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TECHNICAL ANALYSES OF PAINTED INKA AND COLONIAL QEROS

Ellen J. Pearlstein, Emily Kaplan, Ellen Howe and Judith Levinson

1. Introduction

Wooden drinking vessels known as qeros have been used for the ritual consumption of maize beer in the Andean region for millennia, and are still used today for ceremonial purposes in traditional communities. The prevalence of Spanish motifs on highly decorated painted qeros places them firmly in the Colonial period, between the seventeenth-nineteenth centuries. Inka qeros, dating from the fifteenth-sixteenth century, are mostly unpainted but are decorated with incised geometric designs, which correspond with designs found on Inka textiles. Both Colonial and Inka qeros were carved in matched pairs, but few actual pairs are documented in American museums or private collections, having been separated through the process of the art market (figs. 1-2).

Carved and painted wooden qeros are widespread in American museum collections, but, like many museum objects, there is limited documentation about their provenance. The authors have access to a combined total of more than 150 qeros in their four museum collections, which form the corpus for this study. Many scholarly investigations have been made into the chronology, iconography, and historic and ethnographic contexts of qeros (note for example, Rowe, 1961, Cummins, 1988, and Flores, 1998), but significant questions about materials and techniques of Inka and Colonial qero production remain unanswered. In this paper, we describe the preliminary results of an ongoing collaborative study designed to characterize these materials and methods of manufacture. A second aim of our study is to examine what these technical choices might tell us about qero patronage, production, individual workshops, chronology, or the introduction of non-indigenous materials. Other authors who are currently studying qero technology include Ramos, et. al., 1999, and Rivery, et. al., 1998.

The authors worked in consultation with conservation scientists, primarily Richard Newman at the Museum of Fine Arts, Boston, and with tropical wood expert Regis Miller at the U.S. Forest Products Laboratory in Madison, Wisconsin. Curators in charge of Andean collections at each museum, and qero expert Thomas Cummins, an art historian at the University of Chicago, participated in the study by providing literary references and assisting with the interpretation of results.

Our results thus far indicate that wooden qeros are technically uniform products from the Inka through the Colonial periods, and that the carving style and method of paint application continue a pre-Hispanic tradition indigenous to the Andean region. In most qero studies, iconography has been the primary basis for dating: virtually all extant Inka period qeros display incised geometric motifs while Colonial period qeros are decorated with painted figural, floral, and faunal narrative motifs. We determined that while iconography became increasingly influenced by narrative European styles during the Colonial period, many of the materials and techniques used to create

the qeros remained the same.

2. Description of project

The project to examine qero materials and technology has included visual analysis, identification of wood types, sampling for cross-sectional analysis, sampling for the identification of pigment and binder materials, and replication studies to assist us in understanding the paint application techniques.

Each of the more than 150 qeros in the four museum collections was surveyed and comprehensively documented with written descriptions, photographs, and drawings. For the documentation, each qero was examined with a binocular microscope and ultraviolet light source to evaluate the appearance of carving and paint application, and the state of preservation. Each examiner used the same survey form that we designed specifically for this project, so that uniform technical information was recorded for each cup (fig. 3). The completed survey form includes observations about the following characteristics: iconography, dimensions, shape, paint colors, appearance of paint application, appearance of carving and finishing methods, the presence or absence of possible maker's or owner's marks on the bases of the qeros, types of metal decorations, and types of repairs (indigenous and later). To compare paint colors on qeros in different museums, each color was matched to Munsell color standards from the Munsell Book of Colors using consistent lighting sources.

3. Visual Results

Visual examination of the qeros indicates that the forms were always carved in the longitudinal direction of the wood. We suspect the use of a compass to establish cup base diameters, or a turntable for the application of horizontal register lines, as there are shallow depressions in the center of the base of most qeros¹ (fig. 4). The painted decoration seems to have been planned by first incising shallow outlines with a sharp tool. Following the incising, paint was sometimes applied flush on top of the wood surface. More commonly, however, the paint was applied in cavities that were carved out in the wood to allow colors to be inlaid (fig. 5). Some qeros show a combination of these techniques. Colorants that retain some transparency have also been found applied on top of other more opaque color areas, or directly on the wood, creating a glaze like effect. Some motifs were carved to include cavities at two different depths in the wood: one opaque colorant would be inlaid into the lower cavity, and a second, more transparent colorant was inlaid over this in a larger, more shallow cavity. The motif would have two colors and increased depth, resulting from the transparent color passing directly over wood in one area and over the opaque pigment in an area of detail. Even though an inlay technique appears dominant, extremely fine details are also observed in some of the qero decoration.

4. Wood

Wood sampling from the generally well preserved qeros was deemed too intrusive to carry out on a routine basis. Instead, Regis Miller, a wood anatomist with a specialty in tropical woods, consulted at each of the four museums to examine features of the wood structure under magnification, without sampling. The coatings, wear, and paint on the qeros made it difficult for Miller to see wood features, but he placed the cups into preliminary groups based on physical characteristics such as density, weight, color, and grain.

Woods from qeros which date, based on iconography and, in rare instances, excavation records, to the Inka and Colonial periods were placed by Miller into different but overlapping wood categories. Conservators at two museums were able to remove samples for examination from a small number of selected Inka and colonial period qeros which have existing cracks and damages. Miller also examined Inka period wood specimens that author Kaplan had sampled from private collections in Peru. Miller concluded that all of the colonial woods observed and sampled appeared to be species of the genus *Escallonia* (common Andean names include *chachacoma*). The Inka period cups that were sampled were also *Escallonia*, but other Inka cups were visually assessed by Miller and were thought to be *Alnus* (alder), or *Prosopis* (mesquite). One Colonial qero at the American Museum of Natural History had been repaired with a section of another qero. Miller identified the wood of the Colonial qero as *Escallonia*, while the earlier repair fragment is of the *Alnus* species. The wood findings were surprising since palms, and especially *chonta* (the Quechua name for several species of palm), are most often cited in the literature as the wood used to manufacture qeros (Boussingault, 1985). Results from another recent study at the Museo de Americas in Madrid showed great similarity with our results (Carreras Rivery and Escalera, 1998). We intend to carry out more wood sampling where possible, as additional wood results may allow us to determine whether there is a chronological progression in the types of woods used for qeros. This may assist in dating qeros that are transitional.

Examination of the wood also revealed some interesting information about technique. While each of the qeros was carved in the longitudinal direction of the wood, they were not necessarily cut from the center of the tree as one might suspect. Instead, they were cut from an off-center part of the cross-section of a mature tree. At least one pair of qeros from the Metropolitan Museum of Art collection was actually cut from the same tree, one on top of the other, as the growth rings visible on both bases are super-imposable² (fig. 6).

5. Paint

The following results derive from the examination of the paint materials and techniques, which have received the most time and attention within the study. Visual observations about technique were followed by sampling select areas of the polychromy.

6. Sampling

During visual examination, potential paint samples sites were selected from the following: 1) microscopic areas selected for chemical analysis to identify the composition of the binder and/ or colorants and 2) cross-sectional areas that presented the opportunity to understand the pigment to binder ratio, the order of paint application, and the relationship between different layers. Cross-sections were sometimes stained with ultraviolet fluorescing stains to aid in the identification of separate layers.

Characterization and identification of the binders were carried out using Fourier-transform infrared (FAIR) microspectrometry followed by gas chromatography/ mass spectrometry (GC/MS). FAIR has been used first as a kind of screening method for organic materials, and portions of some of the larger samples from qeros were analyzed by GC/MS. Pigments were further identified by polarizing light microscopy and by electron microprobe spectroscopy.

6.1 Binder

We began our work on the paint medium by analyzing a botanically vouchered sample of a South American resin from the plant *Eleagia pastoensis* Mora. The exudate from this plant is known by the common name of mopa mopa. This resin had been suggested by other researchers as a possible paint medium used on Colonial Andean wood objects. The vouchered sample was obtained from the collection of the Colombian botanist Dr. Eduardo Mora Osejo through Jean Portell, a private conservator in New York. Since then we have been comparing the results of these analyses to those of the samples of the paint from Inka and Colonial period qeros in the four museum collections. To date, more than 150 samples have been analyzed by chemists at conservation research laboratories: primarily by Richard Newman, Conservation Scientist at the Boston Museum of Fine Arts, Boston, Massachusetts, and also by conservation scientist George Wheeler and staff at the Metropolitan Museum of Art, N.Y. We have obtained vouchered specimens from economic botany collections from other plant exudates, including balsam, Peruvian pepper tree resin, and copal, which would have been available for use as paint binders in the Andean region.

Our results show that the binding medium used to decorate Inka and Colonial qeros best matches the processed exudate of *Egaegia pastoensis* Mora. A semi-drying oil often appears mixed with the plant resin. None of our samples match the traditional European paint binders linseed oil or walnut oil, nor do they match any of the other native Andean exudates in the reference group. We have identified the composition of Inka period beads from Colombia to be mopa mopa resin³, and have similarly found mopa mopa as the paint binder in a pair of excavated Inka qeros currently in a museum in Cuzco (Llanos, L. A. , 1936). This confirms a knowledge of the resin's existence and working properties prior to the Spanish conquest.

Documented botanical sources for mopa mopa are restricted to the montana of southwest Colombia in the region of Putumayo (Mora-Osejo, L. E., 1977). This area, in conjunction with neighboring northern Ecuador and including the Colombian city of Pasto, is thought to constitute the northernmost extension of the Inka empire (Salomon 1986). Seventeenth, eighteenth, and nineteenth century European naturalists who visited the city of Pasto described in detail the use of the plant in the production of an exquisite material most often called barniz de Pasto but also known as barniz, mopa mopa, mopa mopa de Pasto, barniz de Mocoa, and barniz de Condagua, which they found being used to decorate such things as wooden objects, leather, and gourds (Botina, 1990).

Barniz de Pasto is still produced by artisans in Pasto today. *Eleagia pastoensis* produces an enormous quantity of resin: the end buds on the branches of the trees are encased in resin. The raw material, comprising a large compressed cake of resin and plant parts, is hard and an opaque pale green in color. After repeated heating in water and manual manipulation, the mass softens and becomes malleable and elastic. This facilitates the removal of plant parts and other foreign matter by hand. When all of the impurities are removed, the mass has a putty-like texture. The cleaner it is, the more translucent and less green the resin. Powdered colorants are mixed into this elastic mass which is then pulled and stretched by two people to the thinnest possible sheet of uniform thickness. For modern folk and tourist art, barniz de Pasto is cut into shapes, either freehand or according to patterns, and then applied to a wood substrate (Friedemann, N. S., 1990). Today, some barnizidores ensure that the thin shapes of barniz de Pasto adhere to the wood substrate by first coating the wood with oil paint or a commercial adhesive, followed by placing under pressure. Sometimes a final coat of commercial varnish is applied.

6.2 Colorants

Though only a minority of Inka qeros are painted, the mineral pigments we identified on Inka qeros continued to be used in the Colonial period, when other colorants were added. Both mineral pigments and plant based pigments have been identified on the Colonial cups. The additions made to the palette in the later period includes pigments derived from mineral processing and others of organic origin such as browns, blues, and certain reds. Mixtures of pigments are also widespread in the Colonial period, increasing the range of colors.

An intense yellow colorant found on many qeros derives from orpiment, a sulfide of arsenic. This pigment appears both in mixtures and in varied concentrations to produce a number of yellows ranging from orange to tan. This platy, reflective pigment, identified as realgar and pararealgar, was also used in low concentrations in the medium resin where it appears golden and reflective. It should be noted that Colonial artists in the Andean region were using orpiment in imitation of gilding on paintings depicting Christian imagery (Tomkiewicz, 1995).

The most common pigment found on the qeros is a deep opaque red that has been identified as

cinnabar, or a sulfide of mercury. Cinnabar has a long tradition of use as a pigment in the Americas. On the qeros, cinnabar is sometimes mixed with white to create a pink color. Several organic reds were also detected, but have not yet been fully identified. The fugitive nature of these organic colorants has resulted in a dull purple appearance on the exposed surface, with an intense red color only identified on the interior areas in cross-sections. Organic reds were noted as colorants in Peruvian paintings from the 17-19th c. in a previous study at the Brooklyn Museum of Art (Tomkiewicz, 1995).

White and cream colors, seen only on the Colonial and not on the Inka qeros, were mostly identified as lead white. Cerrusite, a neutral lead compound, is the form most commonly found. Hydro-cerrusite, a basic lead carbonate, was also identified, mixed with cerrusite in some cases. Both forms of lead white are likely to be products of Colonial industry as, to date, no references to pre-Hispanic lead white have been identified in the literature.

The blue-green, green, and yellow-green colorants fall into two broad categories. The first are those that contain indigo, alone or in combination with other pigments such as lead white and orpiment. When used alone, indigo often appears as green because of the tinting effect of the currently yellow binding medium. Colonial Peruvian canvas paintings make frequent use of indigo, either mixed with lead white (Seldes, M. et. al, 1999), or mixed with a yellow pigment to produce greens found in foliage (Tomkiewicz, 1995).

The greens in the second group all contain a pigment that is copper based. Some of them are formed from naturally occurring minerals such as brochantite and malachite, which were used in pre-Hispanic metallurgy. The others generally appear to be artificially manufactured copper salts such as verdigris. There is to our knowledge no documented instance of the use of verdigris as a pigment in pre-Hispanic America.

Earth pigments, *i.e.*, those derived from iron compounds, appear only rarely to form browns. Other complex mixtures of organic materials, as yet unidentified, were also used to create browns. Black pigments have consistently been found to be based on carbon.

7. Replication Experiments

The authors decided to try to replicate the production and application techniques for mopa mopa, based on published accounts, visual observations, analytical results from our corpus of qeros, and on modern craft practices. In our replication experiments, we started with fresh plant samples collected in Colombia by Ellen Howe, following the processing steps that she and others have observed in use by the Pasto barnizidores. Since our analysis has identified a semi-drying oil as well as mopa mopa in our samples from qeros, we have attempted to incorporate different oils into our mopa mopa. However, neither traditional nor contemporary barnizidores recognize this addition. We have added mineral pigments to our resin mixture and have worked it while warm

by pressing the pigment resin mixtures into carved recesses in wood. Thus far in our replication experiments, we have found that the addition of oil produces samples which are very similar to qero decoration. When viewed in cross-section, the replication samples show a smooth, even mixture of pigment and resin, similar to that seen in qero cross-sections. For certain pigments such as lead white, the addition of oil was essential to the production of a smooth pigment resin mass. We have also been able to cut extremely finely detailed forms out of the pigment resin mass, which can be inlaid into larger color areas using a heated tool such as a spatula. Some of the fine details observed on qeros in our museums appear fluid and painterly, though our replication studies indicate that such fine details may also be pulled out like threads and then inlaid (figs. 7-8).

It has been useful to learn about the modern technique of barniz de Pasto. However, it is clear that the application of paper-thin sheets of barniz de Pasto to wooden objects with smooth surfaces is not the same as the application of the processed and colored resin from *Elaeagia pastoensis* Mora used in qero inlay. First, the paint layers on the qeros are quite thick - several millimeters - much thicker than the paper-thin modern barniz de Pasto. Second, unlike the modern technique, there is no indication of a preliminary adhesive layer used in the production of qeros.

8. Conclusions

All of the investigative phases of this work are ongoing. Future work includes the creation of a relational database for all information collected. We hope this will aid us in comparing and grouping the results of analysis to determine the frequency and trends in qero decoration, and will increase our understanding of historical and technological events during the Colonial period. In addition, we are investigating other pre-Hispanic objects decorated with paints with plant exudate binders from the Andean region, in an effort to better understand the possible sources for the qero decoration techniques.

Our original sample group consisted of more than 150 unexcavated qeros in our four museum collections. We have sought, and continue to seek out, samples for analysis from excavated or well documented painted Peruvian and Colombian pre-Hispanic objects to try to determine the earliest use of the sophisticated mopa mopa technique. Thanks to the generosity of the UNSAAC Museo in Cuzco, Emily Kaplan was able to examine a pair of excavated Inka qeros with inlaid paint decoration and to take tiny samples necessary for analysis. Analysis of these samples indicated that they contain the diagnostic binder mopa mopa and pigments similar to those found on our museum qeros. Judging by these findings, the Inka period application technique appears to be similar to that of the Colonial period. The decoration on the qeros displays a technical sophistication that far surpasses what would be expected in a new or experimental technique. We are therefore anxious to understand why these materials and techniques, many of which were pre-Hispanic, experienced a florescence in the post-Inka period.

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References

- Botina, P. J. R. 1990. *Barniz o mopa mopa*. Mocoa, Colombia: Corporacion Automna Regional de Putumayo.
- Boussingault, J. B. 1985 [1802-30]. *Memorias, tomo 5*. Bogota: Publicaciones del Banco de la Republica.
- Carreras Rivery, R. and A. Escalera. 1998. Identificacion de la madera de las vasijas de libacion inca (keros) pertenecientes a la coleccion del Museo de America. Madrid: *Anales: Museo del America*, tomo 6. 217-222.
- Cummins, T. B. F. 1988. *Abstraction to Narration: Kero Imagery of Peru and the Colonial Alteration of Native Identity*. Ph.D. dissertation. Los Angeles: University of California.
- Flores, J. O., Kuon Arce, E., and R. Samanez Argumedo. 1998. *Qeros; Arte Inca en Vasos Ceremoniales*. Lima: Banco de Credito.

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Friedemann, N. S. de. 1990. *Mopa-mopa o barniz de Pasto*. In *Lecciones barrocas: pinturas sobre la vida de la Virgen de la Ermita de Egipto*. Bogota: Banco de la Republica, Museo de Arte Religioso.

Kaplan, E., E. Pearlstein, E. Howe, and J. Levinson. 1999. Analisis tecnico de qeros pintados de los Periodos Inca y Colonial. *Iconos* . 2: 30-39.

Llanos, L. A. 1936. Trabajos arqueologicos en el departamento del Cuzco bajo la direccion del Dr. Luis E. Valcarcel. Informe de Luis Llanos sobre Ollantaytambo. Lima: *Revista del Museo Nacional*, tomo V (2). 123-156, apendices I-XIII.

Munsell Book of Colors. Macbeth Division of Kollmorgen Instruments Corp., New Windsor, NY.

Ramos, L. , C. Garcia, E. Parra, and C. Blasco. 1999. *Estudio de los qeros, pachas y vasijas relacionadas*. In *Encuentro Internacional de Peruanistas, tomo II: Estado de los estudios historicos-sociales sobre el Peru a fines del siglo XX*. Lima: Universidad de Lima

Rowe, J. 1961. *The Chronology of Inca Wooden Cups*. In *Essays in Pre-Columbian Art and Archaeology*, ed. S. K. Lothrop et. al. Boston: Harvard University Press. 317-341.

Salomon, F. 1986. *Native Lords of Quito in the Age of the Incas; the political economy of north Andean chiefdoms*. Cambridge: Cambridge University Press.

Seldes, A., J. E. Burucua, M. S. Maier, G. Abad, A. Jauregui, and G. Siracusano. 1999. Blue pigments in South American Painting (1610-1780). *Journal of the American Institute for Conservation*. 38(2): 100-123.

Tomkiewicz, C. 1995. Spanish Colonial Paintings at the Brooklyn Museum: Some technical observations. *AIC Paintings Specialty Group Postprints*, American Institute for Conservation 23rd Annual Meeting, St. Paul, Minnesota. Washington , D. C.:AIC. 103-14.

Endnotes

1. Thanks to Lisa Bruno, Associate Objects Conservator at the Brooklyn Museum of Art for sharing this observation.

2. Metropolitan Museum of Art accession numbers 1994.35.22 and 1994.35.23.

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3. Inka period beads found in an uncontrolled excavation of tombs in Miraflores, Colombia, have been identified in this study as mopa mopa resin. Other pre-Hispanic beads, purportedly also of mopa mopa, have been systematically excavated in the same region of Colombia, but the records of these findings are largely unpublished.

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Figure 1. Pair of incised wood Inka qeros. Photo: Giannoni Succar, courtesy of Museo Inka, Universidad Nacional del Cuzco, Peru. After Flores et. al. 1998, p. 15.



Figure 2. Pair of carved and painted wood qeros, 18th c., Photo: Giannoni Succar, courtesy of Museo Inka, Universidad Nacional del Cuzco, Peru. After Flores et. al. 1998, p. 225.

Kero Cup Technical Study
Survey Form

Museum: _____

Catalogue/Accession Number: _____

Conservator: _____

Date: _____

I. Cummins/Curatorial

II. Gross Physical Characteristics

A. Shape

- ___ Straight-sided
- ___ Flaring
- ___ Collars
- ___ Other Raised Elements
- ___ Animal or Human Head
- ___ Footed
- ___ Deep Relief
- ___ Incised Maker/Owner Mark
- ___ Other

B. Dimensions (maximum)

- ___ cm. Height
- ___ cm. Diameter Rim, exterior, measured w. calipers
- ___ cm. Diameter base, exterior, measured w. calipers
- ___ cm. Wall thickness, measured w. calipers

III. Materials and Method of Manufacture

A. Wood Fabrication

- ___ Chisel Marks
 - ___ interior
 - ___ smooth→rough (rank 1→3)
 - ___ exterior
 - ___ smooth→rough (rank 1→3)
- ___ Prominent Score Marks
- ___ Turning Point on base
- ___ Evidence of sanding/abrasion

B. Decoration

- 1. Undecorated
 - ___ no incisions, no paint
- 2. Incised
 - ___ no paint
 - ___ with paint in incising

Figure 3. Sample pages from the qero study survey form.

3. Coloring

a) Bound opaque colors present (list all, by Munsell # range)

- red
- cream/white
- light red orange
- tan/yellow
- yellow
- peach
- green
- light yellow green
- dark yellow green
- light blue green
- brown
- light brown
- dark brown
- tan brown
- black
- other

total number of bound colors present

b) Application of bound colors

- Surface (no inlay, assumed to be proud of surface)
- Inlay

- single layer
- carved in
- multiple layers
- proud of surface
- flush with surface
- recessed

Overlay (particle rich)

- single color
- more than one color
- glaze (particle lean paint over inlay), 1 color
- more than one color of glaze

c) Solubility of binder

- water ethanol
- acetone pet. benzine
- tol/xyl other

d) craqueleure

- regular "network"
- none
- other

e) presence of bubbles

C. Varnish

1. Appearance in visible light

- not visible
- multiple applications
- Relatively Translucent
- Black
- dark brown
- Pigmented
- Unusual Build-Up in Craquelure
- Other

2. Appearance under UV Illumination

- Unvarnished
- varnished before incising
- Varnished
 - Exterior
 - full
 - partial
 - Interior
 - full
 - partial

3. Color of varnish on unpainted wood under UV Illumination (standards TBD)

- green yellow
- orange white
- other

4. Solubility of varnish

- water ethanol
- acetone pet. benzine
- tol/xyl other

D. Metallic Decoration

1. Recessed Studs

- a. Location
 - Rim
 - Panel
 - Raised Elements
- b. Identification of Metal
 - Pb Ag
 - Sn Alloy

2. Raised Studs

- a. Location
 - Rim
 - Panel
 - Raised Elements
- b. Identification of Metal
 - Pb Ag
 - Sn Alloy

3. Other Applied Metallic Elements

- a. Location
 - Rim
 - Panel
 - Raised Elements
- b. Identification of Metal
 - Pb Ag
 - Sn Other
- c. Method of Join
 - Nailed
 - Adhered
 - Crimped

VII. Condition

A. Structural

- Cracks
- Losses

B. Surface

1. Surface coloring (bound colors, not inlay)

- Unstable
- Loss
 - Minor
 - Moderate
 - Severe

2. Inlay (bound colors)

- Unstable
- Loss
 - Minor
 - Moderate
 - Severe

3. Varnish

c) Degree of Intact Condition of Film Interior

- generally intact
- worn
- removed
 - abraded
 - solubilized

Exterior

- generally intact
- worn
- removed
 - abraded
 - solubilized

4. Metal decoration

- losses
- tarnish
- corrosion
- wear

5. Accretions

- Fatty Bloom
- Crystalline Bloom
- Repair Associated
- White Drips
- Burial Dirt
- Other

VIII. Post-Manufacture Treatment

A. Presumed, No Longer Extant, Native Repair

1. Holes

- Filled
- Unfilled
- Covered

B. Native Structural Repairs Associated with Cracks

1. Applied Adhesive

a. Solubility

- water
- acetone
- tol/xyl
- ethanol
- pet. benzine
- other

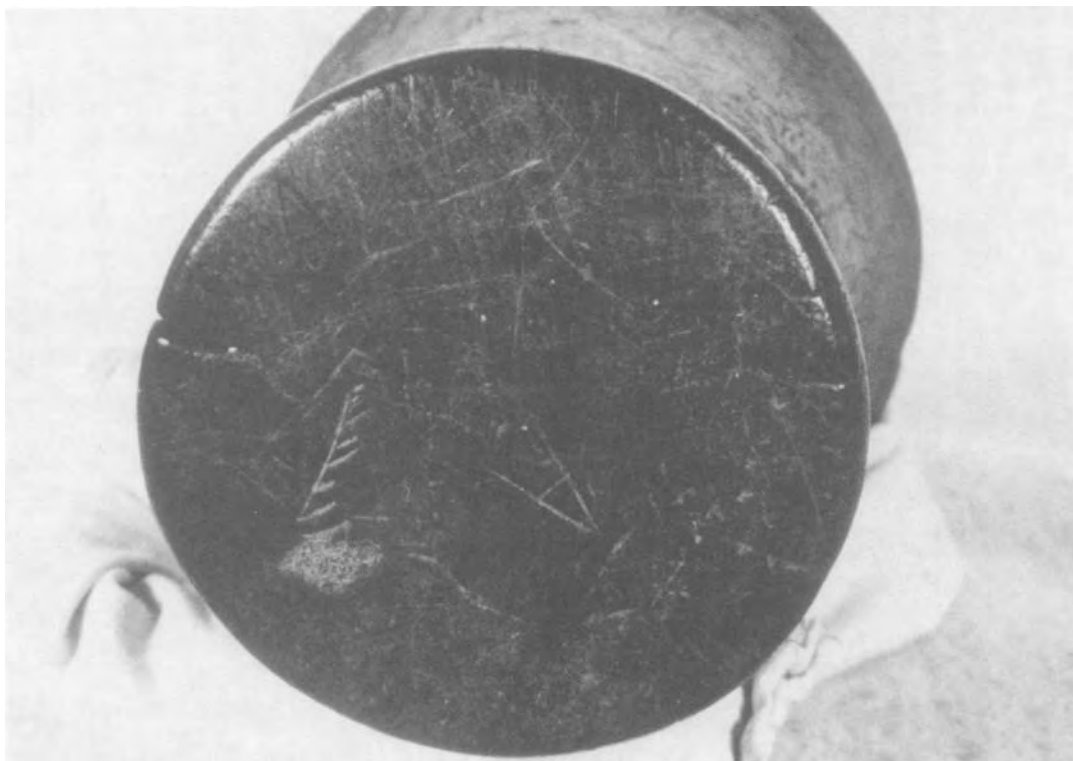


Figure 4. Base of a wooden qero showing central depression, and “feather” and “A” shaped incisions. Brooklyn Museum of Art accession # 36.357.

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Figure 5. Colonial period qero showing incised and carved areas with color inlay. Brooklyn Museum of Art accession # 36.356.

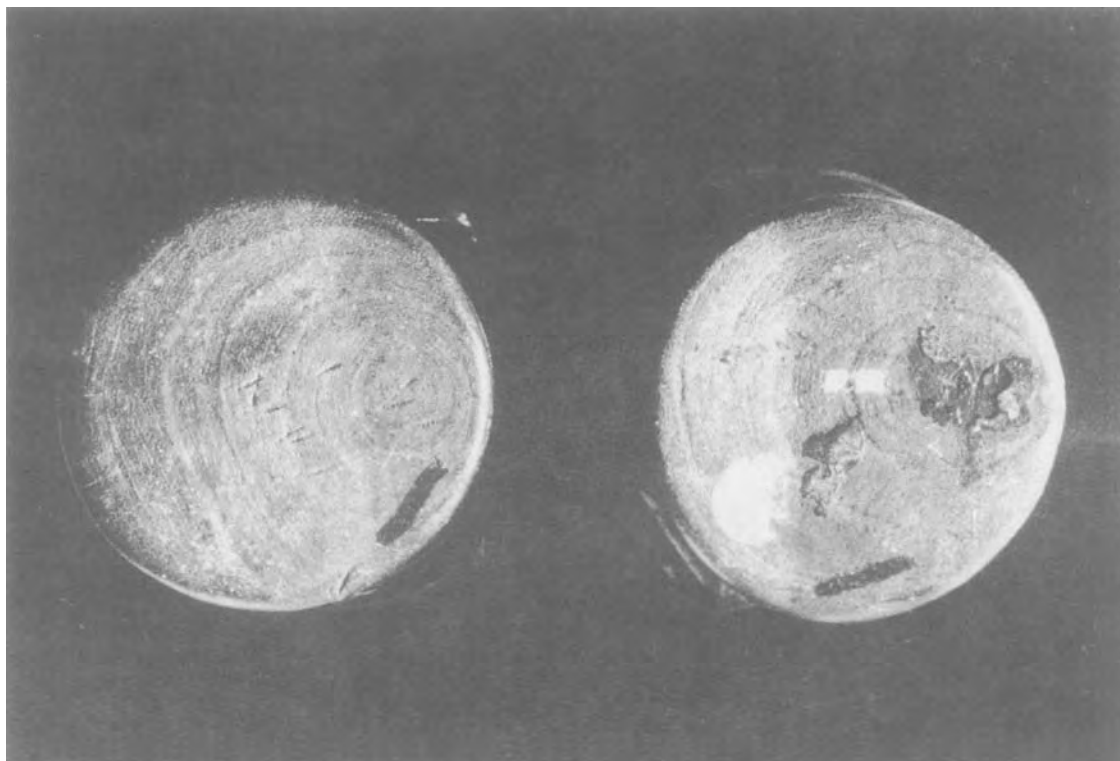


Figure 6. Bases of a pair of qeros made from the same tree. Metropolitan Museum of Art acc# 1994.35.22 and 1994.35.23.



Figure 8. Detail of a qero with fine inlays. National Museum of the American Indian, accession #163605.

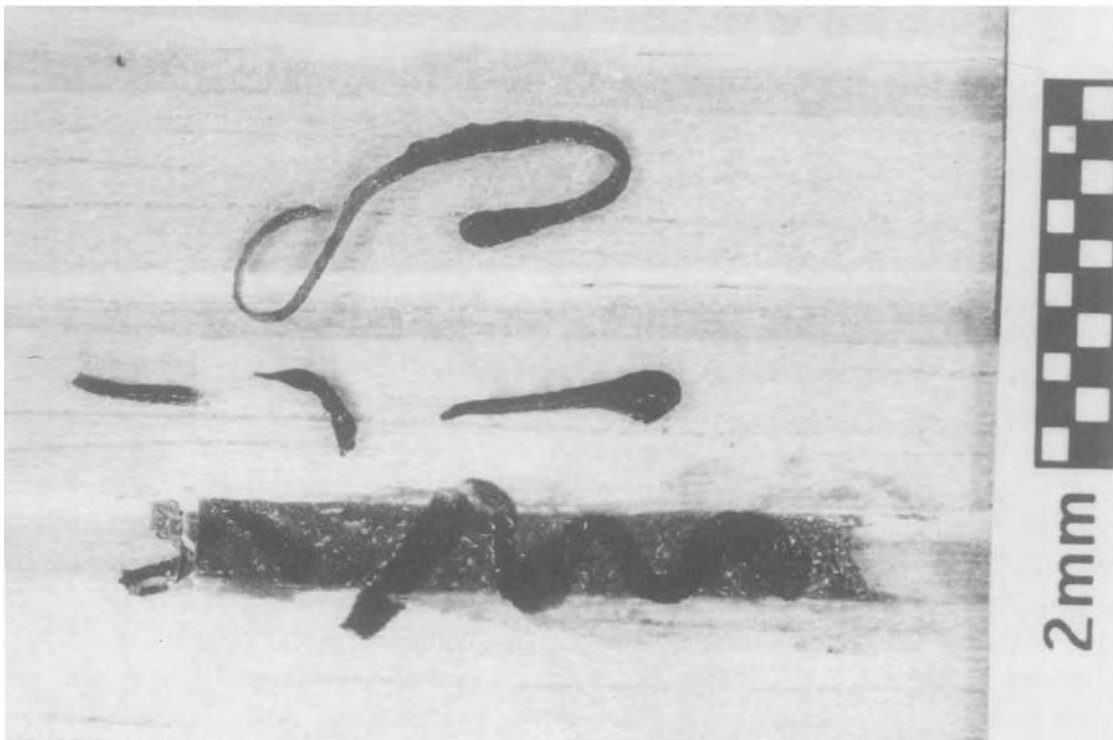


Figure 7. Replication work showing processed, pigmented mopa inlaid in a channel carved in wood. Threads of contrasting colored mopa mopa have then been inlaid in a second step.