Ethnoarchaeology at the Top of the World

New Ceramic Studies Among the Kalinga of Luzon

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1. History of the Project

The Kalinga are a tribal society inhabiting the high mountains of Luzon in the northern Philippines. Here, on ridges and in valleys overlooking swift flowing rivers, they make their living by growing rice in irrigated, terraced fields. Why, in 1973, did a Southwestern archaeologist leave his dig in Arizona and travel some 10,000 miles to live with and learn from these people? The answer lies in the theoretical climate of the day.

The Kalinga Ethnocultural Project was forged during the era of the “New Archaeology.” Reacting against traditional archaeological approaches, proponents of the New Archaeology emphasized explanation over description. One of their aims was to develop the means to infer aspects of past societies that are difficult or impossible to excavate, such as social organization and certain behaviors of interest to the archaeologist. New Archaeologists frequently used excavated pottery in making their inferences. Could the abundant pottery the Kalingas still make and use in their daily lives hold a key? We thought it could.

Over the 18 years that have passed since the Project began, the face of archaeology has changed dramatically. So, too, have the goals of the Project, now encompassing concerns about the formation of the archaeological record, performance characteristics of pottery, experimental studies, production and distribution of pottery, and much more. Reviewing these changes in historical context provides a look at the changing nature of archaeology itself.

Selecting an Appropriate Society

Why did we choose the Kalinga? In one of the first case studies of the “New Archaeology,” the senior author analyzed the distribution of painted pottery decoration at a pre-historic Pueblo ruin in Arizona called the Carter Ranch Site (Longacre 1970). In that study, he argued that certain aspects of social organization could be inferred through such a distributional study. If pots are made by women, as they are in nearly every known case where pottery is made for domestic consumption, then subtle styles of decoration might develop that reflect the learning of pottery making from one’s mother. And if that is so, then micro-traditions of pottery decoration might reflect the making of pots by a group of related women-sisters, for example.

Some societies favor the husband leaving his natal home at the time of marriage and moving in with his wife’s family. If that were the rule at the Carter Ranch Pueblo during pre-historic times, then clusters of decorated pottery should be found in architecturally defined groups of rooms. Although Longacre’s study found a correlation between pottery designs and architectural units, by 1973 serious doubts were raised about that study and others like it. Concern was expressed about whether or not micro-traditions reflected learning frameworks in such a society.

Also, the study of prehistoric pottery did not unravel factors (other than kinship) that affected the distribution of the pottery as it was excavated from the prehistoric village. Some of these factors included where the pottery was produced, how the pottery was used, and how the pottery was affected by environmental processes after the village was abandoned. It had been assumed in the original study that the distribution reflected directly the locus of use and production of the pots themselves.

It was clear that the only place where one could begin to address such concerns was not in the archaeological record, but among a living society. The problem was to find an appropriate society with which to work. Ideally, it should be a group that makes and uses pots on a household basis. That is, each household makes pots for its own use and not for sale in a market. It should also be a culture whose customs and traditions had already been studied by cultural anthropologists (e.g., Barton 1949, Dozier 1968, 1967; Scott 1958, 1960; Taki 1977, 1994), providing a foundation for ethnoarchaeological research. Finding such a society was
difficult in the modern world. At the time, the Kalinga, a tribal society living in the rugged mountains of north central Luzon in the Philippines (Fig. 1), seemed the most likely candidate. An initial trip was made to the Kalinga-Appayo province in 1973 to ascertain if the people still made pots on a household basis and to seek their permission to undertake a long-term study if such were the case (Longacre 1974).

The Kalinga Ethnoarchaeological Project focused its efforts on villages within the Pasil municipality (Fig. 2). The village of Dangtalal was the first place visited (Fig. 3a,b). Pottery was in use everywhere: the Kalinga used pottery vessels to cook their rice and their vegetables and meat, as well as to carry and store water from the spring and even to brew Bago, a sugar cane wine. Women made the pots and learned how to do it from their mothers, and virtually every household made its own pottery. This seemed the perfect place for the envisioned study.

After getting to know the senior author, however, he learned that he was going about the planned research, the Kalinga agreed to let him return for a year-long study, and that a date was carried out during 1975-1976 (Longacre 1981). The main objective was to collect information (and pots) that reflected the learning frameworks in order to test some of the ideas generated in the Control Ranch study. During the course of the fieldwork it became apparent that the Kalinga potters tended to work in informal groups based upon neighborhood, so data and pots from particular groups were also collected to measure the impact of potting together. In addition, information on ceramic decorative style was collected for each Dangtalal potter.

Various Dangtalal pots are decorated with incised designs that are known as gill around the vessel neck (Fig. 4a,b). The number of gill bands on a particular vessel ranges from one to four or more. Many gill designs have names, and bands may be combined in a variety of patterns. After the Kalinga field work was completed and a large collection of pots made, analysis of the gill decorational system was undertaken by Michael Graves as part of his dissertation research (Graves 1981). Combinations of gill designs are characterized using multivariate techniques to see whether micro-traditions reflected the Kalinga pottery framework, as had been hypothesized. Graves found only weak support for that hypothesis and a strong link between the age of the potter and the degree of complexity of decoration: the older potters tended to make more complex decorations than their younger counterparts.

**New Research Goals**

By 1975, new concerns and questions were being raised about the "formation processes" responsible for the archaeological record. What types of processes permit artifactuals after they are discarded within a living system and before archaeologists excavate the artifacts centuries or millennia later? The Kalinga setting offered an appropriate research venue for investigating such issues, and they were added to the research plan that guided the field work that year.

One of the new concerns involved the general question of how long items last before they are discarded. Thus, the use-life of different types of pots among the Kalinga became of interest. But how could we measure the use-life of pottery? In 1975 and 1976, all the pots in use in two Kalinga villages, Dangtalal and Dalupa, were inventoried. The type of pot, the name of the potter, and the year the pot was made were recorded for each household; in all, over 2,000 pots in use were collected.

By 1980, political turmoil caused by Kalinga resistance to a government-sponsored hydroelectric project made the Kalinga area too dangerous to continue the study. In 1979 and 1980, the senior author's principal Kalinga assistants re-inventoried each household. New and replacement pots were added to the inventory, and information about each pot missing from the original inventory was collected. Many of these vessels had been broken or had simply worn out, and the dates of their departure from the ceramic assemblage were noted.

This information formed the basis for detailed estimates of the use-life of the various types of Kalinga pots (Longacre 1980). A general principle emerged that seems to hold true for other pottery-using societies as well: the large pots last longer than do the smaller-sized vessels in regular use. This principle has important implications for the prehistorian trying to draw chronological inferences from pieces of pottery recovered from an archaeological site. The archaeologist has a better chance of defining chronological differences by focusing upon the pieces from the smaller pots. Smaller pots likely broke more often and required replacement more frequently, promoting faster stylistic change, a change that could be observed archaeologically.

**Return to the Kalinga**

By 1986, problems in the Kalinga subprovince had subsided and conditions were sufficiently peaceful to resume the project. A major ethnoarchaeological project was planned, and in the summer of 1987 the senior author, along with six University of Arizona graduate students and several more from the University of the Philippines, began 12 months of fieldwork.

By the late 1980s archaeology had changed a great deal, and the new research plans reflected some of those changes. But the main theme continued to be the investigation of the relationships between variation in material culture and variation in behavior and organization. Some of the questions that guided the earlier research continued to be addressed. Thus, collecting data and pots from younger potters was planned to test the Graves hypothesis, that design complexity was decreasing among those potters who had been trained by older potters.
II. The Kalinga Ceramic Studies

Here, we present the results of a study of the pottery production of the Kalinga Ethnoarchaeological Project, which involves the production and distribution of pottery. The study examines the factors that influence the production of pottery, such as the availability of raw materials, the skills of the potters, and the economic conditions of the communities. The results of the study are then compared with archaeological records from other areas of the Philippines, in order to understand the development of pottery traditions in the region.

Ceramic Production and Distribution

One hallmark of "Neolithic" communities in the Philippines is the production of pottery. This study examines the factors that influence the production of pottery, such as the availability of raw materials, the skills of the potters, and the economic conditions of the communities. The results of the study are then compared with archaeological records from other areas of the Philippines, in order to understand the development of pottery traditions in the region.

The Switch to Metal Pots: A Case Study of Technological Change

A unique feature of the archaeological record is that it can document long-term change. But what are the factors that govern technological change? How do changes in material culture relate to other aspects of society? These questions, important to archaeologists, cannot be answered by looking at the prehistoric record alone; the process of technological change must be addressed through research such as experimentation and ethnoarchaeology. As part of the pottery use-alteration study, information was collected on one component of change in Kalinga society: the replacement of ceramic with metal cooking pots.

Nearly all households in the village of Guina-an have enough metal pots for all their cooking needs, but as Figure 9 illustrates, ceramic vessels are still widely used. Metal pots are used most frequently for cooking rice, but ceramic vessels are still used for cooking vegetables and meat. Interviews with Kalinga potters users, as well as laboratory experiments, demonstrated that the types of pots is important in the transition from ceramic to metal vessels. Pots, or any technology, can have performance characteristics that relate to the actual use of the pot as a tool (i.e., technon-functions), but also social or ideological functions. Metal pots are now used to cook rice because they boil the rice faster and are more durable. Ceramic vessels are still used for cooking vegetables and meat because the food can boil without boiling over, and they are easier to wash than metal vessels. Durability and heating are important factors in the choice of pots.

Kalinga pottery making is a combination of coil-and-scrape manufacture, which yields the initial shape of the vessel, and paddle-and-orient techniques, which produce the final shape and surface of the vessel (Fig. 6a-b). Although the initial vessel-forming sequence lasts just 15-25 minutes, the entire pottery-making process involves clay preparation, vessel forming, drying, and firing. An active Kalinga potter can finish between 10 and 15 vessels in a week; this number varies according to other household and farming demands that may hinder pottery-making efforts. Kalinga potters use a comb to smooth the surface of the clay, and then use a paddle to shape the vessel. They also use a paddle to create the desired shape of the vessel. Kalinga potters use a comb to smooth the surface of the clay, and then use a paddle to shape the vessel. They also use a comb to create the desired shape of the vessel.
Changes in Kalinga ceramic production can be examined through an archaeological perspective as well by focusing on Kalinga material culture. Previously mentioned influences include the reactivation of gold mines and the establishment of logging companies in the area. Perhaps the most profound impact on the general Pasil area occurred as a result of the Marcos government’s efforts regarding the Chico River Dam Project. Governmental employees were unsuccessful in their efforts to woo the Kalinga into accepting the hydroelectric project that would displace 10,000 Kalingas from their land to provide electricity for Cagayan Valley residents living 40 miles to the northeast. Massive resistance to the project by the Kalinga and the neighboring Bontoc groups prevailed, and the project was cancelled.

During this period, however, non-Kalinga customs and values were introduced that had an impact on traditional lifeways. Governmental employers (including the military) sought Dalup ceramic "sojuvens"; figurines and religious plaques (Fig. 8) were developed that have now become a standard part of the Dalup potter’s repertoire. One means by which the Marcos government attempted to curry favor with the Kalingas was through the establishment of centralized workshops to promote and revitalize traditional crafts such as backstrap-loom weaving. Interaction between Dalup potters and weavers in the center of Lubuangan during the Chico River Project encouraged Dalup potters to modify both the shape and the decoration of their water jars (immanso). Dalup produced water jars now sport festive ochre decorations of floral motifs, geometric design, and an occasional anthropomorphic depiction.

Pottery Use-Alteration

Since the work of the Russian anthropologist Semenov (1964) was introduced to the west, lithic use-wear analysis has become commonplace. From the polished and micro-chips on the edges of stone tools
archaeologists are now able to infer how a tool was actually used. Though it has been several decades since the first literate use of adzes, comparable studies with pottery have not been done. This is not for lack of need. Ceramic data are often employed to determine things such as prehistoric exchange patterns, diet, population size, and social organization. Many of these inferences rely on a fundamental but often unresolved question: was pottery used?

Accurate estimates about household size from pottery, for example, require a determination of which pots were used for daily cooking, water storage, and serving, and which pots were not in use. Similarly, before one can determine that a type of pottery was controlled and distributed by elites in an elaborate exchange network, it is necessary to understand the way pottery functioned in everyday life. To test all inferences about past society that employ pottery must rely ultimately on assumptions about how the pottery functioned. The purpose of this component of the Kalinga Ethnoarchaeological Project is to link pottery use with alterations to the vessel. This will help prehistorians determine how pottery was used in the past.

The data for this project were collected from March through May 1988 in the Kalinga village of Guina-ang. Masashi Kobayashi was the co-director of the pottery use-alteration study. Guina-ang is across the river and about an hour’s walk from Dangtalan. It is the largest village in the Paul Valley and is thought to be the oldest. Guina-ang consists of slightly over 100 houses that cluster atop a ridge overlooking the Paul river.

The data for the pottery use-alteration study were collected in two phases. The first phase involved inventorying all the vessels in the 102 households. This information was collected by Kalinga assistants and included not only data about each pot, such as the age, the dimensions, and the maker of the pot, but also information about pottery use. For all 2481 vessels in the village of Guina-ang, 437 things such as what each pot is used for, when it was last used, whether it is ever used to cook other foods, and some basic information about use-alteration trances.

The second phase of data collection involved day-long observations of pottery use. In 40 households the use of pottery was carefully documented from before the first meal until after the final meal of the day (Fig. 9). Any activity that involved pottery, such as cooking, cleaning, and storing, was recorded (Fig. 10). In these households new vessels were exchanged for the old ones in order to create a use-alteration study collection of about 200 vessels. These vessels were wrapped carefully to avoid further alterations to the surfaces and then shipped to Tucson where they now reside in the Arizona State Museum.

The analysis of pottery use-alteration concentrated on three things: evidence: absorbed residues, attrition, and carbon deposition. The analysis focused on the two forms of
desire for “souvenirs.” Regular motor transport was also begun that made travel between communities easier and encouraged Dalupot potters to expand their regional exchange network and diversify their products. Wage labor trickled into the traditional barter economy through the reactivation of gold mines and dam-related construction efforts. The introduction of new ideas and values, the access to motor transport, and the availability of cash in the Kalinga economy all contributed to the development of the Dalupot ay-ayam tradition.

Fascinating as the birth of the ay-ayam tradition may be, its future is equally intriguing for anthropologists. Increasing contact between the industrial world and tribal societies often stimulates the development of ethnic and tourist art forms. Carved Eskimo ivory, North American Pueblo pottery, and African woodcarvings have all found a firm niche in an international ethnic art market. Is the Kalinga ay-ayam tradition a passing fancy or a nascent ethnic art tradition? Kalingas often express a desire for “progress,” and such progress means improved transportation, increased wage labor opportunities, better health care, and population increases. With “progress” will come rapid culture change, and this change will in part be reflected in the Kalinga ceramic traditions. Now, and in what ways, Kalinga ceramic traditions will change can only be examined with the long-term approach that ethnoarchaeological research requires. As archaeologists, we concern ourselves with the past; as ethnoarchaeologists, we also look toward the future.
Kalinga cooking pots (Fig. 4a,b): ittomy, used to cook rice, and oppagya, used to cook vegetables and meat. The rice and vegetable/meat pots provide a good contrast because they are used to cook different foods, and there are a different set of activities associated with each vessel type.

The analysis of absorbed residues concentrated on fatty acids. All plant and animal species have different combinations of fatty acids, which can, potentially, survive long periods in the depositional environment. Fatty acids were extracted from a sample of vessels and a set of Kalinga foods and then identified with gas chromatography/mass spectrometry. The results demonstrated that fatty acids can be used to discriminate pots used to cook different items. The residue absorbed into the vessel wall of the rice cooking pot could be clearly linked to rice. Although the vegetable/meat cooking pots were more problematic because they were used to cook a variety of foods (e.g., chicken, pork, dog, and various forms of garden-grown vegetables and wild plants), the residue analysis did determine that a variety of both plant and animal foods were prepared in the vessels.

To determine how well the fatty acids survive in the depositional environment, a sample of shreds exhumated from a Kalinga midden were also analyzed. Fatty acids were still present in the walls of the shreds but there was some evidence of fatty acid decomposition. Research in this area is ongoing.

Attention to the vessel surfaces as a result of use is also an instructive trace. There are nine areas on the Kalinga cooking pots that have evidence of distinct activities, such as stirring, mixing, or heating the contents, and washing. The use-attrition traces were identified with the help of low-power optical and scanning electron microscopy. It was found that the exterior surfaces of the rice and vegetable/meat cooking pots have similar use-attrition patterns, but that the interiors have distinct use traces that reflect different cooking activities. For example, the vegetable/meat cooking pots have evidence of stirring and manipulation of the contents during cooking, but the rice cooking vessels do not. Moreover, the rice cooking pots have thermal spalls on the interior midsection suggesting that they were placed next to the fire. The attribution data are so patterned that it is even possible to identify the pottery users in the community that are left-handed.

The final form of use-alteration analyzed in this study is interior and exterior carbon deposits. Interior patches of carbonized food provide information on what the food was and how it was cooked. Exterior carbon, on the other hand, can demonstrate how the vessel was positioned over the fire. The rice and vegetable/meat cooking pots have different patterns of carbon deposition that represent different ways of cooking. For example, the vegetable cooking pots often have a carbonized patch on the interior mid-section from being placed next to the fire in the final stage of rice cooking. The Kalinga pots offered firsthand evidence of pottery carbon deposition, and this has led to a more complete description of the factors that control both interior and exterior carbon formation.

This is the first ethnoarchaeological study to concentrate exclusively on pottery use-alteration. It was demonstrated that all three forms of use-alteration—residues, carbon deposits, and surface attrition—are reflected on pottery use activities. The rice and vegetable/meat pots could be distinguished on all three of the use-alteration traces (Skibo n.d.). This has led to a more general discussion of the factors that control the ways in which pottery can reflect activities. The ultimate objective of this research was to provide the means for the prehistorian to make more refined inferences about pottery tere my. An important component of the Kalinga Project demonstrates that patterned activities of pottery use alter the vessel in ways that can be interpreted by the archaeologist, leading to better inferences of pottery use and therefore to more accurate reconstructions of the past.

III. Conclusions

Change is a unifying theme in the history of the Kalinga Ethnoarchaeological Project. During the last 18 years, much has changed in both the types of research topics pursued on this project, and in the nature of Kalinga society. The project was initiated in the 1970s as an effort to explore ceramic styles and residence, but has become sensitive to changing trends in archaeology. Research within the Kalinga project today ranges from focus on leather use-life, use-alteration, and refuse disposal to regional studies of ceramic production and distribution. One of the major strengths of the Kalinga Project lies in its efforts to integrate experimental, ethnoarchaeological, and archaeoological approaches to ceramic analysis. The other strength is its long-term perspective, enabling us to track material culture change, and even an archaeological core. Kalinga research continues, and the next two decades promise to provide even greater contributions for archaeologists.

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