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CORRELATIONAL STUDY ON EARTHEN VESSEL TYPE AND FUNCTION: A CASE OF OINAM POTTERY (MANIPUR, INDIA)

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ABSTRACT

The study of correlationship between form and function of earthen vessel is one of the important aspects of ceramic ethnoarchaeological study, where ethnoarchaeologists try to illustrate how the resulting parameters can be applied to archaeological pottery studies. The main aim is to draw a hypothetical set of morphological dimensions for each of the major functional categories of earthen vessel forms of Oinam pottery of Manipur (India). This has been made on the working assumption that Oinam vessels with their different functional categories are made to a specifiable set of morphological boundary in consonance conditions. For the purpose, five classes of pottery are categorized according to the primary functions assigned to each of them by its makers and users. Basic dimensions of pottery such as vessel height, vessel diameter, angle, thickness and circumference etc. of 196 pots of different functional classes of Oinam pottery have been measured. The categories of the functional class include cooking, storage, transport, serving and eating vessels.

INTRODUCTION

The function and morphology of ceramic vessels are related by definite physical properties and that vessels within a functional class are designed and made according to specifiable set of morphological boundary. Until recently, ethnographers have paid little attention to ceramic formal/functional analysis. A number of ethnographic studies have focused on ceramic technology and methods of manufacture (e.g., Foster 1948; Lothrop 1927; Mackay 1929; Machalan 1940; Raven-Hart 1962; Hankey 1968; Waldeman 1972; Rye 1976; 1981; and many others).Among the few functionally oriented studies, while Linton (1944) assembled information on the structural features of cooking pots, Thompson (1958, esp.pp.59-63) incorporated formal/functional correlations into his study of modern Yucatan Maya ceramics. Solheim (1965) and Matson (1974) provided unillustrated accounts

of the functions of Southeast Asian and Near East pottery, and David (1972); David and Henning 1972) and DeBoer and Lathrap (1979) have supplemented Foster's (1960) research into average lifespans of various vessel forms known to have specific uses.

The present study on the Oinam earthen vessels, in respect of their morphological and physical properties, attempts to characterize the mechanical performance of the vessel forms in order to correlate the possible limits of variety of tasks for which they are designed, and to formalize a primary use range of the vessels as perceived by the craftsperson in relation to the vessel morphologies. Aim of the present study is also to detect whether the ceramic functional boundaries manifested in the stylistic and morphological features of the vessels can have probable applicability to the prehistoric archaeological ceramic assemblages in the area.

Pottery making tradition of the Paomai tribe who inhabit the Oinam village (located at a distance of about 40 km away from Imphal in the Senapati District of Manipur. The patri-oriented agrarian Paomais obtain their subsistence primarily through wet terrace cultivation. In the household, men and women are involved in different activities to ensure the availability of goods and services for family consumption and well-being. According to their gender-based division of labor - females, besides engaging in tilling the terrace fields along with their males, have primary responsibility for household-related activities. Occasional engagement is also seen in spinning and weaving on their loom to provide clothing to the whole family members besides also made earthen pots for their utensils. Another important economic pursuit of Potmaking by the Oinam females is done on part-time basis in the dry seasons when they are free from the agricultural activities. They make pots with their naked hand without using wheels. A wide range of earthen vessels are made and used by the people in their daily chores, and some of these are the indispensable items in the religious affairs also. Some of the households are seen using earthen vessels for cooking rice and curry, and more particularly the local rice-beer.

THE OINAM CERAMICS: SYSTEM OF PRODUCTION

Manufacturing of earthen vessel is a long process right from ceramic resource procurement to firing through the stages of processing of resources (clay and tempering material), mixing and pounding of resources, fashioning of different shapes and size, decoration, etc. Clay and temper being the primary ceramic resources, form the important items responsible for the development of the craft of pottery making.

Three kinds of potting raw materials are known to the craftsperson – such as, black clay (dongae), brown clay (ngasou) and red clay (ngahei). Dongae and ngasou form the primary tempering material. The potters collect the ceramic resources from different sites of the village. Dongae (black clay) is

collected from a site called Kure/Voh which is located at a geodesic distance of about two and half kilometers, and pheric distance is of about an hour and forty five minutes from the village. Ngasou (brown clay) is collected from the site called Thai/Phai/Ture Taro. The geodesic and pheric distances to this location from the village are of about two km and sixty minutes, respectively. The red clay ngahei is collected from the site called Runo, having its geodesic and pheric distances of about one km and thirty minutes respectively. Collection of these resources are done by the potters in groups and before digging the site they pray the custodial deity of the site to protect them from any harmful acts during potmaking. After that they start digging horizontally with the help of a hoe. These clays are found from a depth of about one to two feet below the surface.

The other equally important secondary ceramic resources like fuel, husk/chaff, colouring material and water are readily available nearby the potters' house. They used straw, dry shrub and small woods (called Mothing) as fuel. Since Oinam people practice agriculture, straw is available in abundance; they stored the straw after harvesting the fields. The colouring material made from the bark of a tree called 'Paothing' (Alnus Nepalensis) is collected from the nearby jungle and also available near potters' house.

The three kinds of potting materials are first exposed to sunlight to dry for about four to five days or even longer depending on the weather condition. After it get dry, these are taken in the ratio of 2:1:1 (two parts of ngasou, one part each of dongae and ngahei clay material) and pounded in a wooden mortar with wooden pestle. The non-pounded, coarse granules are separated out using a bamboo sieve ('ngeajande'). Coarse granules that do not pass through the sieve is again pounded and shifted, two to three times. The finely powdered material is well kneaded by mixing little water till it becomes soft dough. It is again kneaded thoroughly. After that, well kneaded clay is ceded apart into many clay balls according to the size of the vessel to make.

The Oinam craftsperson makes earthen vessels by their naked hand and it is an art of their hands. Firstly the potter sits on a wooden platform ('pheng') specially made and used while making an earthen vessel by a craftsperson. While she is sitting on the platform, she kneaded clay thoroughly upon the available space of the same platform where she is sitting. While doing so, a little water is sprinkled off and on the platform and make flattened the clay balls with her hands and palms. The very first stage of shaping an earthen vessel - the making or the 'preform'- involves the potter's initial transformation of raw damp clay into a preliminary cylindrical shape. The flattened clay is wrapped around a cylindrical roller (vu) so as to get an elongated/cylindrical shaped object with a desired length. After the wooden log is taken out slowly a hollow and cylindrical shaped object of flattened clay is thus obtained. One hollow end is made closed with a flat piece of clay. This preform

production is both 'transformative' (which makes a solid cylinder of clay having opens holes in both ends, without a base) as well as 'additive' (in which the potter gradually adds the total quantity of clay required). The suture between the joints is obliterated with fingers and also by using "tuta" (protector). Body part of the vessel is prepared to gain its desired shape by the potter's hand grasping the cylindrical structure over the knees of the potters. During this process, both the inner and outer surface is dampened by sprinkling a little water or saliva on and off. The neck and rim parts of the vessel are prepared by coiling method. Here, rolls of clay are spirally turned to form the walls of the shoulder part till the desired height is achieved. Then, the wet 'titu' (a thin beater made of a piece of wood) is used. At same time, the pot is rotated slowly by placing between the craftsperson's thighs so as to enable to mend eventually the outer surface of the vessel with the help of a water-soaked plain dabbler (titu). Regularity of lip is adjusted by tapping with 'titu' and with potter's fingers placing below by giving support, and then tapping with 'khouthing'(a thick beater of wood) at the rim and shoulder parts. After this, the uneven surface of the rim is obliterated by shaving with 'zha' (a smoother) and rubbed with index finger. It is then sundried for three to four hours. After it becomes a little harder, beating the base of the pot starts. The base is enclosed simply by way of pushing and pinching. The excess part is then taken off. Then the potter dilates the base portion by beating on the other surface with 'titu'(beater) while it is protected from inner surface with a 'tuta'(oval shaped stone) held by the other hand up to the greatest diameter. After the completion of overall shaping, pots are sometimes decorated, followed by shade drying for a day. During this period light beating with the help of 'khouthing' is done on the outer surface after every two to three hours. After three or four days pots are ready for baking.

Decoration of the vessel is not done on all the pots they made. Some of the pots are left undecorated and it depends on the potters' choice. Decoration is usually done with a paddle (Khea) one end of which is being wrapped with a plaited cord, made with bamboo splits (the species of which is grown locally). By doing this a decorative pattern of oblique, criss-cross lines are seen over the surface as a by-product while beating and shaping the pot in its leather-hard condition. Another decorative pattern is the zigzag lines done on the outer surface of the green pots (especially on the body part of the vessels) by way of pasting kneaded clay piece with potter's naked finger.

Firing is the last stage in the pot making process and is done at the open sites. In the Poumai society, a couple has to observe strict sexual contact on the day before firing the pots. Male members also participate in the firing activities. Before proper firing, pots are to bake to the fire by placing them horizontally near it. This prevents the green pots from breakage or cracking while firing. Firing bed is made with straws, upon which dry branches of Mothing tree are placed. Over this is covered with

straws and twigs that look like a heap of straw. When the straw and twigs are completely burn, it is examined by inserting a long pole to check whether the pots are fully baked or not. After it is baked properly the pots are removed one by one with a long wooden pole.

When the pot removed from the fireplace is still red hot, chaffs are thrown all over them. It is believed that in doing so the hardness of the vessel accelerates. Again, the scraped bark of the Paothing tree is rubbed against the outer wall of the pot after it is cool down. At the final stage the decoction of the bark of Paothing tree, prepared well before, is poured inside the vessel and kept remain for about 10 days. After doing this pot is ready to use.

THE OINAM CERAMICS: FORMS AND FUNCTION

The study of relationship between ceramic vessel form and function is one of the important aspects of ceramic ethnoarchaeological study, where ethnoarchaeologists try to illustrate how the resulting parameters can be applied to archaeological assemblages. A close study of the basic dimensions of Oinam ceramic is undertaken here to draw a correlationship between the function and morphology of vessels. The study rests on the assumption that Oinam vessels within a functional class are made according to a specifiable set of morphological boundary. A good number of Oinam vessels are attributed to different sets of functions, such as cooking, drinking, storing, carrying, and so on. Different types of earthen vessels set within different functional categories are given in Table1.

For the present study, six classes of pottery, such as cooking vessels, drinking vessels, storage vessels, transport vessels, serving vessels and liquor brewing vessels are categorized according to the primary functions assigned to each of them by its makers and users. Basic dimensions of pottery, such as height, diameter, circumferences, angle, thickness etc, on 196 pots of different functional classes of Oinam pottery have been measured. Basic dimensions of the morphological characters of each functional class of pottery are detailed below

COOKING VESSEL: In Oinam three types of cooking vessels are found. These vessels are used for cooking rice and curry. They are Lakho, Lane, and Sailane.

a). Lakho: It is a wide open mouth vessel ,out turned rim with beveled labial flanged lip, the side is concave and base is oval in shape; made by moulding and beater technique with smooth surface. This vessel is used for cooking rice. This type of vessel is designed with a vessel opening wide enough for convenient scooping out of content from inside it. It is seen from the table that the maximum body height ranges from 6-8cm (mean=7.428), maximum diameter ranges from 15-25.6cm (mean =20.67), rim thickness of the vessels ranges from 0.4-1cm (mean=0.692) and circumference of the vessel body ranges from 50-75cm (mean=57.64).

b). Lane: It is an oblong shaped vessel with short narrow neck, flaring rim, beveled labial flanged lip, convex wall and base with a plain smooth surface; made by moulding and beater technique. This vessel is used for cooking curry. It measures maximum body height ranging from 5-15cm (mean=7.8), maximum diameter ranges from 12.5-34cm (mean=18.58), rim thickness ranges from 0.5-1cm (mean=0.725) and circumference of the body ranges from 48-100cm (mean=62.4).

c). Lane: This vessel with beveled labial flanged lip, the side is concave and base is oval in shape, similar with sailane but little big in size. It is used for cooking curry. The measurements of the vessel are, the maximum body height ranges from 4-9.5cm (mean=7.068), maximum diameter of the vessel ranges from 14-34cm (mean=17.7), rim thickness ranges from 0.4-1.5cm (mean=.827) and circumference of the body ranges from 34-89cm (mean=58.44).

Storage Vessel: Only one type of storage vessel (daoso) is known to people. It is used as a container for storing water or rice beer.

Daoso: This is a short, narrow neck and globular body vessel, with beveled labial flanged lip; convex body wall and base. This is used as a container of water or rice beer. The maximum body height ranges from 8.4-15cm (mean=12.48), maximum diameter of the vessel ranges from 26-33cm (mean=27.6), rim thickness ranges from 0.4-1cm (mean=0.84) and circumference of the body ranges from 50-90cm (mean=77.19).

Transport Vessel-The vessel include in this type is Dao. It is used for fetching water and carrying rice beer to the paddy fields.

Dao: This vessel is long, narrow neck, out turned rim with beveled labial flanged lip, convex wall and base. The surface of the vessel is scrapped before decoration with cord mark in linear pattern, with round appliqué lines on the shoulder. This vessel is used for fetching water. The narrow is provided to reduce loss of the contents on spillage. The maximum body height ranges from 6-18cm (mean=10.46), maximum diameter ranges from 12-30cm (mean=22.44), rim thickness ranges from 0.18-1cm (mean=0.736) and circumference of the body ranges from 40-91cm (mean=60.64).

Serving Vessel: This type of vessel includes Daone, Ngakou and Ngakuni. These vessels are used in serving food items like rice, chutney etc.

Daone: A ring footed vessel, with short narrow neck, slightly flattened body out turned rim with beveled labial flanged lip, convex wall; made by moulding and beater technique; decorated with cord mark on the body in the linear pattern and appliqué lines on the shoulder. This vessel is used as wine or water jug. The maximum body height of the vessel ranges from 6-10cm (mean=8.192), maximum diameter ranges from 8.1-27cm (mean=17.17), rim thickness ranges from 0.4-1.9cm (mean=0.716) and circumference ranges from 30-65cm (mean=47.71).

Ngakou: A ring-footed bowl with flat lip, convex wall, the body is half-spherical in shape. The size and styles varies according to the potters and users desire. This vessel is used as rice bowl. The maximum height ranges from 9-10cm (mean=9.33), maximum diameter of the mouth ranges from 17-18cm (mean=17.63), rim thickness ranges from 0.8-.09cm (mean-0.833) and circumference ranges from 43-45cm (mean=44.67).

Ngakuni: It is a ring footed bowl made by hand and beater technique. It has flat lip convex wall, the body is half spherical in shape. This pot is used as a vessel for making chutney. The maximum height of the vessel ranges from 4-10cm (mean=6.603), maximum diameter ranges from 10.6-25cm (mean=14.78), Maximum thickness ranges from 0.2-1cm (mean=0.69) and circumference ranges from 28-45cm (mean=35.40).

Liquor Brewing Vessel: This type of vessel includes Oraradao and Sulah.

Oraradao: This vessel has smooth plain surface, oblong in shape with short narrow neck, flaring rim, beveled labial flanged lip, convex wall and base; made by moulding and beater technique. It is used for brewing rice beer. The maximum body height ranges from 12-23cm (mean=17.7), maximum diameter of the vessel ranges from 26.5-36.5cm (mean-32.5), rim thickness ranges from 0.5-1.1cm (mean=0.875) and circumference ranges from 90-107cm (mean=99.4).

Sulah: This vessel has short narrow neck, out turned rim with beveled labial flanged lip, convex wall, decorated with cord mark on the body in linear pattern, used for boiling water for brewing rice beer. The maximum body height ranges from 9-16cm (mean-11.75), maximum diameter ranges from 27.5-33cm (mean=30.87), rim thickness ranges from 14-20cm (mean=16.5) and circumference ranges from 64-80cm (mean=77.25).

It is seen that vessel morphologies, thus, corresponds to the functional needs of the containers. As mentioned above, the people use three kinds of vessels to cook rice and curry. According to them curry cooked in this vessels taste better than those of metal vessels. Storage vessel daoso with short, narrow neck, convex body wall and base is used as container of water or rice beer. An example that signifies demand of specific shape by specific function is given by dao. It has a long bulbous body, opened in a narrow mouth with a raised neck. This jar is meant for carrying rice beer to the agricultural fields. This tall, narrow-mouthed jar is made categorically to avoid spilling of rice beer. This is also used as water carrying vessel. Vessel like daone, ngakou, ngakuni with ring footed base are made to use as serving vessel. Daone a ring footed vessel, short narrow neck and with the foot is used as a jug for rice beer or water. Ngakou and ngakuni are also ring footed bowls used for serving rice and making chutney. These vessels are provided with ring footed so that it can be used as serving or eating vessels. Another vessel oraradao and sulah is used by the locals for boiling water

for brewing rice beer. This vessel is very big in size having oblong shaped with short neck jar. The neighboring villagers also use these vessels in their ritual acts. The ritual performed during feast of merit is known as "Cossodo". In this ritual all the villagers are invited for a feast by a well to do person, he butchers many animals like, cow, buffalo, pigs etc. The wealth is counted by the buffalo heads killed for the feast. And the meat of these animals is cooked in an earthen pot and they make fire with the help of the bamboo split by rubbing two bamboo splits .The earthen pot which is used for cooking is "lakho" (small size cooking vessel), "yandao" (bigger in size than lakho).

It is also seen in some vessels their forms have linkages with the needs of the container as are demanded by their functional requirements. However, at the same time, certain kinds of vessel shapes are also influenced by the mode of conveyance or motor habit patterns of the people who use them.

CONCLUSION

The Oinam ceramic production allows seeing how economic activities relate to the local socio-cultural and political networks. Cultural demands for ceramics within the normative principles strongly influenced the production as much as the domestic economic consideration of the craft on the makers. It is seen that socio-cultural rules demand for a favorable conditions of earthen vessels with various functions, which motivates the craftsperson to excel in the craft. The purpose served by the earthen pots cannot, however, be replaced by the modern metal vessels that are flooded in the market. This has been proved by a number of factors of demands of pottery. Oinam craftsperson makes pottery for their personal use and also designs certain types of vessels on the demand of the clients. Thus, the present ethnoarchaeological study reveals that specialized Oinam pottery production is a strategy turned out more cultural necessity than with economic ones.

The present study reveals that the Oinam earthen vessels, which are made to serve specific functions within certain general functional class, are designed within specifiable morphological limits. The craftsperson are aware of the relationship of the vessel forms and their intended functions, and attempt to maximize the functional efficiency of their pots by making a number of vessel types, each with different performance characteristics and a variety of intended uses. The present findings agree with the earlier studies (Arnold1971;Braun1980,1983;[David and Hening 1972;Deboer and Lalthrap 1979; Ercison,et.al.1972];Pastron 1974;Rye 1976, 1981; Rye and Evans 1976;Steponaitis 1983;Weigand 1969,etc). And , it is proposed that the model derived from the Oinam ceramic assemblages can be used in clarifying and redefining a more tentative correlation that exist between vessel form and function of archaeological pots. The statistical calculation of

basic dimensions of different functional classes of pottery reveals independent class of specific vessel shapes. The relative degree of homogeneity or reduction in variability exists in the characteristic of pottery within a functional class. This is a criterion of craft standardization (See, Rice, 1991) and may be conceded to be a repetitive behavior pattern of specialized production because utilitarian vessels are designed to meet daily domestic needs that are correlated with the shape-size maintenance of the pot. From the present Oinam ceramic ethnoarchaeological studies, a positive implication may be derived, on how the functional analysis of ethnographic ceramic assemblages is a feasible approach towards understanding ancient society and economy.

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Sl.no	Functional Category	Vessel Types	Function
1.	Cooking Vessel Type I. Rice	Lakho	Used for cooking rice
	Type II. Curry	Lane, Sailane	Used for cooking curry
2.	Drinking vessel	Daone Tini	Used for drinking water/rice beer
3.	Storage vessel	Daoso	Used as container of water or country rice beer
4.	Transport Vessel	Dao/ Zudao	Used for fetching water and for carrying rice beer to paddy fields.
5.	Serving Vessel	Daone	Used as a jug for serving water or rice beer
		Ngakou	Used for serving rice
		Ngakuni	Used for making chutney and serving
6.	Liquor-brewing Vessel	Oraradao, Sulah	Used as container for boiling water for brewing rice beer

Table 1: Oinam –Earthen Vessel types by Function