region. I have long wanted to work with them, but until recently have had no chance to do so. Only two (Codex Nuttall and Codex Mendosa) are published in popular form [as we go to press, I have learned that Dover has put out an edition of Codex Borgia]. Glass and Robertson [1975] published many scarcer ones in black and white. Others can be found only in specialized libraries. While many key codices have been reproduced exactly as the originals, especially by Akademische Druck u. Verlagsenstalt of Graz, Austria, they are costly, up to $500 each.

To date, I have examined 126 of these manuscripts. This may seem a small sample, only a quarter of the total, but constitutes the major ones, others being mostly fragments or unpublished. To research this project, I have been working in Instituto Welty of Oaxaca; Museum Amparo of Puebla; the Benson Latin American Collection at the University of Texas, Austin; and the Arizona State University in Tempe. The staff at all these institutions were most helpful and deserve much thanks.

There are countless beads and other forms of jewelry in the codices. This is not an attempt to classify them. If a PhD student doesn't do it first, maybe I will in my next life. Someone should. The work of Anawalt [1981] shows how much is to be gleaned from studying the costumes on a select number of the codices, and the detailed description of the jewelry worn in the Codex Ixtlilxochitl by Anders [1976] is very illuminating. I have limited myself here to technical considerations

[NOTES: For further reading on the pictorial manuscripts in general Glass [1975] and Glass and Robertson [1975] are invaluable introductions. In this text a number in square brackets following the name of a codex refers to the page number in the codex itself; r is recto, v is verso, other letters refer to positions on the page.]

READING THE MANUSCRIPTS

In a few cases manuscripts were painted by order of the Spanish and Spanish legends written on them to explain the pictures. In most cases, no such help is available, and reading relies on understanding glyphs and the figures portrayed. Except for rather late codices, the pictures are rarely representational but conventional.

For example, Fig. 1 shows common Mixtec glyphs indicating beads or bead materials; Fig. 2 represents a common form by which necklaces are shown. Fig. 1, A1 stands for "jade," and often by extension "bead." In some cases, it is elongated, apparently indicating a pendant (A2). When strung it is usual for the hole to be placed over the string (A3), rather than passing the string through the hole. Note also in Fig. 2 how the beads are shown on a whole strand.

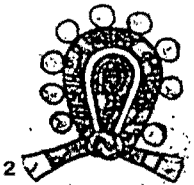
Fig. 2

An area of possible confusion is that the jade glyph also represents water, as the two were closely connected in myth and ritual. In the Codex Borgia [58] two bird-headed deities appear to be eating strings of beads coming from a container, but the container is a jar of pulque (an alcoholic drink, a precursor to tequila) and it is common to represent eating/drinking by having the food/liquid jump from the container to the mouth (Fig. 3). On the other hand, Codex Fejervary-Mayer [42] shows a string of beads, complete with golden pendants and a

decorated bone in the center connecting the mouths of a disembodied head on a table and a dog-headed god (Figure 4). This appears to be consumption of a string of beads, though its meaning remains unclear.

There is much else to understand: dates, names, the meaning of actions, the identification of glyphs, etc. While I have learned a great deal about this ancient writing/pictorial form, I am no expert. But, approaching the manuscripts from the specialization of beads is like learning a new language to carry out research. It is not the first time.


Fig. 3

SOURCES OF BEAD MATERIALS

No manuscripts mention sources of raw materials. Those commonly valued for beads included jade and other greenstones, turquoise, gold, silver and marine products such as shells, tortoise shell and pearls.

The Hill of Jade and the Hill of Gold, along with the Hill of Quetzals (a bird whose feathers were widely used in ornamentation) appear together at the beginning of Codex Seldon. These were the most precious objects of the Mixtec and the hills appear in other codices, always dated Year 1-reed, Day 1-alligator, the foundation of many towns. The collector Seldon said this was the birthdate of the god Quetzalcoatl [Caso 1964:71-2]. These "hills" have no reality, but are merely symbolical.

Two tribute rolls, which detail the expected gifts to the Aztec emperor, also furnish few clues. The Codex Moctezuma [Berdan and Durand-Forest 1980:36-44], and the Codex Mendoza [Molins n.d.:51-2] list the same tributes from the same provinces; many authorities believe that both were copied from one older original.

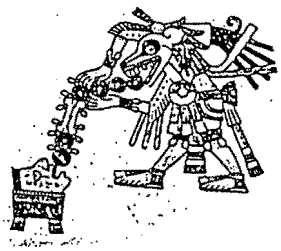
Fig. 4

In them, jade necklaces were demanded from north-central Guerrero, northern Oaxaca, the Pacific coast of Chiapas and central Veracruz. While Guerrero may have furnished the "blue jade" of the Olmec [M.D. Coe 1968:100-3] none of these areas produced jade for the Aztecs; the southern areas may have been transit points for Guatemalan jade. Turquoise tribute came from the Guerrero/Oaxaca/Puebla corner, central Veracruz and southern Puebla. The turquoise itself must have come from the north; Saville [1922:27-8] said there were no known deposits of turquoise in Mexico, while Pogue [1973:48; orig. 1915] said there were no important deposits, only a few minor ones in Zacatecas and Sonora. Thus, these precious materials were not obtained from their sources, but demanded of wealthy provinces which had to get them elsewhere. The only tributes coming from their actual sources were amber from the Pacific coast of Chiapas and Spondylus shells from around Acapulco Bay.

SHELL BEADS

The most common shells depicted as beads in the manuscripts are also to be seen on statuary and found archaeologically. Most numerous are necklaces of oliva (Oliva porphyria) shells, which are usually sawn toward the base for stringing. Sometimes their spires are knocked and ground off, though not so shown in the codices. These shells are usually associated with rain [Safer and Gill 1982:153-5]. Necklaces of this type are in the Codex Borgia [64] (Fig. 5) and on the common people in Codex Rios [57v, 59r, 60r].

The Horse Conch (Pleuroploca spp.) is worn as an emblem of the god Quetzalcoatl, as seen in several depictions of the Codex Barbonicus [e.g. 16] (Fig. 6). Such conchs are also on statues. Priests or devotees wore them as well; they are uncovered particularly in the Huastec region of the Gulf Coast.


Fig. 5

CUTTING STONES

Very little exists in the codices concerning the working of raw stone into bead roughouts or blanks. One instance in the Codex Vindobonensis [49c] is a (painted?) black man leaning over a large glyph meaning "stone" and cutting into it (Fig. 7). He uses a flint knife like those shown in sacrificial scenes and the "flint" date glyph.

The position of the man, the stone and the knife are clearly not drawn from life. No stone exists in yellow, brown, red and green plaid, nor do any have little protrusions as this one does. Cutting a stone at this angle would be all but impossible. What we have is a symbolic, not pictorial representation of stone cutting, typical of most pictures in the painted manuscripts.

A scene in the Codex Mendoza [Ross 1978:115] is more realistic. It shows a lapidary instructing his son in beadmaking (Fig. 8). Both are squatting on the ground facing each other. At the man's feet are two strung jade beads. He is holding a green stone to which is attached the "jade" glyph in one hand and a stone knife in the other. He has cut a notch into the jade, apparently to break it in two. Thus, the use of stones to work stones is verified in a much more tenable manner than shown in the Codex Vindobonensis.

DRILLING STONE

Drilling is more often depicted than stone cutting, but yields little technical information. The Codex Dresd-

en [6] has three panels with men sitting cross-legged on the ground drilling a glyph Thompson [1972:33] identifies as tortoise shell (Fig. 9). The Codex Madrid has three drilling scenes. Two on page 38 are of a black demon (?) and a man, each squatting on the ground and drilling the "stone" glyph (Fig. 10). On the other page [99] a standing demon-like character drills a round object not easily interpreted as a glyph of any sort.

Fig. 6

In all these pictures drilling is done by twirling a large stick between two hands. The codices show no mechanical drills of any sort, nor are there any early colonial references to them. The missionary Sahagún [1959, book 9-80-2] (died 1590), wrote a detailed account of drilling hard stones, telling us that a metal tubular drill with abrasives was employed. He discussed lapidary work elsewhere as well [Ibid., book 10:26-7], but in never tells us how the drill was operated. Another missionary, Duran [1964:120] marveled at "the amazing skills of these stone artisans," but only said that large stones were shaped with smaller ones. Neither Landa discussing the Maya of Yucatan nor Torquemada's history of the Aztecs mention beadmaking.

Fig. 7

Thus, subsequent writers have been ambiguous about the drills of Mesoamerica. M'Guire (McGuire) [1892:170-1] was the first to replicate successfully pre-contact stone artifacts. He concluded that since Mesoamericans had bows and arrows they would have adopted them for fire and other drills. (This seems likely; indeed, it could be that the drills preceded the bow and arrow.)

In his study on the lithic industries of aboriginal Americans, Holmes [1919:353-7] relied heavily on McGuire, noting that in a 1896 paper McGuire had become less sure about the use of mechanical drills south of Alaska, where strap drills were still in use. In the first published book on beads (1929) Orchard [1975:51] said there was, "no positive information as to the method of revolving the drills," noting hand drilling in some codices. He then said the bow, pump and perhaps the strap drill were ancient and probably used in pre-contact Mexico.

Martin [1934] published a drill set consisting of a bow, a drill-spindle and a handpiece (for the top of the drill spindle) which was less than scientifically excavated in a Utah pueblo, though he was sure it was of pre-contact date. After reviewing the evidence for mechanical drills in northern North America, he put this forth as the first one discovered south of the Great Lakes.

Kidder, Jenkins and Shook [1946:123], in their report on the jade working site of Kaminaljuyu, Guatemala, noted that McGuire and others doubted the use of a mechanical drill, but the long holes in jade, Martin's report, "and because of the enormous amount of drilling done by the ancient Mesoamericans, we think it certain that they must have had the bow drill or some perhaps even more efficient apparatus."

Fig. 8

Digby [1972:16] recognized the palm-held drills in the codices, but believed that, "the lateral stresses of this method of imparting a rotary motion to the shaft would have broken the point [of the drill when perforating jade].... The most likely assumption is that the Maya used a pump-drill."

In the latest study on the problem, Jernigan [1978:199] said, "Present evidence is all negative: no pump or bow-type drills have been recovered in contexts which leave no doubt as to their use by prehistoric Southwesterners [rejecting Martin's evidence]. All drills must have been rotated between the palms or simply twisted with the fingers."

Not so. Though the authorities have agreed to disagree, archaeologically as far back as the earliest Olmec site, San Lorenzo Teotichitlàn, mechanical rotary motion was employed. This is clear from the concentricity of the drill hole, as opposed to an eccentric hole which results from hand-held drills [Gwinnett and Gorelick 1981:22] and the continuous concentric patterns left inside the holes.

Through the kindness of Ann Cyphers, San Lorenzo's current excavator, I examined small ilmenite blocks which had been perforated, usually three times. Their use is am-

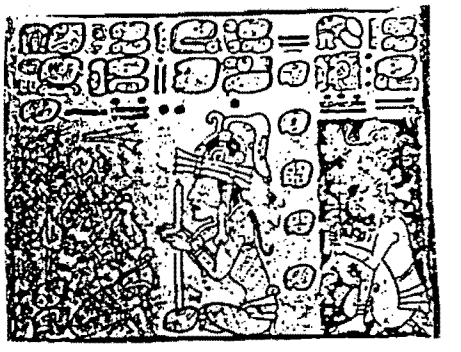

Fig. 9

biguous, but they were certainly not beads as M.D. Coe and Diehl [1980:242] avered. Cyphers believes that the nearly six tons of them now uncovered were handpieces for the top of the shaft of a bow drill. This may be correct (I have no other explanation for them), but in any case they attest to a mechanical drill. Additionally, the famous large Olmec heads, of which

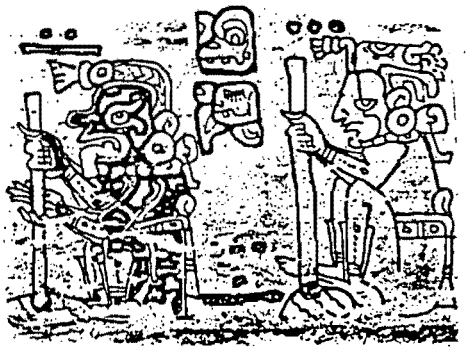

Fig. 10

16 are now known, were drilled at the corners of the mouths and several later defaced by drilling. I have examined nine of these and drilling was also mechanically done.

What can we conclude from this? The use of mechanical drills in Mesoamerica as far back as Olmec times is established from the patterns left on drilled objects. The lack of a drill set archaeologically is not surprising, since they were probably made of wood, abandoned soon after the coming of the Spanish, and have since perished. The six tons of ilmenite objects found at San Lorenzo may be one of the few remaining artifacts related to drilling (but see below).

But, why do the codices show us nothing but hand-held drills? The reason has nothing to do with actual lapidary techniques and everything to do with ceremonial conservatism. Many codices, including the Vindobonensis (which has nine such scenes), Laud, Seldon Roll and Becker I, show drilling not for beadmaking but for fire making.

Fig. 11

Firemaking was an important element in pre-contact religion. The complex double calender, consisting of the sacred cycle of 260 days and the secular one of 365 days, interlocked in a 52 year interval (sometimes called a "century") when both were once again in synch with each other. This significant event was celebrated by several ceremonies, including the "tying of the years" (variously translated), in which bundles of wood were tied [Dibble 1947:5].

Another important ceremony involved the extinguishing of the fire of the last "century" and the igniting of a new one. Hand held drills may have been used for the starting of the fire. Martin [1934] noted several groups around the Great Lakes and north used bow drills for starting fires, but that at Mesa Verde and in Arizona hand drills were used. Kidder, Jenkins and Shook [1946:123] pointed out, "the modern Pueblos, although they habitually employ the pump drill for bead making, stick to the primitive hand method for all ritual purposes." The ceremonial use of hand-held drills for fire-making as opposed to the practical use of pump drills for beadmaking is noteworthy.

We cannot say how accurate the depictions of fire drilling in the manuscripts are; they may be anarchistic. In some cases a single figure is starting the fire, while in other scenes one person drills the fire and two people hold each end of the log being drilled.

The hypotheses here is that due to the ceremonial nature of fire lighting the codices always depict that scene in a conventional manner (and perhaps even a realistic manner) and this has been transferred to all drill scenes, even with stone or tortoise shell. This is what we saw in the stone cutting scene in Codex Vindobonensis above, but since this is not an important rite, stone cutting is depicted realistically in the Codex Mendoza.

Fig. 12

Before leaving the problem of drilling in the codices, one other thing is striking. In virtually every instance, drill shafts are decorated with colored objects at the upper end. They do not seem to be part of the stick, but large perforated objects placed on it to give it momentum, as is known in other parts of the world [Holmes 1919:356]. When these objects are separated from the drill shaft they would look like wide-holed beads. Are some "beads" uncovered in Mesoamerica really drill weights? If so, which ones? And how can we distinguish them?

Without noting their depiction in the codices, Digby [1972:16] made this observation: "Most parts of the pump-drill are made of perishable material, wood and string, but throughout Meso-America numbers of pottery spindle whirls [sic] have been found. It had generally been assumed that they were used for spinning cotton but they would make excellent flywheels for pump-drills, and it is reasonable to assume that they were also used on pump-drills for lapidary work."

The clay "spindle whorls" of Mesoamerica look surprisingly like those of a certain period in the Middle East. They are late in the Mesoamerican archaeological record, apparently not appearing until post-Classical times (ca. 900 to 1500 AD) [W.R. Coe 1959:69]. The codices often depict spindle whorls

with thread on them, but some excavated "whorls" may have been drill weights. There are also other large, perforated, ambiguous objects in the records. This possibility should be explored in more detail.

Fig. 13

SPECIAL USES OF BEADS

As said at the outset, there is no room to explore all bead uses in the pictorial manuscripts. Some are revealing, though others are puzzling. A few notes on these may indicate how wealthy these manuscripts are in terms of what they can tell us about beads.

Tribute and Booty: Tribute of beads and jewelry is very common. It appears that these items were also booty of conquest. In the Codex Borgia [63] a captive is held by his hair and floating above captor and captive is an elaborate necklace (Fig. 11). In the sacrificial scene of Codex de Huamantla [25] necklaces of beads are given to the ruler and others make up the background of the scene. In an unusual depiction in the Codex Borgia [59] the apparent victor wears an animal skin and holds a string of beads which goes around the neck of the captive (Fig. 12).

Fig. 14

Tribute After the Conquest: The idea of tribute or gift-giving was not abandoned when the Spanish arrived. There are many depictions of the giving of beads or ornaments to them. In the Lienzo de Tlaxcala [7] a scene at Tecoaccinca shows a native putting a string of beads onto the wrist of a seated Spaniard, with other beads at the feet as part of the tribute (Fig. 13). Tribute of the type of ornament shown in Fig. 1, E is presented to Spaniards in two scenes of the Lienzo de Patzuaro and once on the additional fragment of Becker 2. In Codex Baranda [42] a Spaniard is holding a complex piece of jewelry on a chain (which must be Spanish), while a native holds a less complex jewel on a string; they seem to be exchanging them (fig. 14).

Burials: Beads are commonly depicted with burial mummies. In Codex Magliabechiano [69] the drawing of the mummy and its offerings are too crude to discern beads, but when the mummy is seated [67] a strand is clearly draped around the bundle. In Codex Ramerez [24, 25], strings of beads are shown both with the seated and the lying mummy (Fig. 15). In Codex Ixtlilxochitl [104v] the mummy bundle is accompanied by two beads on one string and one on another, while the seated mummy [104r] has a string of beads around it. Anders [1976:27-8] adds that jade is often colored red in this codex and believes the red bar near the head of the mummy bundle is jade to put in the mouth of the dead.

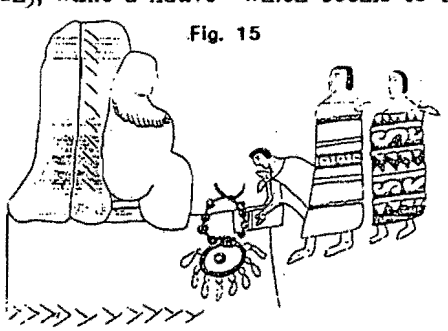

Fig. 15

Ritually Broken Jade: Jade, especially earreels but also other pieces of jewelry were broken at "termination ceremonies," which celebrated the burial of broken objects or the abandonment of sites (Fig. 16). The practice is being identified at an increasing number of Maya sites.

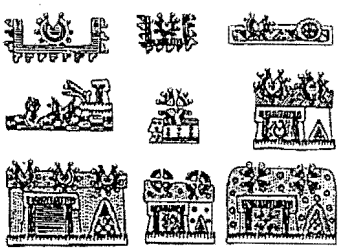

Fig. 16

Symbols of Power: There is little question that elaborate jewels symbolize power in many instances. In the Historia Tolteca-Chichimeca [Kirchhoff, Odena and Reyes 1976:18, 219] Xiuhcozcotl sits in front of his house facing his son, Tecamecatl, who is sitting in front of his house. The incident is the older man handing over his position of ruler to his son. The string of beads, complete with pendants, floats near the older man's house, indicating his superior rank.

Symbol of Spanish Priests: Beads being a symbol of power, it is not surprising that the Mesoamerican artists after the conquest would have noted their association with Spanish clerics. Sometimes just a few rosary beads and a cross are all that is needed to signify a priest as in the Lienzo de San Juan Tabaa No. 1. In one case, the native artist seems to have been very impressed with the rosary, as the Codex Yanhuitlan [xv, xvi] (cover) testifies.

Noteworthy Uses of Beads: The Codex Rios (or Codex Vaticanus 3738) has two pictures which show unusual uses of beads. The copy of Rios used for these figures is a crude non-native copy of the Aztec manuscript; Vaticanus 3738 (the facsimile) is better. On page 59r is a youth dressed only in a open net, which seems to have beads (unless they are knots) where the rope of the net crosses (Fig. 17). On page 60r is a woman in a full-length dress decorated with beads sewn onto it (Fig. 18). I have not seen anything like these two uses anywhere else in the codices.

CONCLUSION

The painted manuscripts of Mex-

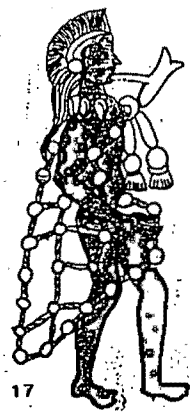
Fig. 17

ico are a wealth of information on many topics. Beads, as present in ancient Mexico as anywhere else, play their part in these works. Technological considerations such as the sources of raw materials, shaping and drilling of beads, are not easily distinguished. Most working of beads, especially drilling, is pictured symbolically rather than realistically.

The use of beads is clear from many pictures. It would be a major undertaking to catalogue all beads and adornments worn in these manuscripts. Special uses are easier to enumerate. They were employed principally for tribute, burial and termination ceremonies, and as symbols of special status (including that of Spanish priests). Some other particular uses are more enigmatic and difficult to identify.


Fig. 18

The opening of research into beads in the Mesoamerican codices shows that they are a treasure waiting to be mined for information. I hope to have given it a start here and to have suggested paths for further work, both archaeological and paleographical.

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NEW BEADMAKERS

BELIZE CITY, BELIZE

The smallest Central American country, with 200,000 people and one tiny phone book, Belize (the former British Honduras) is just discovering tourism. Among things tourists buy are beads.

About 15 years ago Marcos Alamina thought of expanding his jewelry business by making beads from local materials. At first it didn't pay off, and he stopped a while, beginning again in the late 1980s. Today his workshop is devoted to beads, worked by two employees and is just one of seven in Belize City.

The principal material worked is black (horny) coral, gathered by fishermen who sell it to beadworkers as a sideline. Diving is done without tanks (as are used in Veracruz, Mexico), so the coral is relatively small and young. The fishermen also sell shells, principally Trocus (pearly top sells) and Strombus conchs to the shops. The other principal materials worked are a hard palm nut and coconut shell.

The operation is completely mechanized, with saws, grinding wheels, a buffer and small hand-held drills. The beads are strung in-house as necklaces, bracelets and earrings, often with small black glass beads or bright dyed stone beads.

It is legal to take out small amounts of black coral, which is not officially on the endangered list; its trade is regulated by the Convention on International Trade in Endangered Species. Some areas of the Caribbean have been over-fished, but small quantities may still be worked [Eliot 1994:147].

Eliot, John L. 1994 Black Coral, Coveted Jewel of the Sea. National Geographic 185(6):147.

CIUDAD DE CARMEN, MEXICO

When asking in Campeche about the tortoise shell industry (see Bead Alert), I was told that black coral and shell beads were made in Ciudad de Carmen. At the one local shop selling beads the proprietor would tell me nothing about where they were made. However, the American Express office was friendly and directed me to Francesca Pacheco, pinpointed on a map by the tourist office the next morning.

While Pacheco does not make beads, the story starts with her. She began making small souvenir objects with shells about six years ago, selling them to tourists and exporting to New York and California. She taught other women to do the work, who now sell the trinkets in the marketplace.

About four years ago her husband, Edmundo Vargas Chavez, began beadmaking as a sideline to his job with Petroleos Mexico. He is entirely self-taught, working shell and black coral, mostly bought from fishermen (again, no tanks). They also buy some shells (especially Olivellas) from the Oaxacan Pacific coast and gather some themselves from the beaches surrounding the city. While Vargas has an electric grinder and polisher, he drills by hand with a commercial drill bit. The industry is not large, but the work is well done and the potential is certainly there.

ONYX AND ONYX -- TECALI AND TECALI

Our word onyx comes from the Greek, meaning fingernail, because of its banded structure. The first century Roman, Pliny, used it for two different stones, as we do today. One is strongly banded agate (nearly always man-induced), the onyx of mineralogists and bead people. The other is alabaster, a compact, fine-grained gypsum.

In Mexico the alabaster is "tecali." The word comes from Nahuatl (the Aztec language) by combining ***tetl*** (stone) with ***calle*** (house). *Tetl* was often used for place names, shortened to ***te-*** [Dibble 1951:162-3].. Hence, tecali the stone is actually named after Tecali the village (stone house). Why and how is unknown.

The village of Tecali in Puebla state, Mexico, has recently become more accessible with a new road built through it (but you wait for hours for the bus). Some eight to ten kms away are deposits of an attractive, nearly translucent stone, white or nicely banded with different colors. The stone is brought in by farmers and worked into figurines and small knick-knacks, including rosaries and necklaces. It is also worked in a few shops in Puebla and Tehuacan.

Ernesto Leonor Jimenez showed me his beadmaking system. Slabs are cut the right thickness, then drilled with holes, perhaps eight or ten. The slab is then cut into cubes with the holes in them. Each cube is ground to shape by holding it against a wheel. When the beads are finished they are put into dilute hydrochloric acid for a few minutes to polish them. Larger items are polished by hand, rubbing the acid on with a piece of cloth. The polishing is the only non-electrified step in Leonor's neat factory.

The Use of Tecali

I was told in Tecali that work began only about 50 years ago, but this refers to the modern knickknack industry. Tecali objects, such as vases and masks are well known from pre-contact Mexico. I have not seen any in Olmec contexts, but they are found in Maya, Aztec, Zapotec and other cultures. A particularly beautiful vase, perhaps for sacrificial blood, in the National Museum was named by Caso [1938:37-8] as one of that great museum's "masterpieces."

The use of the stone did not stop with the Spanish conquest. The Spaniards employed it widely, especially in Puebla and Mexico City for church statues and pulpits, and often for windows; it has long been a celebrated industry of Puebla [Echeverria 1962:292-3 (written 1780); De Los Rios 1910:24; Toussaint 1962:145]. More recently, it has been used for the dome and to adorn the walls of Palacio de Bellas Artes in Mexico City, completed in 1934 after several decades. The Tecali region is apparently the only source for tecali in Mexico [Toussaint 1962:145].

Mini History of the Village

The name Tecali does not appear in either the Codex Xolotl, a post-conquest Aztec map reflecting earlier sources [Dibble 1951], nor the Maps of Cuauhtinchan [Yoneda 1981]. However, a place-sign in the Codex

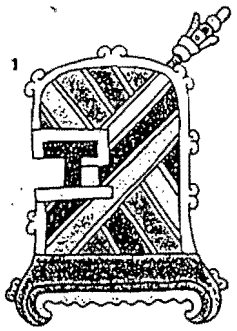
Fig. 1

Nuttall may represent it (Fig. 1). One town conquered by 8-Deer Tiger Claw, (ca. A.D. 992-1050),the great Mixtec ruler, is symbolized by a hill (as is common) decorated with a plaid design meaning "stone" containing a glyph meaning "house." [Nuttall 1975:44] While the language of the codex is Mixteca, the symbols are recognizable and in Nahuatl, this would read "Tecalitepec." or Tecali, since "tepec" (hill) can easily be eliminated. It would seem a long way from 8-Deer Tiger-Claw's home of Tilantongo, but long-range warfare was not unknown to the Mixtec [Spores 1966:14]. If this identification is correct and refers to modern Tecali, the name has been in use for 1000 years.

In any case the name was in use before the Spanish. Duran [1964:100] described its conquest by the Aztecs under Moctezuma I (A.D. 1440-69), when Tepeaca was the leading city of the region (Puebla was a new city founded by the Spanish in 1532): "The Aztecs were taken into the city of Tepeaca and given rich presents of cloth, skins, sandals, stones, jewels, gold, fine plumage, shields, insignia, and weapons. Similar presents were given by the towns of Tecali, Cuauhtinchan and Acatzinco, though they were smaller." Since jewels and gold were listed separately, "stone" may have meant tecali.

Tecali came under Spanish rule, centered in Puebla, but like many villages was slow to adopt the ways of the conquistadors. Torquemada [1977:150-2; orig. 1615], the zealous Dominican monk, recorded a poignant story from there. Antonio, a youth converted to Catholicism, took it upon himself to go with his younger friend, Juan, to a house where they knew an idol was hidden to destroy it. Juan was supposed to be the look-out, but he went out to the plaza and the plot was discovered. The villagers beat him to death, eliciting a long eulogy by Antonio that it was his fault; he knew the idol was a devil and not the true god.

Another hint that Tecali was slow in adapting to Spanish ways is the account of Pedro Farfán, sent by the Royal Audienca in 1581 to settle land and other disputes. Although everyone he met in Tecali had a Spanish name, few could speak Spanish and he relied heavily on an interpreter [Martínez 1984:483].

As with most Mexican villages, Tecali was quickly given a second, Spanish name. Santiago Tecale [sic] is recorded in 1559 [Martínez 1984:276]. Its name was changed to Tecali de Herrera in honor of Ambrosio Herrera y Mota, who with 40 national soldiers heroically but unsuccessfully resisted the 1200 troops of the rebel Ordóñez [Peral 1979:506].

This is not a history of Tecali, but the village of a stone named after the village itself has had long experience as a source of a much-valued commodity.

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BEAD ALERT

FAKE DZI BEADS FROM CHINA

At Bead Expo '94 Walter Seifried kindly showed me some new dZi bead imitations being made somewhere in China. They are made by artificially coloring chalcedony, just as genuine ones are. They can be distinguished by two means. One, their color is an unusual brown. Two, the design is copied from the metal-cored plastic imitation dZi, a design apparently not recorded anywhere for true dZi beads.

While one can tell these from genuine dZi beads, given the price of the real article and the attempts being made to imitate them in stone, buyers should be especially wary when purchasing dZi beads.

INDIA'S FOURTH GENERATION CHEVRON BEADS

In 6(2):11 we reported on the growing sophistication of the Indian glass bead industries. Molds were being widely used in Purdalpur to make chevrons, distinguishable from genuine ones by the quality of their glass. However, at Bead Expo '94 I saw several good Indian chevrons. Thus far, they are "new chevrons" with interesting color combinations and even goldstone stripes.

The quality of the glass, the molding and the grinding are improving. These chevrons do not yet resemble Venetian ones, but one must look closely. Purdalpur is not Venice yet, but may be soon.

THE BEAD DETECTIVE CASE

In the last few issues I asked for help to see why a well-advertised gallery was selling so many mislabeled beads. Several people responded and a list was drawn up of items that did not look right.

Armed with this list, I visited the gallery recently. The owner is a young man who was, much to my relief, quite open to what I had to say. He was very concerned with my saying that many things he was selling had been badly misrepresented. Several items listed as "Coptic Egyptian," for example, but known to be recent Ethiopian, came from one source. For the dates of beads he relied on various suppliers.

This was a well-meaning, but misled dealer. For example, I pointed out the amber in the shop (it hadn't looked right in the ads or catalogues, but one can't tell from pictures). He said that it passed the "amber test." When I asked him what this was, he replied that when one stuck a hot needle into it, it did not melt! He was surprised to learn this was a thermosetting plastic test, and that amber would melt. He had been the victim of the "false test" trick.

My offer of sending him a detailed account of the things that could be tested by him or that were known to be wrong was immediately accepted. He countered by agreeing to change his catalogue and advertising accordingly, though he warned that it would be a half a year or so before the changes actually found their way into print.

Frankly, it was with trepidation I approached his gallery. I was pleased to find an open, honest dealer.

TORTOISE SHELL

Tortoise shell, properly the carapace of the Hawksbill turtle, has been curtailed in sales because of the endangered status of the turtle. Tortoise shell was worked in cities along the coast of the Gulf of Mexico for generations. At one time, elaborate combs were popular and objects such as picture frames, boxes and the like were made from this material.

Campeche was once the center of production, but seven years ago I met Pedro Mis Perez in Veracruz carrying on the work of his family, which had come from Campeche. I did not return to Veracruz this year, so do not know if Mis Perez still has his shop, but I did enquire in Campeche, where I was told emphatically that no tortoise shell is being worked. Neither is it being worked in Ciudad de Carmen nor Belize City (see New Beadmakers), except under very limited clandestine conditions. All to the good.

However, people like tortoise shell and the Mexicans have figured out a way to give it to them. I have not found out the precise method, but they are bleaching/staining cow horn to make it resemble the mottled brown and amber of tortoise shell. It is a really good substitute. Upon very close examination, the dot pattern of tortoise shell (arising from its fibrous structure) can be easily distinguished from the rayed pattern of cow horn (since the fibers parallel the direction in which the piece is cut), but without a strong lens it is all but impossible to tell them apart, and they are the same material, the protein keratin.

BEADS IN MEXICAN VILLAGES

HEIRLOOM BEADS

AMONG THE FEW PUBLICATIONS ON Mexican ornament, Cordry and Cordry [1968], Barba de Piña Chan [1960] and Davis and Pack [1963] mention heirloom beads in the villages of Mixistlan, Yacoche and San Pedro Quiatoni in Oaxaca. The Cordrys collected examples, some of which are now in the International Museum of Folk Art in Santa Fe, NM, discussed in an earlier issue [1987, 1(4):7-9].

Following work on heirloom beads in Southeast Asia [1992, 5(2):3-6], I was interested in learning whether the principals governing them applied to heirloom beads elsewhere. It had been a goal of the 1994 Mexican tour to visit these villages, but it didn't happen. They are all east of Oaxaca City, but one has no bus to it, another is said to have a bus, but a Mexican friend spent hours in the station looking for it in vain, and the third has a bus that leaves at noon, arrives at 7 p.m. and returns at 7:30 p.m. Without one's own transportation and contacts in the villages, getting there is out of the question.

I shall be better prepared next time. Nonetheless, some new information has come to light about the beads in these villages.

Mixistlan and Yacoche

The women of these villages wear 40 to 60 strands of glass beads, weighing up to 3.5 pounds. Most beads are white, interspersed with a few colored ones, especially hexagonal "cut blues" and "Vaseline" beads. Among a dozen or so examples I have seen, there are two types of white beads. One are wound Chinese; the other European Prosser beads. Sometimes all the beads are of one type, sometimes as with the example in the Bead Museum in Prescott, AZ, they are mixed.

Although references do not discuss the inheritance pattern of these beads, it seems to follow an interesting route. In Yacoche at the age of one, a boy's hair is cut and he is given a string of beads he wears all his life. At the same age a girl is given the first of the many strands she will accumulate, though her hair is not cut [Beals 1945:53]. A strand of beads is given a bride by her new husband at marriage [Ibid.:44]. It appears that a woman builds up a set of beads throughout her life, probably purchasing some when she can, and eventually inheriting an equal (to her sisters) share from her mother; women retain the rights over their own property [Lipp 1991:3-4].

There were clearly more than one step in the evolution of the Mixistlan and Yacoche beads. The Chinese ones must have arrived in Mexico before the end of the Galleon trade (1815). European beads are later, as "Vaseline beads" appear only in the 1820s and 1830s, though "cut blues" may be a little earlier. The Prosser beads were first made in the 1860s and probably adopted as a substitute for the Chinese white beads.

These two villages are inhabited by the Mixe people. Women's dress is a mixture of pre-conquest and Spanish styles. Beals [1973:113-6] noted that though there is no record of pre-conquest Mixe dress, the impression is that little clothing was worn and the dress of their Zapotec neighbors was adopted after the Spanish conquest. He listed three elements which distinguished Mixistlan and Yacoche from neighboring villages: 1.) their beads, 2.) the uniquely non-Spanish women's turban-like headdress, and 3.) the women's general costume.

In addition to being isolated, they are also ancient. The Cuadros Sinopticos, [hereafter CS] a survey of Oaxacan villages, said the time of foundation of both villages was unknown [CS 1883:836-7], but the oldest church in Mixistlan dates from 1591. The name Mixistlan is a combination of "men" and "the land" in Mixe, while Yacoche comes from the Mixe for "tree" and "sleep, dream." (The Spanish name of Santa Maria has been appended to both villages.)

Both villages were listed in the 1548 Spanish census. Mixistlan had a population of 91 and Yacoche of 148 [Borah and Cook 1960:194, 208]. In 1568 Mixistlan seems to have been missed, while Yacoche had 168 people [Cook and Borah 1960:88]. In the 1880s the populations were 749 and 348 respectively [CS 1883:836-7].

San Pedro Quiatoni

The population of this village in the 1880s was 1679. Its name is Zapotec, meaning "large stone." Its people are said to have come from the east and around Oaxaca City after the foundation of Mitla by the Mixtecs in A.D. 980 [CS 1883:734].

The heirloom beads of SPQ are single strands of 19th century Venetian trade beads with long pendants between them. I have not yet discovered any information about their inheritance pattern. The long pendants, however, have caused considerable debate [1987, 1(4):9], focusing on whether they could have been made in Puebla, site of the first glass industry in the New World, starting in 1542 and operating on and off ever since. We still do not know if the pendants were made there. It remains a strong possibility, since these beads are reported from nowhere else. The sites of the old glasshouses are now under modern buildings (my hotel was near one). I thought the beads may have originally been made for chandeliers, of which Spanish/Mexican clerics were so fond, but have not seen them in any churches, including a couple dozen I visited in Puebla.

I have found an early eye-witness reference to the Puebla glass industry, which does not seem to have been quoted before. Augustin de Vetancurt (Betancur) was a renowned Franciscan teacher at the convent of Puebla. He [1698:47] remarked: "Glass, knives, and soap have been introduced into New Spain. The crockery is finer than that of Talabera [Talavera de la Reina, Spain], and can be compared to that of China in its strength, the glass, however, does not seem to be as fine as that of Venice..."

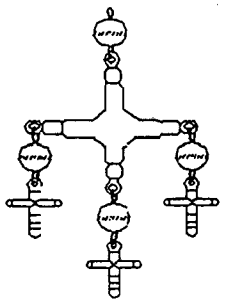
Summary
All three villages with heirloom beads are similar to several Southeast Asian groups with such beads. They are isolated, and in the case of San Pedro Quiatoni, were forced to be so. The two Mixe villages, at least, have other distinctive elements of dress as well.

The heirloom pattern in Mixistlan and Yacoche appear to be different from that we have seen elsewhere. It consists of a continuing splitting and curating of beads, being built up over the lifetime of a woman and split among daughters at death. It is not an entirely closed collection, but follows the rule that white beads dominate, though they have changed over the years. As far as can be determined, San Pedro Quiatoni pendants are closed and curated collections, with single strands handed down directly.

There is still much else we want to know about these beads: the rules of inheritance, especially in SPQ, the origin of necklace styles, the origin of the SPQ pendants and what the people themselves have to say about the beads. Anyone have a good jeep, driver and a sense of adventure to donate?

THE CROSS OF YALALAG

Another distinctive piece of Oaxacan jewelry is a cross associated with Yalalag, a relatively large and accessible Mixe market village. They were made there or in nearby villages, based on a 16th century Spanish model. These crosses are made with one large cross with a shortened vertical element and three small crosses dangling from the ends of the crosspiece and the base. Cordry and Cordry [1968:153-6]. Davis and Pack [1963:103-6] and Barba de Piña Chan [1960:25] all featured it. The Cordrys [p. 153] said "today they are practically nonexistent."



But there has been a revival of them. For the study collection I purchased a rather delicate silver one, an attractive example of the large and expanding silver industry of Oaxaca City. Another one, of unknown origin but probably somewhat older, was bought at Nacional Monte de Piedad (the National Pawn Shop) in Mexico City. I saw a fairly crude Cross of Yalalag made of the black ceramic of San Bartolo Coyotepec, near Oaxaca. The dealer would not budge on the rather high price; I passed it by.

INDIGENOUS COSTUME DISPLAY

Museo Serfin (sponsored by Bank Serfin) in Mexico City has a detailed display of Mexican costume though the ages. It includes large charts showing changes in clothing from ancient to modern times in different regions. Informative displays of weaving techniques and an unusual exhibit of the use of feathers in pre-conquest Mexico are also featured. Additionally, there are a couple of dozen manikins dressed in regional styles.

Brightly colored hollow blown beads, called papelillo in Mexico [Cordry and Cordry 1968:162] are quite popular with many peoples. No one has provided a comprehensive listing of them, but those displayed at Museo Serfin included: the Trique and Chinanteca of Oaxaca; the Mazahua of Tanchanhuitz, San Luis Potosi; and the Nuhua of Amatlan de los Reyes, Veracruz.

Chavlina [1994] discussed these beads at Bead Expo'94. He said the process of blowing into a tube (or blowing a short tube on the spot) and pressing it into a split mold [see Francis 1982: pl. 1] was invented by the Japanese in the late 1920s. India was the biggest market until they worked out the process for themselves (Indians told me they were taught by the Japanese). The Czechs are also producers. He noted that the market had fallen off, but they are still in demand in some places, such as Brazil for Mardi Gras (and as we see, in Mexico).

Red is favored by the Chinanteco of Oaxaca as small plastic (?) beads. The Tacuate of Oaxaca use olive shaped red glass beads, and the Mazateca of Oaxaca graduated red glass strands. The Tzotzil of Chiapas wear large faceted brass? beads, while the Meztiza da Gala of Yucatan wear rosaries of coral-colored glass beads with golden caps on the ends.

Among the Huicholes of Jalisco, well known for their beaded bowls and other objects, the women wear multiple strands of "pony" sized drawn beads. The only beadwork displayed was of the Otani women of Puebla.

There was also a small display of heirloom beads, including those from the Oaxacan villages discussed above, but unfortunately without documentation. All in all, a superb display.

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Borah, Woodrow and S.F. Cook 1960 The Population in Central Mexico in 1548: An Analysis of the Summa de visitas de pueblas. Ibero-Americana 43. U. CA, Berkeley/Los Angeles.

Chavlina, Vladislav 1994 Beadmaking in the Czech Republic. Paper read to Bead Expo '94 conference, Santa Fe.

Cordry, Donald and Dorothy Cordry 1968 Mexican Indian Costume. U. Texas, Austin.

Cook, Sherbourne F. and Woodrow Borah 1960 The Indian Population of Central Mexico 1531-1610. Ibero-Americana 44. U. CA Berkeley/Los Angeles.

Davis, Mary L. and Greta Pack 1963 Mexican Jewelry. U. Texas, Austin.

Francis, Peter Jr. 1982 The Glass Beads of India, WBMS 7, Lapis Route, Lake Placid.

Lipp, Frank J. 1991 The Mixe of Oaxaca: Religion, Ritual, and Healing. U. Texas, Austin.

Vetancurt, Avgustino de 1698 Tratado de la Ciudad de Mexico... Doña Maria de Benavides, Mexico.

SOURCES

Reviews of books recently seen or sent us. . .

Geary, Christaud M. and Andrea Nicolis 1994 Beaded Splendor. National Museum of African Arts, Washington D.C. 24 pp.

The pictures and text of the living beadwork in several parts of Africa are quite interesting and suggest the exhibition on which they were based was truly stunning. Unfortunately, the short introduction relies on some of the same old secondary/tertiary references as ever, perpetuating the myths that the Portuguese brought all the coral to Benin and that there are Egyptian Ptolemaic period glass beads at Jenné.

Miller, Polly G. 1994 Early Contact Glass Trade Beads in Alaska. Bead Society of Central Florida, Altamonte Springs, FL. 46 pp. $10.00?

This is a handsome work, nicely laid out. It is based on a paper read at the Bead Expo '92 (Glass Beadmaking and Trade) conference. While it doesn't detail very much about the beads or try to identify them and lacks some academic touches, it does present a good general background to the trade that brought them in. It also provides an apt warning (pp. 36-7) of how the modern bead trade exploits ignorance of the historical trade.

De Weigand, Celia García 1987 Huichol Indian Beadwork: Techniques and Design 1820-1980. Monographs in Western Mesoamerican Research # 1. ca. 300 pp., paper $27.50 postpaid from Ehecatl-Guaxicar, 2320 N. Kramer, Flagstaff AZ 86001 as of 1990; no ISBN.

Based on a long first-hand study of the Huichols of Mexico and their beadwork, this book gives a background to their history, archaeology and social situation as well as their costume and ornament. Much of the book consists of sketches of particular beaded designs, which beadwork people may find most inspirational. The text, references and documentation bring one up to date on the life of this interesting people.

Waterman, Basil and Sofus S. Michelsen 1994 The Art of Diamond Cutting. Chapman and Hall, New York. 137 + xxi pp., paper. ISBN 0-412-98441-3. $27.95.

This book is designed as a handbook for those who already cut colored stones to learn how to cut diamonds. It takes the reader through the major practical steps and issues of diamond cutting. Its illustrations and eleven page glossary are especially helpful. The 33 pages of charts at the end devoted to pricing is perhaps necessary, but might have been condensed. Interesting sections include discussions of raw diamond producers (pp. 76-80) and marketing (chapter 12).

Dayton, John E. 1993 The Discovery of Glass. Peabody Museum, Harvard University, Cambridge MA. 47 + xii pp. + 8 color plates. ISBN 0-87365-544-3.

Dayton is a polymath with a deep interest in archaeology through interdisciplinary means, who often publishes things of interest to bead people. The fact that academia pays little attention to him (as is true with "outsiders") means nothing, and though he no doubt makes mistakes of exuberance, he challenges the establishment to reconsider entrenched wisdom. The Introduction by C.C. Lamberg-Karlovsky puts these issues in a much-needed focus.

Dayton's thesis is that cobalt blue glass was invented as a by-product of silver smelting and could only have happened in Saxony. His many avenues of argument, experimentation and insistence on the geological contexts of finds are to be applauded. Whether he is right or not remains to be learned. Certainly not all early cobalt blue glass in the Middle East came from the same source.

The origin of glass is a problem of great controversy today, as my review of Kurinsky (1993 6(1):12) indicated. It is impossible to accept any hypothesis at the moment, because much more work needs to be done. However, since we all want to get back to our origins, and glass is the premier bead material, these conflicting ideas will interest us for a long time.

Kovel, Ralph and Terry Kovel 1994 Kovels' Antique & Collectibles Price List 1995. Crown, New York. 876 pp. many b&w, some color ills. $14.00 ISBN 0-517-88259-0

These books are always fun to browse through to see how valuable (or not) are things around the house. The Kovels have their fingers on the pulse of some aspects of the antiques markets, especially glass and ceramics.

However, they are overlooking one of the hottest collectibles around: beads. There are beads there, but you have to look under Jewelry -- Necklaces or Purses -- Beaded to find any. Their much-beloved computer generated index tells us nothing of this. Let's get with it. Beads are booming and deserve separate sections in this and similar antique price lists. If it is any consolation to our readers, playing cards didn't fare much better.

Recently Published:

Some papers of mine recently published in sources readers may not have right at hand:

1994 Beads at the Crossroads of Culture pp. 281-305 in William W. Fitzhugh and Valérie Chaussonnet, eds. Anthropology of the North Pacific Rim. Smithsonian Institution, Washington D.C. [Paper from the Crossroads of Continents (Siberia-Alaska) symposium.]

1994 Sowing the Beads of Change (2 parts) Lapidary Journal 48(7):79-84; 48(8):49-54. [Mechanics of the Bead Trade.]

1993 review of Vimala Begley and Richard D. DePuma, eds. Rome and India: The Ancient Sea Trade Archaeological News 18:50-2.