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EVIDENCE FOR CONJURING IN PRECOLUMBIAN PERU

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INTRODUCTION

Conjuring is an ancient art that has universal appeal because it appears to violate the natural laws of science, and consequently, baffle human logic. In earlier ages, conjuring and science shared a much closer relationship than they do today. It was during the scientific revolution in the 1700s that science emerged as a distinct discipline and distanced itself from the magical world (Hanson 1986:134). A subtle relationship continues to link science to conjuring, because most magical feats are accomplished with props that utilize scientific and/or mathematical principles.

As with most professions, conjuring has its unique tools of the trade. Special apparatus, usually modeled after common objects, assists the conjurer in creating the illusion of magic. Basic magical illusions, such as causing objects to appear or disappear, or to be transformed, or levitated, have been in the repertoire of conjurers for centuries. Wine and water are favorite liquids that conjurers have manipulated throughout history. Transmuting water to wine is a popular example used by modern and ancient magicians. The ability of conjurers or shamans to cause liquids to transform, appear, or disappear enhances their status within their cultures.

A PRECOLUMBIAN CONJURING DEVICE

The first author identified a ceramic vessel of precolumbian origin in the home of an acquaintance in 1986. The vessel was the gift of a friend who had visited Peru during the early 1950s. Upon close examination, Spooner recognized the

artifact as identical in structure to those currently employed by stage magicians.

The artifact is a trick vessel that appears to contain an inexhaustible supply of liquid. The artifact, a small incurving bowl of reddish clay with a double wall, was reportedly found in a prehistoric cemetery near Lima, Peru in association with a textile fragment. The pressed designs on the upper surface of the outside of the vessel suggest a possible affiliation with the Chancay or Chimu culture (Banks 1985; Lanning 1963; Figure 1). The vessel is approximately 12.5 cm high with a diameter of 15.9 cm. The textile fragment exhibits a weave typical of Chancay fabrics with Chimu influence and could date as early as the 13th century C.E. (Anne Rowe, personal communication, 1986).

The bowl's structure permits it to function in a manner identical to a modern conjuring apparatus commonly called a *lota* or *lota* bowl. Use of the vessel to create the illusion of an inexhaustible supply of liquid, together with the well-documented use of liquid libations in precolumbian Andean ceremonies and rituals (Carrion Cachot 1955; Morris and Thompson 1985:81-96), suggests the vessel functioned as a piece of ceremonial equipment for performing illusions.

HISTORY OF THE LOTA

The term *lota*, is Hindi, and is defined "as a spheroidal water-pot, usually made of polished brass" The term was accepted into English by 1809 (O.E.D. *s.v.*) All future references to *lota* in this text refer to an expanded definition that

connotes a trick vessel used to create the illusion of being inexhaustible.

The lota is one of numerous trick vessels that operate using pneumatic and/or mechanical principles that have been known since ancient times. Vases constructed for special purposes have roots traceable to the ancient Greek societies dating to 500 B.C.E. according to Joseph Veach Noble (1968:372-374). He describes Greek vases designed to mystify and deceive, and to be used as practical jokes. The modern day "dribble glass" has a counterpart in a specially constructed Athenian cylix of the fifth century. This cup would trickle wine on an unsuspecting guest much as the modern dribble glass does.

Noble describes ingeniously made trick amphorae of probable south Italian or possible Etruscan origin. These vases are constructed and function identically to modern lotas. An amphora, in the Museum of Fine Arts, Boston (acquisition number 00.356, negatives C 25676, C 25677, and D18454) can be used to perform the magical feat of pouring liquid from an apparently empty vase. A similar, but broken, amphora in Amsterdam (Noble 1968:373-374, figures 9, 10) reveals the same internal structure. These amphorae reportedly give the illusion of refilling about ten times.

Several notable early publications on pneumatics are those of Heron of Alexandria and the ninth century works of the Banu Musa bin Shakir (the three sons of Musa bin Shakir, an early ninth century C.E. Persian engineer and astronomer). Though no lota principle is apparent in either of these publications, numerous ingenious and complex vessels that operate on mechanical and pneumatic principles are described. Examples include vessels that refill to the same level when water is dipped out, whistling birds using flowing water, and devices for pouring wine and water from the same vessel. These vessels would likely appear to be magical to the uneducated observer of the authors' times. (Bin Shakir 1979; Woodcroft 1851:29-40). Double-chambered whistling bottles from pre-Hispanic Peru are well known (Bankes 1980:49; Garret and Stat 1977).

The earliest documented performance of an inexhaustible vessel occurred in Istanbul in 1582 (And 1978:17-20). During the sixteenth century, Istanbul was the "cradle of magic" according to Metin And, a Turkish scholar. In his book, *Magic in Istanbul*, he describes the status of magic thusly: "It [magic] was an art cultivated by the Turks during the Ottoman Empire to such a degree of perfection that we can assume that 16th century Istanbul was the cradle of magic" (*ibid*:12). And writes about the Imperial Festival in Istanbul that took place in the Byzantine Hippodrome over fifty-five days and nights in 1582. This event is recorded in the *Imperial Book of Festivals* which resides in Istanbul's Topkapi Palace Museum. According to And, 437 miniature illustrations follow the text of this book which was written by court analysts. Several large vases are shown on tripods. According to the text, the vases are used as lota vases, although this term does not appear in the original text (Metin And, personal communication, November, 2005). "They are first shown empty and then discovered to be filled with water" (And 1978:20).

Clarke posits from *The Prince of Wales' Tour: a Diary in India . . .* that in 1875 an inexhaustible water-vessel was used in a Bombay performance for the Prince of Wales during the Royal Tours of India. Great efforts were made to show the future King Edward VII "the best of the native tricks" (Clarke 1928:132). Lotas were listed in magic catalogs printed in English during the late 1800s (*c.f.* Cremer 1868:27; Martinka & Co. 1896: item 362; Maurer 1982 [c. 1888-89]:66, item 316; Robinson 1895). Today they remain a popular magic device used by many well known performers.

AMERICAN CONNECTIONS

Milbourne Christopher discusses American Indian conjuring in *The Illustrated History of Magic*. He states that in the account by Bernal Díaz del Castillo describing Cortez's gold-seeking expedition in Honduras in 1524, Díaz noted that the Indians the Spanish explorers met were familiar

with sleight of hand.¹ This is the first known reference to magic in the Americas (Christopher 1973: 69-70). However, conjuring is embedded in a list of Old World skills acquired by the Indians.

Recently, use of a lota was established in Mexico. Craige Snader reported that during the 1970s he witnessed a street magician perform the "Miraculous Jar" in Oaxaca. The jar was made of clay and was filled with water. It emptied several times during the magician's performance. In conversation with the Oaxaca magician, Snader was informed that the jar had been handed down for at least a dozen generations. "It looked it!" stated Snader. If taken at face value, the magician's claim suggests that knowledge of the lota principle may have known in the Americas in the 1600s (Snader 1994).

Robert B. Gregory, a Distance Education Specialist in Agricultural Communications at the Department of Agriculture and Life Sciences, North Carolina State University, worked in Peru during August, 1989. He had previously spent two years living in South America and was fluent in Spanish. In addition, he is knowledgeable in the magical arts and has been an associate of the first author. Mr. Gregory was familiar with the pre-columbian artifact, as well as modern lotas used by magicians. He was provided with photographs of the artifact under study to take with him on his trip. During a visit to the National Museum of Anthropology and Archaeology in Lima he did not locate any pieces of similar structure, color, or decoration. However, at the Rafael Larco Herrera Museum, also in Lima, he did identify one vessel in a large storage area that was identical in structure to the artifact discussed in this article, but the Rafael Larco Herrera Museum piece is undecorated. The cultural affiliation of this piece is unknown. Similar pieces have been produced in the town of Quinoa, near Ayacucho, at least until

recently (Richard Burger, personal communication, March 20, 2006).

LOTA CONSTRUCTION

Any vessel constructed as the one depicted in Figures 1 and 2 can function as a lota. All lotas have a cylindrical sleeve extending from the mouth to the base of the vessel. As one looks into the mouth of a lota, one can see that the sleeve creates a central chamber. There is also a hidden chamber between the sleeve and the outer wall. The sleeve has small top and bottom vents. The top vent can be seen on the sleeve or on the outside wall of the vessel. The bottom vent is always located at the base of the sleeve.

LOTA OPERATION

When liquid is poured into the central chamber of the vessel, it flows into the hidden chamber through the bottom vent. This is possible because the top vent allows air to escape from the inner chamber as gravity equalizes the liquid level between the chambers. The filling process can be continued until the levels of both chambers reach the top vent.

The operation of a filled lota begins by gripping the vessel with the hand in such a manner that a finger or thumb covers the top vent. The vessel is slowly inverted in the process of pouring the liquid out. This action allows only the liquid in the central chamber to be emptied. The liquid in the inner compartment is retained. When the vessel is up-righted and the finger is removed from the top vent, the water level again becomes equalized in the hidden and central chambers.

The magical illusion of an inexhaustible vessel is created when a lota is slowly emptied by gradually tilting until it is completely inverted. The lota effect can be repeated only a few times because each subsequent pouring produces less liquid. The illusion is enhanced by the dramatic skills of the performer.

¹See http://www.antorcha.net/biblioteca_virtual/historia/bernal/111.html for an on-line publication of Chapter CXI of Bernal Díaz' *Historia verdadera de la conquista de la Nueva España*. Consulted 8 December 2006.

COMPARATIVE STRUCTURE

The authors compared the structure of the precolumbian artifact to those of five modern lotas. The results of the comparisons indicate that the structures of the vessels are virtually identical. Most frequently, the location of the top vent is on the outside wall of the vessel. The precolumbian vessel has the top vent on the inside sleeve wall. This variation has no effect on how a lota functions. However, it could determine how the vessel needs to be gripped when it is emptied.

VOLUMETRIC AND FUNCTIONAL COMPARISONS

Comparative measurements on total capacities and pouring volumes were made for both the precolumbian artifact and modern lotas. An explanation of terminology is as follows:

Total capacity is the maximum volume of water in milliliters (ml) required to fill the container to the lower edge of the top vent.

Pouring capacity is the total volume of water that can be effectively emptied from a lota.

Residual capacity is the volume of water remaining in the vessel at the end of the effective pours. Residual capacity plus pouring capacity equals total capacity.

Central chamber capacity is the maximum volume of water emptied on the first pouring. Each subsequent pouring will be less than the previous one. The central chamber capacity is approximately the same as the interior volume of the cylindrical sleeve at the top vent.

Modern stage-sized lotas have an average capacity of 2183 ml, which is approximately twice as large as the precolumbian vessel. The precolumbian artifact and modern lotas were compared with respect to performance. Each lota was filled with water to the lower edge of the top vent. A finger was held firmly over the top vent and the vessel was slowly inverted and emptied into a

2000 ml beaker. The water was then transferred into a 500 ml graduated cylinder to determine the volume for each pour. The volume for each pour was converted to percent volume of the total capacity for comparison.

The volumes were averaged for the five modern lotas to yield a mean percent volume per pouring. The results show that on the first pour the precolumbian vessel emptied 31 percent of its volume compared to 37.4 percent for the modern lotas. Each subsequent pour yielded percentages of 19.1 and 23.14, 14 and 16, 10.2 and 10.34, 7 and 6.8, and 5.4 and 4.1 respectively. The average variance in percent for the six pours of the precolumbian and modern lotas is 1.83 percent. To further substantiate the functional relationship between the precolumbian and modern lotas, a correctional analysis yielded a Pearson Product Correlation Coefficient of .993. Statistically, these results suggest that the precolumbian artifact and modern lotas are identical in respect to function. Figure 3 illustrates the similarities in function between modern lotas and the precolumbian artifact.

THERMOLUMINESCENCE AND RADIOCARBON DATING

A witnessed sample of the precolumbian artifact was taken according to procedures recommended by the Daybreak Nuclear and Medical Systems. The results of the analysis indicate the vessel was most likely last fired in A.D. 1290 \pm 300 years before the present date. Special comments from the Daybreak laboratory state: "This TL age was computed using typical radioactive constituents for Peru, and may therefore have some systematic error. As this material generally gives reasonable TL ages by this means, it is expected that the errors are not large" (Bortolot 2004).

The fabric associated with the lota discussed in this article was dated by Geochron Laboratories and produced a radiocarbon age of BP 510 \pm 40, for a calibrated age of A.D. 1421 (Geochron 2005) with a range from the intercepts of 1405-1437.

While a direct association between the vessel and the fabric is not absolutely certain, they are said to have been found together.

CONCLUSIONS

Documenting the actual use of the pre-columbian artifact is not possible. Conjecture suggests a probable purpose. Magic has long been employed by temple ritualists, medicine men, soothsayers, and shamans to play on the beliefs of their followers. In the Andes, the essential role of liquid offerings in religious ritual, and indeed nearly every aspect of ceremonial behavior, has been well documented (Carrion Cachot 1955; Gose 1993; Lothrop 1956; Sherbondy 1982, 1987, 1992). The Incas performed rituals involving the manipulation of liquids in specially designed vessels called *paqchas*. They also carved elaborate channels on sacred stones into which liquids were poured during ceremonial libations. Drinking, toasting, and the offering of libations were an essential part of the rituals of hospitality in Andean cultures, and archaeological evidence suggests that this was a custom going back hundreds, perhaps thousands of years. This concern with the ritual use of liquids leads us to suggest that this vessel may have been employed in ritual magical performances. At the same time we cannot rule out the possibility that magic was used as entertainment in Pre-Colombian Peru, but there is no evidence to support this position.

This precolumbian object is especially interesting for two reasons. It is often the case in archaeology that objects of unknown function are given the designation "ceremonial object". It is rare to have a case where the function of the object can be described in a way that warrants the designation "ceremonial". Secondly, this object appears to represent a specific case of independent invention of a particular device in both the New World and the Old.

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Figure 1. Precolumbian conjuring device.

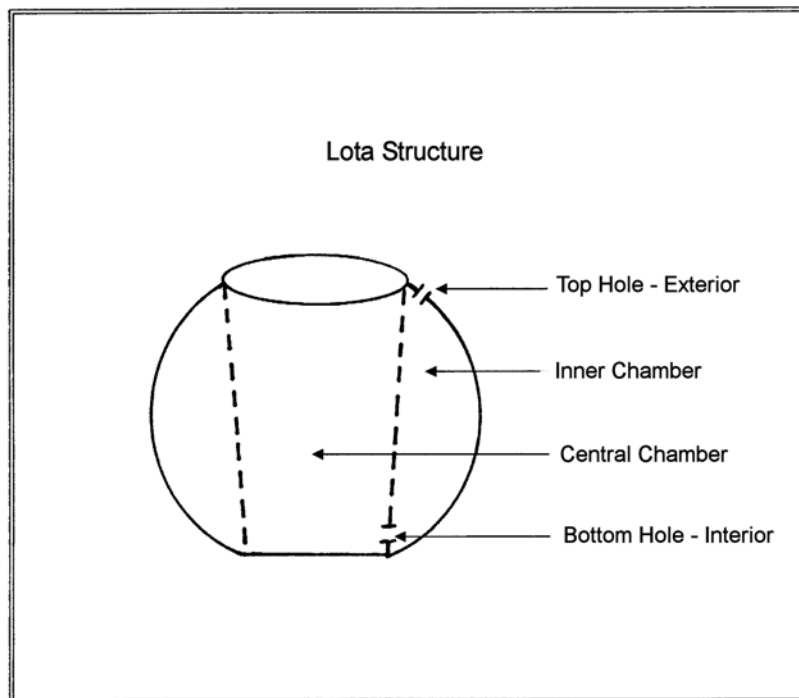


Figure 2. Lota structure.

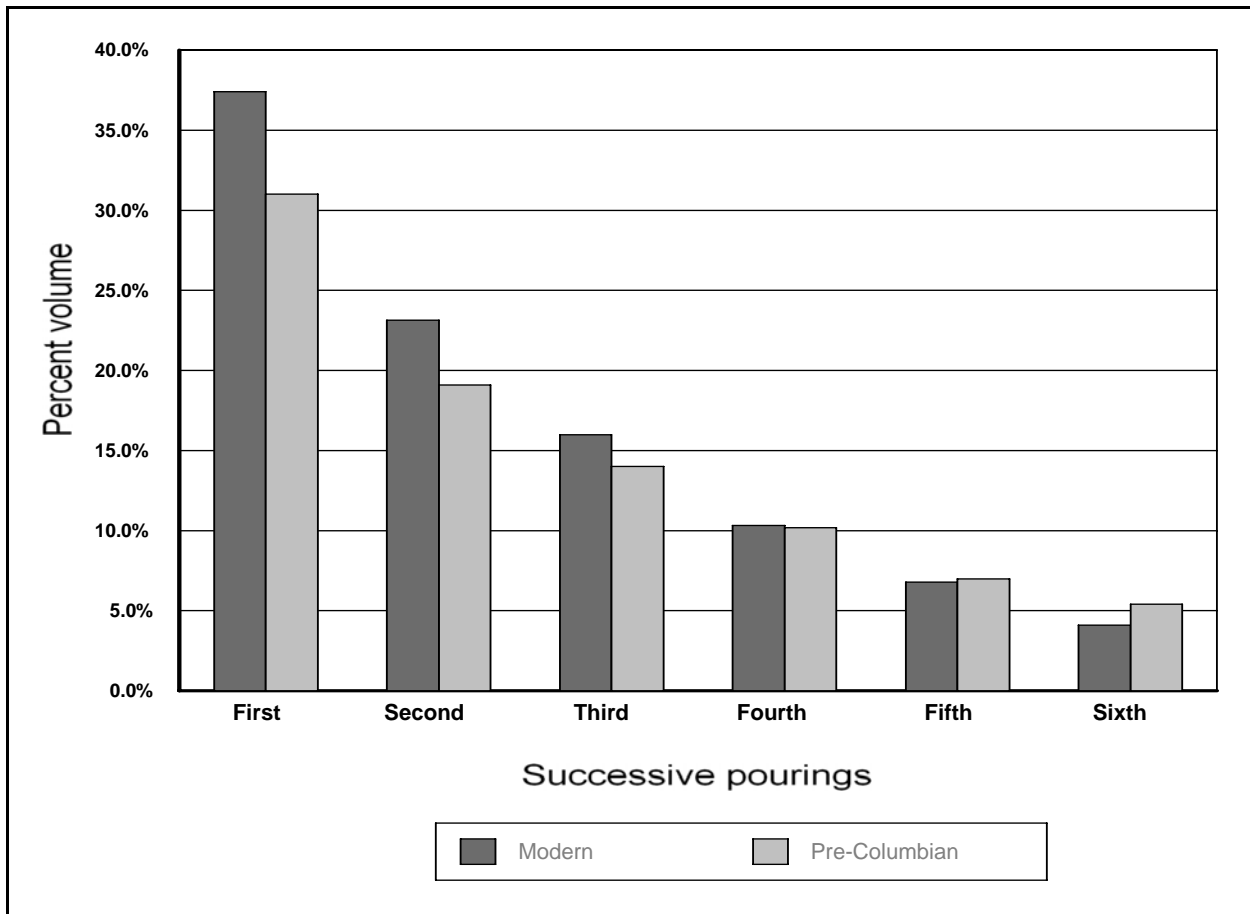


Figure 3. Comparative performances of Precolumbian and Modern lotas.