

Report on an Analysis of Spindle Whorl from Callao Cave, Peñablanca, Northern Luzon, Philippines

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Introduction

The Callao limestone formation in Peñablanca, Cagayan Province, northern Luzon has been the subject of archaeological research since the 1970's (Figure 1). In 1976-77, archaeological exploration of caves sites in the area was conducted by the National Museum in search of Palaeolithic sites. The extensive explorations resulted in the identification of 43 caves and rockshelter containing archaeological materials on the surface floor (Ronquillo n.d., Ronquillo and Santiago 1977).

Since then a number of caves in the Callao limestone formation were excavated between 1976 and 1982, and 1999. The cave sites excavated in the southern section were the Rabel Cave, Laurente Cave, Alejandro Malanos Cave, and Pedro Pagulayan Cave (Henson 1977, Ronquillo 1981). In the northern section were Arku Cave, Musang Cave, Lattu-Lattuc Cave, Callao Cave, and Minori Cave (Cuevas 1980, Dalupan 1981, Mijares 2002, Thiel 1980, 1990a, 1990b).

Callao Cave, with an elevation of 85 meters (amsl) and a coordinate of 17° 42' North latitude and 121° 49' East longitude, was excavated by the team of Cuevas (1980) from 1979 to 1980. Callao Cave is the biggest and longest cave in the area. A seven chambers cave, Callao has an elevation of 85 meters (amsl). It has length of 366 meters from the mouth to the back narrow chambers with a width of 14 to 35

meters. The height of the cave ceiling varies from 10 to 45 meter. A chapel was built in one of the outer chamber in the early 1970's. Cuevas team excavated a 4 x 4 meter square up to 7.5 meters in depth (Cuevas 1980).

Cuevas recognized two cultural layers. The upper layer is from surface to 80 cm below surface consists of earthenware sherds, flake tools, beads, animal bones and shells. Earthenware sherds were recovered from current ground surface up to 50 cm below surface. Flake tools, which were made from andesite, basalt and chert materials, were recovered up to 80 cm below current ground surface. In 2003 Callao Cave was re-excavated (Mijares 2005). Two contiguous squares were opened besides the east wall of the cave entrance. The upper layer appears to be a Neolithic deposit and contains shell beads, clay *lingling o* earrings, brown, red slipped and black earthenware sherds, flake tools, human bones and teeth, bat bones, riverine and gastropod shells. This layer has a radiocarbon calibrated date range of 3650-3470 BP (WK-17010). Maharlika Cuevas' excavation in 1980 was able to retrieve a spindle whorl at this level that is the subject of this paper.

The aim of this paper is to present the physical analysis of this spindle whorl and compare it with spindle whorls from other know sites with similar attributes. The senior author, Judith Cameron, conducted the analysis on the spindle whorl.

The Analysis

The functional attributes of spindle whorl 03-2514 from Callao Cave were measured and are summarised in Table 1.

Material composition	Munsell colour	Weight (g)	Shape	Height (cm)	Width (cm)	Central perforation (cm)
clay	Hue 7 Value 7/1	48.46	conical	3.50	4.00	0.80

Table 1. Functional attributes of spindle whorl J3-2574 Callao Cave.

The three significant functional attributes of the spindle whorl are material composition, shape and weight.

The spindle whorl was made from clay with a high mineral content. Traces of quartz and plagioclase were noted. It has a JIS (Munsell Notation) of 7 (Hue), 7/1 (Value). The whorl is hand built, and undecorated except for some incised lines, some of which appear to form a cross on the base (Figures 2 and 3).

The whorl weighs approximately 48.46g, which falls within the range of prehistoric spindle whorls. It measures 4.00cm in diameter and 3.50cm in height. The central perforation of the whorl is perfectly straight and measures 0.8cm in diameter although the top of the whorl is broken.

Shape is the principal diagnostic feature of the Callao Cave whorl as it enables more specific correlations to be drawn. Elsewhere the senior author has demonstrated the cultural specificity of certain spindle whorls (Cameron 2002). Conical whorls of this type first appear in the Early Neolithic at archaeological sites in the Yangzi River with the earliest parallels in the basal layers (layer 4) of Hemudu dating to 7000 BP (Kuhn 1988).

Parallels also occur at sites in Taiwan from the Fengpitou culture (c.2500 – 500 BC) through to the Beinan culture (ca. 1500-800 BC). At Fengpitou, 13 whorls of this type were found where they occurred in all layers (Chang 1969). Two [P (1), V (1)] were excavated from layer 1, 2 [K (3), P (2)] were found in layer II. Two conical whorls of this type were also found in layer III [N (1), V (3)]. Four were found in layer IV (B (1), K (1), S (1), V (4) and three (P (1), U (1) and V (3) were recovered from the surface. The whorl shown in Figure 65 (6) of Chang's site report on Fengpitou is precisely the same as that from Callao Cave. This parallel is shown in Figure 2.

The weight of the whorl is also diagnostic as it indicates the tensile strength of the fibres that were spun. As the whorl is relatively heavy (98 g), we can conclude that it was used to spin very strong fibres. When weight is combined with size, we can say that the whorl was not used to spin light fibres for clothing, but cords. Stiff elongated strands from leaves and hard leaf stems are generally used to manufacture cords and the most likely fibres to have been spun by the whorl is *Musa textilis* (abaca, Manila hemp) which has long been used in the Philippine islands to make black "hemp" rigging and cables. Navarrette (1618-1686) refers to the usage of these fibres called *cabo Negro* for this purpose on the island of Mindoro in the 17th Century (Cummins 1962).

Discussion

The spindle whorls from Callao Cave have been used for spinning thick fibres. Its form and other physical attributes shows its close similarity from the spindle whorls excavated from Fengpitou Site in southwestern Taiwan.

Peter Bellwood as part of the early Austronesian migration has raised the connection between Taiwan and Luzon. The spread of agricultural subsistence and associated material culture through Southeast Asia has been a source of contentious debate among proponents of sometimes-conflicting models. Peter Bellwood has espoused the current dominant model, in his Out of Taiwan model (Bellwood 1979, 1992, 1995, 1997, 2001, 2002, 2004a, 2004b, 2005). This proposes a migration of

Austronesian-speaking populations from Taiwan, who carried Austronesian languages and knowledge of agriculture into the Southeast Asian islands, previously inhabited to the west of New Guinea by hunter-gatherer groups. "The simplest form of the basic hypothesis-that prehistoric agriculture dispersed hand-in-hand with human genes and languages-is that farmers and their culture replace neighbouring hunter-gatherers and the latter's culture" (Diamond and Bellwood 2003:598).

Hsiao Chun Hung (2004) has postulated that there is a link between the Middle Neolithic of Taiwan at c.4000 BP and the early Neolithic of Luzon, c.3800. Eastern Taiwan shows an increase in red slipped pottery during this time (Hung 2004, 2005), while in Luzon the earliest red slipped pottery was already present, as at Andarayan (Snow and Shutler 1986).

Bellwood (1987) and Hung (2004, 2005) used the presence of red-slipped pottery in connecting Eastern Taiwan such as Fushan site with Northern Luzon. Mijares (forthcoming) has suggested that southwestern Taiwan also contribute to this connection particularly as a possible source for the black pottery tradition. On the western side of Taiwan, the Fengpitou site has a pottery sequence that includes black pottery, clay *lingling-o* earrings, and spindle whorls, in a shell midden deposit (Chang 1969). The earliest radiocarbon dated layer that contains black pottery at Fengpitou is 3722±80 uncal. BP (Y-1580), or 3839 (3632) 3443 cal. BP (Spriggs 2003).

The Callao spindle whorl's close affinity in form and possible use with the Fengpitou spindle whorls adds more credence to this proposition. This spindle whorl was found associated with clay *lingling o*, red-slipped and black pottery that are also found in Southern Taiwan.

Austronesian migration from Taiwan into Luzon c. 4000 years ago did not only come from south eastern Taiwan as previously thought but from a number of areas bringing with them their different cultural traditions and their subsistence strategy.

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Abstract

During the 1980 archaeological excavation at Callao Cave in Northern Luzon, a clay spindle whorl was recovered. This spindle whorl was recently analysed and compared with whorls from other known sites. The Callao spindle whorl has similar attributes, like material composition, shape and weight, with those excavated at the Fengpitou site in Taiwan. These similarities between spindle whorls of Taiwan and the northern Philippines could be taken as evidence to support the Out-of-Taiwan model in explaining the spread of the Austronesian-speaking people.

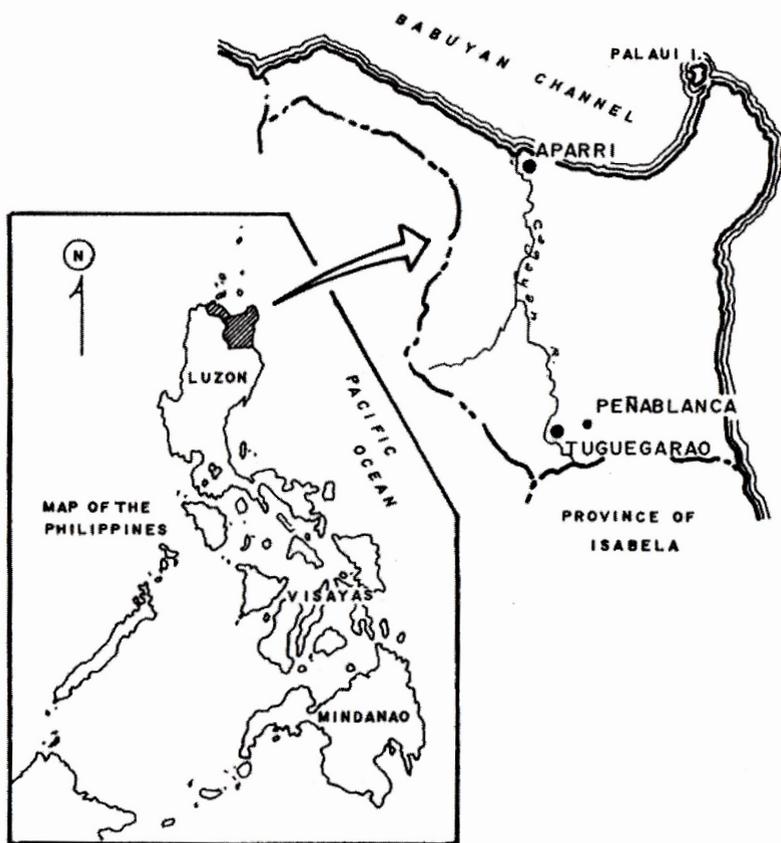


Figure 1
Site Location Map



Figure 2
Spindle whorls from Fengpitou, Taiwan (left)
and Callao, Philippines, width of 4 cm (right)

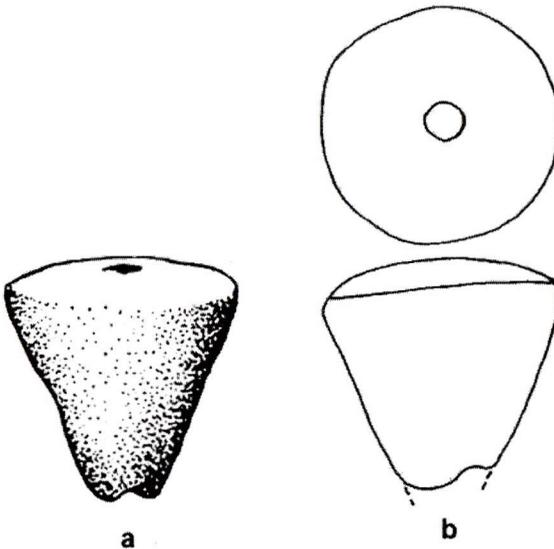


Figure 3
Drawings of Spindle whorl, a. Fengpitou, Taiwan
and b. Callao, Philippines