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More than just a pot : an in-depth look into the invention, technology, use and social functions of prehistoric pottery vessels

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A Thesis

entitled

More than Just a Pot: An In-Depth Look into the Invention, Technology, Use and Social
Functions of Prehistoric Pottery Vessels

by

Ashley Lynne Drown

Submitted to the Graduate Faculty as partial fulfillment of the requirements for
the Master Degree in Liberal Studies

Dr. Lawrence Anderson-Huang, Committee Chair

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August 2010

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An Abstract of

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This paper considers in some detail the technology, use and meaning of prehistoric pottery vessels. This paper has a cumulative focus on “prehistoric” pottery vessels as whole, rather than on those pots found in a specific culture, or dating to a specific time period. As such, issues of pottery production, function and meaning are constrained in their foci. The analysis conducted here establishes that production of pottery was available in all cultures and across continents-- even though the “clay” used would not be the same in all locations. In this paper I intend to prove that prehistoric societies developed sophisticated technologies of pottery manufacture and integrated the resulting vessels within networks that operated in their everyday lives.

I dedicate this to my friends and family.

Acknowledgments

I would like to say a big, thank you to my parents for all their financial and emotional support. You are always behind me a hundred percent. Next I would like to thank, Karen Roderick-Lingeman, for allowing me into her Graduate Student Independent Study ceramics class. You are a “teacher” in every sense of the word. I only meant to take one semester of ceramics and ended up taking four. Last I would like to thank all my committee members; Dr. Lawrence Anderson-Huang, Dr. Lea McChensey, and Dr. Edward Schortman for their advice and “direction”. Thank you.

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Preface

My first loves have always been anthropology and history, as there is always the question of “what if”? There are really no definite answers to the questions raised by the antiquities that are discovered. For the most part, every interpretation is always based on assumptions. What if that assumption is wrong? What if all we knew about other cultures, societies, and objects was not correct? For example, there are 2,000 different locations across Sweden showing depictions of human figures from the Bronze Age. Some figures represent what scholars consider to be armed male warriors with erect male genitalia, while other depictions are of figures with long hair and with signs of female genitalia. Some drawings depict sexual intercourse among male and female characters (above from Joyce, 2008, p. 86). The interpretations of and assumptions made concerning such drawings are best stated by Joyce (*ibid.*):

It might be a self-evident conclusion that the ancient Scandinavians who created these images considered distinctions between males and females to be enormously important, that perhaps sex was the most important distinction in that society. Archaeologist Tim Yates studied the entire collection of images and came to very different conclusions. What if, Yates asked, we do not make the prior assumption that the figures represented two categories, warrior men and unarmed women? Could examination of different features of the images lead to entirely new conclusions?

Yates approached the subject by making masculinity the focus of his study (Joyce, 2008, p. 87). By taking this approach he was trying to put to one side contemporary gender roles, based on sex, which our society imposes on human behavior and ideas of

differences (Joyce, 2008, p. 86-87). Yates came to the conclusion that scholars are operating with a bias toward heterosexual interpretations of human imagery. Yates suggests that the people who created such images may have been, in fact, trying to interpret the contrasts between male and female (Joyce, 2008, p. 87). Westerners of today are using their values, morals and gender roles to interpret past cultures. As Stanislawski (1978, p. 203) states, “cultures are systems of socially transmitted behaviors, a set of concepts that each individual thinks other people know, believe and mean.” It is, therefore, relatively easy to impose our culture’s belief and practices onto past actors, projecting foreign meanings onto the objects they created.

This thought has crossed my mind over the years as I would visit museums, and read the descriptions and histories of pieces. Who is to say what an object was used for, or what was the thought, or the idea, behind a work of art? I remember going to the Detroit Institute of Arts with a good friend and her art history class, and the Professor telling the history and story behind a painting. My automatic thought was, “are we sure that is true?” as the Professor was only relying on information that art historians had written about. Yet, how did those historians know what the artist’s thoughts or feelings were at the time unless the artist kept a diary at their side and wrote in it as they were working? This is not true for all types of art—however, prehistoric¹ pottery is harder to decipher as there is not always iconography associated with it.

Art to me is the most intimate form of expression. Someone can interpret my work, but they do not know the thoughts, the ideas, or the history of my life while I am creating that work of art. For instance, there would be times when I would be throwing a

¹ Prehistoric- is a term used to describe a period before recorded history.

pot on the potters' wheel, and may have distorted my perfectly round bowl. Did I do it intentionally? Did I do it by accident? What was going on in my life that day that I threw that pot? Was it a stressful day at work? Was it a good day in general? I would be able to verbally tell you the story of that pot. Yet in all likelihood, I'm not going to write down my thoughts and feelings behind the pot. Though I may tell the story of the pot, and someone may repeat my story; is the story the same? Probably not- the story would have changed in some ways depending, in part, on the contexts in which that story was retold and the pot encountered. Would this not be true of some antiquities?

I am curious about the technology, use and meaning related to ancient pottery vessels of the past. During my research it became clear to me how similar cultural groups were in terms of their pottery production technology, as well as the meanings they attributed to those vessels and the ways they used them. This is not to say that differences are not important; I was just surprised at the similarities I encountered. For example, how can the construction process of pottery in Asia Minor be similar to that in the Southeastern United States, in that people in both areas built their pots using coils of clay? There is strong evidence that societies used similar techniques to fashion pottery containers even though the cultures were located in different parts of the world; South America, North America, Roman Asia Minor, Africa, Eurasia, and Asia. So, either there has been a convergence in the technology, use, and meaning of ancient pottery or potters throughout millennia have been plagiarizing and spitting out the same person's ideas on ceramics, which I don't think is the case.

In this paper, I explore the technologies, uses, and social relationships involving prehistoric pottery. I believe that, at the root, pottery around the world exhibits similar

technologies, functions, and aesthetics. The similarities between cultures should not be ignored but looked into for further analysis. Such studies may help open up new doors and give those of us today a better understanding of past cultures.

In Chapter 1, I will explore the invention of pottery and the possible places where it may have originated. In Chapter 2, I will explore pottery manufacturing techniques and how they were used to fashion and develop vessels. In Chapter 3, I will explore the use of pottery and why pottery may have been developed among different societies. In Chapter 4, I will explore how pottery may have impacted the social aspects of prehistoric societies.

Chapter 1

Origin: Accident or Invention?

We use pottery every day in our lives. Pottery vessels are used for cooking, storage, and decoration; they are modern conveniences that we take for granted. It is hard to conceive what it might be like to live without our modern technology; for some of us, the world stops if our modern appliances are out of order. In reality, these modern inventions were created to make our lives easier. However, humans have lived without complex technologies for centuries. The invention of pottery was a major technological advancement for many cultures and societies. It was a new technology that was used to cook, store, serve, transport food, and other goods and pots replaced earlier tools such as baskets, skin bags, wood, gourds, shells and soapstone vessels (Rice, 1999, p. 4).

An important question might be: was pottery an accident or an invention? How and why did pottery originate? People in modern societies use pottery for utilitarian functions or as display pieces. Did people in ancient cultures perceive pottery in the same ways as do those in modern societies? Scholars have made the determination that ancient pottery was used for a variety of everyday purposes: rituals, cooking, storage, transportation, and serving (Rice, 1999, p. 30-37). Yet, is this simply a modern-day scholar's interpretation of pottery?

The origin of the first ancient pottery is hard to determine. This may be a result of the current lack of comprehension of the circumstances that led up to pottery manufacturing, which has made it difficult to predict where to look for the origin of pottery (Rice, 1999, p. 14). For example, there is evidence of pottery in prehistoric Britain, but there is no evidence of where that early pottery was made or fired (Freestone & Gamister, 1997, p. 32). Pottery fragments and figurines have been located at the site Dolní Věstonice, in Czechoslovakia, dating back over 26,000 years ago (Rice, 1999, p. 4). Scholars have also discovered sites of the Jomon culture of Japan where the earliest pottery, dates from 12,700 to 5000/4500 B.P. Early pottery has also been found: in the Alashan Desert of Inner Mongolia, China dating to 11,000 years ago; found in Anatolia, and the Zagros Mountains in Western Asia, dating to 8300 year ago; pottery that is ca. 9,5000 years old has also been recovered from the Sahara and/or middle Nile valley; Taperinha and Caverna de Pedra Pintada in South America yielded pottery dating to 7580 years ago and pottery has been found in Colombia and Ecuador dating to around 5300 years ago; and pottery has been uncovered in Georgia and South Carolina in the United States dating to around 2500 B.C. (above from Rice, 1999, p. 14-20).

Therefore, with information becoming available at different sites, it has been the subject of debate as to where pottery originated. Though one might assume that ceramics must have been invented where the oldest pieces have been found, this is not necessarily the case. The people of Dolní Věstonice are considered to have been hunter-gatherers, and the area where the ceramic figurines were found is considered to be their mammoth hunting ground campsite (Rice, 1999, p. 4). This still does not necessarily pinpoint the

location or society that gave “birth” to pottery. Other evidence of pottery may have been destroyed due to climatic changes. As Rice (1996, p. 154) states:

Several researchers looking at early (Archaic period) pottery in the United States [and elsewhere, e.g., the Near East] have called attention to the fact that much of this material was organic-tempered and low-fired . . . as a consequence of these temper and firing choices the pottery was porous and susceptible to breakage by freeze-thaw cycling, making it difficult to recover in the archaeological record (Reid, 1988; Skibo et al., 1989; cf. Goodyear, 1988).

The most interesting theories on the “birth” of pottery come from the earliest scholars. For example, Rice (1999, p. 5) has stated that during the sixteenth-century, European scholars believed prehistoric pottery spontaneously appeared out of the earth, or were utensils belonging to dwarves. These theories may have been plausible at the time. However, today we find these theories to be laughable. Modern scholars have proposed more empirically-based explanations for the origin of pottery: popular theories include culinary functions, sedentism, and architectural structures.

Perhaps pottery production was a component that helped some nomadic societies opt for a more sedentary lifestyle, as some sedentary populations adopted pottery after the establishment of their communities. Freestone and Gamister (1997, p. 15) state:

In the same way, pottery rapidly became a fundamental part of the material armoury of the first sedentary communities along the Middle Nile Valley during the early to mid-Holocene, where radiocarbon dating has pushed ceramic production back to around 9,000 years ago.

Pottery containers would have been essential to the formation of sedentary communities as they were part of a crucial storage technology that allowed people to keep food throughout the year. It was this ability to preserve food between periods of its availability that allowed people to settle in one place year-round.

Archaeologist P.B. Vandiver concluded that architecture may have played an important role in the production and origin of ancient pottery during the Upper Paleolithic period. She states that there are parallels between the construction of buildings out of clay and the construction of pots out of clay (cited by Rice, 1999, p. 5). Vandiver concludes that “pottery technology probably developed out of pre-pottery Neolithic plaster technology or...architectural technology” (Vandiver, 1989, p. 29). For example, clay was first used as only mortar and plaster for architecture at Mureybat, Syria (Schmandt-Besserat, 1977, p. 133). This theory need not contradict the sedentism hypothesis. For example, the existence of clay architecture implies that a cultural group was at least semi-sedentary. Pottery making would also have required long periods of sedentism to permit the gathering all necessary materials, and the fashioning, drying, sun baking and/ or firing of the vessels (Freestone & Gaimster, 1997, p. 14).

Evidence also suggests that clay may have been initially used to line baskets, ovens or fire pits (Rice, 1999, p. 6). It may have been in the process of using clay in fire pits that an individual discovered that clay was an impermeable container when fired, which may have then given birth to “fired” pottery. Such an invention may have been made by nomadic or sedentary people.

There is some question if perhaps pottery was spread or invented by nomadic hunter-gatherer groups. Evidence has been found that hunter-gatherer-foraging groups have been known to use pottery; groups such as the Karoo, Ute, and Seri Bushman tribes of Africa and North America, also produced pottery (Rice, 1996, p. 154). This fact calls Vandiver’s theory into question—pottery is found in nomadic and sedentary cultures.

Therefore, did nomads adopt pottery making from sedentary populations? Or did nomads develop more pottery goods, as they became more sedentary?

Because hunter-gatherers were often nomadic people, they likely would run into other hunter-gatherer groups, spreading and sharing their “technology” of pottery manufacture. This would be the case whether they developed pottery-making on their own or acquired it from others. There is evidence that some hunter-gatherers did have ceramic figurines as seen at, for example, Dolní Věstonice, and among the Karoo, Ute, and the prehistoric Jomon of Japan, just to name a few. But would nomadic peoples have produced pottery? There are certain societies, such as, the Pygmies, Bushmen, and Australian Aborigines, who are nomadic peoples who did not adopt pottery (Schmandt-Besserat, 1977, p. 150). Clay is heavy and vessels made from it are fragile; pots, therefore, would not have fit into a nomadic hunter-gatherer life style (Schmandt-Besserat, 1977, p. 150). Pottery making may have been ignored by highly mobile societies; whereas those who may have only been mobile for part of the year might have been attracted to the technology (Freestone & Gaimster, 1997, p. 14).

There is the distinct possibility that some nomads may have been sedentary enough for a sufficient period of time to produce pottery (Freestone & Gaimster, 1997, p. 14). For example, the Jomon culture of Japan, a hunter-gatherer society, has produced some of the earliest pottery dating back over 12,000 years ago (Freestone & Gaimster, 1997, p. 14-15). Freestone and Gaimster (1997, p. 15) state, “as agriculture determined sedentary living for the farmer or later Neolithic societies, so the favorable hunting and fishing conditions of the Holocene fostered a number of semi-permanent settlements for the Jomon.” Pottery was introduced to cook and store the various animal and vegetable

products produced in their environment. According to Freestone and Gamister (1997, p. 15), “this was no mere accident of technology; rather, pottery was an essential component of their subsistence strategy.”

Scholars have also used analysis of carbon residues on pottery pieces to look for soot and discolorations, determining if pots were used near or within fires, which can help conclude whether food was processed by boiling, steaming, roasting or toasting (Rice, 1996, p. 144). Scholars have concluded that pottery technologies may have been adapted to allow different and new foods to be processed. For example, clay containers would have had several advantages for different sorts of food preparation, such as, toasting or stone boiling. Pottery would have also added to the long-term storage of surpluses and the emergence of sedentary societies. It would have also improved the quality of food for children, the elderly and nursing mothers, by allowing for the preparation of soft-cooked foods, important for weaning or when people have lost their teeth. Pottery would have reduced time spent tending to, or watching pots when compared to using containers to prepare food, such, as skin, bark, stone, basketry, or gourds. It would also have allowed for processing foods that contained toxins that were otherwise inedible without prolonged cooking or soaking (above from Rice, 1999, p. 8). There are also medicinal benefits to ingesting clay, which has been a common practice among various human populations. Clay ingestion enhances protein absorption, aiding in digestion, alleviating mineral deficiencies, and helping alleviate digestive disorders, such as these caused by parasite infestations (Rice, 1999, p. 8-9).

Scholars may never know which societies first developed pottery, and whether pottery was developed by nomads or a sedentary group. It was however, a new

technology that was embraced by some societies, to make their lives easier by providing shelter and changing how food and drink would be prepared, served and stored. It is apparent that pottery became essential to many prehistoric people's daily lives.

Chapter 2

Technology: How did they do that?

Clay is essentially sedimentary rock in its malleable state (Krum, 1960, p. 4). It is evident that recognizing clay's potential for tool making was a significant technological leap in human knowledge and ability. As Rice (1999, p. 3) states:

The primary component of pottery, clay, draws upon humans' knowledge of the properties of early materials. Clay's versatility and physical properties—malleability or plasticity when wet and hardening when dried or heated—coupled with its ready availability surely were recognized early in human history, making it an attractive resource with many applications.”

Pottery may have been limited in form and design by the selection of materials based on the material relevant to the culture's environment (O'Brien, Holland, Hoard & Fox, 1994, p. 261). Many potters based the type of pottery vessel they would create on the type of materials they are working with. A potter may, for example, be able to create larger vessels when working with “stoneware” as compared to working with “porcelain,” as stoneware is a more stable substance. It is also less likely to slump than porcelain, which has the consistency of “cream cheese.” Consequently, working with a material that is like our modern-day “stoneware” is very different from working with a material like our modern-day “porcelain.” The textures and compositions are different in their

workability and utility in the production of pottery. Stoneware is a human-made stone that is gray in color and has a firing temperatures ranging from 1200° C to 1315° C (Wikipedia contributors, 2010, p. Stoneware). Porcelain is a type of stoneware and is whiter than stoneware and more vitreous (Wikipedia contributors, 2010, p. Stoneware).

The selection of clay would have been up to the individual, but people in prehistoric societies may have been limited in their “clay” selection based on their environments (Sandino, 2004, p. 284). Therefore, the nature of the clay used would have been based, in part, on the minerals derived from the local geology. Modern-day potters, less limited by problems of transportation, are freer to choose which “clay” they want to work with than were prehistoric potters. Clay can be mixed with different mineral additives to get a preferred medium; such as, stoneware, porcelain, and terra cotta.

As noted above, the assumption is that prehistoric peoples would have been limited in their choices. Evidence has shown that many potters are willing to travel great distances to obtain certain types of clay (Rice, 1987, p. 116). For example, the Diola of southern Senegal, East Africa would travel on foot up to 1.5 km from their settlements to obtain clay (Rice, 1987, p. 117). Potters of Nigeria travel up to 15 miles, and potters of Santa Clara Pueblo, New Mexico travel up to 4.5 miles for their clay and over 100 miles for white kaolin, which is used in painting their pots (Rice, 1987, p. 117-118). Potters of Tonalá, Mexico also travel up to 100 miles, and in Melanesia the Ampleet Islanders travel by canoe twice a year to Fergusson Island to obtain clay (Rice, 1987, p. 118). What is to say that prehistoric peoples did not do the same?

Modern-day people are able to obtain clay in their local vicinities, such as, in Bailén, Spain, where evidence has shown that people obtained clay in their own

backyards. In Thrapsano, Crete, workshops were situated in potter's fields where there was easy access to clay, fuel, and water. In North Cameroon, Fulani potters only had a 15 minute walk from the village to acquire clay (above from Rice, 1987, p. 117).

Materials needed to make ceramic pots can be obtained in various and numerous ways, although the sharing of clay deposits could be based on different social structures. For example, the Huichol in recent times widely shared clay deposits, whereas in Bailén, Spain clay mines are owned and inherited within families. In Izamal, Yucatán, Mexico and Bangkok, Thailand potters today have secret locations where clay is obtained and do not divulge the locations to competitors or outsiders. Potters in Santa Clara Pueblo, New Mexico belong to co-ops which share clay sources among several different families. In Deir el-Gharbi, Egypt, however, the gathering of clay is performed by individuals who have no family ties to potters (above from Rice, 1987, p. 115).

Some clays can be dug out of the ground and used in their natural state (Rice, 1987, p. 118). In some cases the gathering of clay can be a labor-intensive process (Rice, 1987, p. 115). Clay is dug out of the ground and material such as, pebbles, leaves, sticks, and other debris, must be removed before it is ready for use. The coarse materials must be removed before production, as they could cause damage to pottery under certain firing conditions, e.g. the pots may explode. The removal of such debris would have been very time consuming. Rice (1987, p. 118) states, "the procedure may be considerably more complex, however, and involve drying the clay, then crushing, grinding and winnowing or sieving it." Sieving would involve a basket-like structure which may have included rawhides punched with holes, or baskets constructed of palm ribs, or the use of cloth. Or societies would have used such techniques as levigation, which is the process of mixing

clay with water and having the larger particles settle with suspension, which has been used in Chalkis, Greece and Bailén, Spain (above from Rice, 1987, p. 118).

Other clays may have to be modified due to their sticky texture; this would include adding temper, which is a filler, e.g. quartz or volcanic sand, salt, crushed rocks, shells, dung, Spanish moss or ground pottery shards (Rice, 1987, p. 118-119). Once clay has been modified, it is manipulated by either wedging, kneading or foot treading.

Wedging consists of slicing the clay and recombining the sliced segments. Kneading is similar to kneading dough, by pushing the clay with the heel of your hand and folding it over in sections. Foot treading is the process of spreading large amounts of clay on a clean floor and stepping on the clay. These processes eliminate air bubbles and ensure an even mixing of clay particles; they also ensure that lumps of clay or other foreign material are removed (above from Rice, 1987, p. 119).

After preparing the clay, potters would then be able to start fashioning and forming their pots. When working with the available clay, there are several techniques that a potter may choose from: pounding in a concave mold; molding over a convex mold; and coiling (Gosselain, 2000, p. 201-202; Stark, Bishop & Miksa, 2000, p. 301). Pounding into a concave mold requires clay being rolled out in a flat disk and then placed into a mold, pounding the clay to form the shape of the mold. Convex molding is the same principle as concave molding, except a piece of clay is placed on the outside of the mold and paddled. Coiling is the process of rolling out long coils of clay, like a rope, and building rings one on top of another, either by spiral coiling, ring building, or segmental coiling, then manipulating the rings to form one uniform-looking piece (above from Rice, 1987, p. 125).

Similar techniques could have also included pinching, drawing, and slab building. Pinching is the process of manipulating a lump of clay without adding clay to it, by punching a hole in the center of the clay and pinching and manipulating it between the thumb and forefinger until you get the desired form. Drawing is based on the same principle as pinching, but the potter is drawing the clay up and outward, emphasizing vertical movement. Slab building is a construction method in which one or more slabs are rolled out into flat pieces and joined in a desired shape (above from Rice, 1987, p. 125).

Wheel throwing was never used in the pre-Columbian Western Hemisphere, and is confined to Old World pottery. This technique is done by preparing and using softer and wetter clay, which is easier to draw and thin the walls of a pot. In throwing, a lump of clay is formed into a ball and centered on a wheel. It must be centered or the walls of the clay will become uneven and asymmetrical in form (Rice, 1987, p. 128). To center the clay, the potter compresses the lump of clay upwards with the side of their hands into a cone shape, then with the palm of their hand pushes it back down, and repeats the process several times, until the top of the clay spins uniformly, like a “top.” Once the clay is centered, a potter may begin to open the clay by inserting their forefinger and middle finger to gently pull the clay in an outward motion toward them. Once the pot is opened to the desired width, the potter may then proceed to make their form. One hand is inside the pot and the other outside, the hands applying light pressure inward or outward to form the desired shape (Rice, 1987, p. 129). Water is periodically added to the forming of the pot as the rotation can lead to rapid evaporation and drying (Rice, 1987, p. 128).

Once the pot has been formed, the bottom is trimmed away removing any excess. It may take several days for the pot to dry to a leather-hard stage to allow for further

trimming, e.g., on the bottom of the pot. Pots may be thrown on bats, which can be hard cylindrical disk that are adhered to the wheel with slurry and water. Bats can be made of mats, a board, or a clay disk; modern-day potters use plaster of Paris to make a bat (Rice, 1987, p. 132). This allows the potters to remove the still wet pot from the wheel without damaging it and still allowing for an appropriate drying time.

It is believed that the first potter's wheel was developed four to five millennia ago in Southwest Asia; evidence suggest that it was commonly used there in the Middle Bronze Age after ca. 2250 B.C. There also is evidence that the wheel was used in China during the first millennium B.C. Two major types of potter's wheel were used: the kick wheel and the stick wheel (above from Rice, 1987, p. 134).

Stick wheels are commonly seen in India. The stick wheel is a wheel with a large head and a short axle. There is no flywheel, as the head of the wheel is heavy enough to maintain rotation. The stick wheel head may have been made of stone or clay, and is rotated by inserting a stick into a hole at the top, turning it several rotations. However, a continuous rotation is difficult to achieve, and almost impossible to turn while the potter is working. The rotation may last about 5 minutes before the stick must be reinserted, to start the rotation again (above from Rice, 1987, p. 134).

The kick wheel consists of a wheel head and a flywheel joined by a vertical axle and mounted with separate bearings. The kick wheel may be sunk into a pit, or placed on a workbench. The potter sits level with the small upper wheel, upon which he or she works the clay while continuously kicking the lower flywheel with their foot and leg (above from Rice, 1987, p. 135). The advantage of using a kick wheel is that has constant rotation and lacks interruptions (Rice, 1987, p. 134).

In the New world, the “primitive” potter’s wheel can be found, which mimics the potter’s wheel but lacks the size, weight, and flywheel (Rice, 1987, 133-134). These “primitive” wheels lack the momentum and centrifugal forces, and are more like turntables. One example of this method of production is represented by the pivoted convex basal mold of San Cristobal Tonicpan (Rice, 1987, p. 134). More specialized wheels have been used that do produce an intermittent rotation, such as the molde of Coyotepec, the parador of Acatlán, and the kabal of Yucatán, which have been known to create the rilling seen on wheel-thrown pottery (Rice, 1987, p. 133)

Once the construction of the pot was completed, whether wheel-thrown or hand-constructed, it was allowed to dry to a leather-hard stage. Potters would have finished their pots with a variety of styles to get the desired look, such as, scraping, beating/paddling, and trimming, completing the forming process (Rice, 1987, p. 136). Scraping is used to thin out the pot walls and remove surface imperfections. Beating and/or paddling is the process of repeatedly striking the pot; this would have possibly been done with a flat wooden paddle or a stone. This process thins out the walls, smooths out the surface, and alters or enlarges the pot. Paddling and beating are normally associated with pots made of coils to remove irregularities and coil marks (above from Rice, 1987, p. 137). Trimming refers to cutting away excess clay or imperfections in the pot (Rice, 1987, p. 138).

Potters next would have completed the process by subjecting the pot to surface treatments, such as smoothing or texturing. Smoothing creates a finer, more regular surface; this can be done with the potter’s hand, bunches of grass or cloth. Texturing is the process of running a hard object over the pot to make indentations and patterns using

such items as, sticks, rocks, shells, corn cobs and other materials found in nature. There is also the process of burnishing, which is rubbing a hard object, such as a rock or bone, across the surface of a pot. Burnishing compacts and reorients the clay particles giving the surface a lustrous finish. Surface techniques can also include striations, combing, stamping and impressing through the clay (above from Rice, 1987, p. 138). Striations and combing are made by drawing a toothed implement over the surface of the pot, leaving shallow parallel marks. Stamping and impressing can be done with numerous materials, such as shells, leaves, twigs, textiles and rope just to name a few; this is done by lightly pressing the object onto the surface of the pot to make patterns and decorations (above from Rice, 1987, p. 140)

The techniques used would have been based on an individual's preference, that preference being informed by what they learned as a member of a society within a cultural context. It is through the culturally-conditioned creativity of an individual that one would be able to recognize that they are adept at problem solving (Scarlett, 1999, p. 169). Therefore, early production would have proceeded by trial and error, working with the materials that the potters had at their disposal. The knowledge that potters gained through trial and error would have been passed to the next generation of potters. For, example, among the Hopi training is taught by relatives that who pass on technological and artistic traditions (Stanislawski, 1977, p. 18).

When working with clay, one can select from a variety of mineral and material components. Clay components also have different firing ranges: ranging from a high fire to a low fire, as not all pottery fires at the same temperature. Evidence suggests that low-fire was probably the firing choice of early potters, as open firing temperatures range

between 600° C to 850° C, based on what type of fuel was used, e.g. dung, soft wood, hard wood, etc. (Rice, 1987, p. 156-157).

The earliest pottery created was probably a sun-baked slab shape (Rice, 1999, p. 6). The sun is often used to dry out clay before a pot is fired to ensure that all moisture is eliminated from the pot; moisture creates steam and can lead to the pot exploding if the pot is not completely dry prior to firing. Societies such as Nasio on the island of Bougainville and potters in the Philippines place pots in the sun for drying (Rice, 1987, p. 152). Climate would also play a significant role in the production of pottery: a humid climate would result in longer drying times for pots. In a dryer climate, a potter would have less time to work with their vessel.

There are two type of firings; kiln and non-kiln. Non-kiln firing of pottery often involves use of an open fire; which is considered low firing (Rice, 1987, p. 153). Pots would have been placed close to the source of heat to slightly warm the port and ensure that all of the moisture had been removed (Rice, 1987, p. 152). Warming the pot would reduce thermal shock when the pot was placed in the fire, which can cause cracking and breakage (Rice, 1987, p. 152). Once the pot was in the fire, it would have been covered by more fuel, so it was completely engulfed in flames (Rice, 1987, p. 153). Firings can last anywhere from fifteen minutes up to eight hours (Rice, 1987, p. 154). There is no set time, but variations may depend on the types of material used to produce the pot and weather considerations. Shorter firings would be possible if clays had coarser textures, as they are less prone to thermal shock (Rice, 1987, p. 156). The disadvantage of open firing is that pots are not protected from contact with fuel, uneven heating, and temperature changes due to drafts (Rice, 1987, p. 155-156). Opening firings would almost never be

used to make glaze wares, but would be serviceable for unglazed pots for cooking and storage (Rice, 1987, p. 155-156).

Kiln firings are enclosed firings done in ovens, which can be made out of bricks or stone (Rice, 1987, p. 158). Kiln firings are considered high firing and individual would have had more control over temperature; kiln firings can reach to over 1000° C, depending on which type of kilns were used (Rice, 1987, p. 158-160). Kilns have been found in Peru, the Near East, Peruuela, Spain, and the oldest kilns have been found in Banpo, China dated to around the middle of the fifth millennium B.C.E. (Rice, 1987, p. 158). There are three types of kilns; updraft kilns, downdraft kilns, and pit kilns (Rice, 1987, p. 158). Updraft kilns are enclosed firing chambers that move heat upward and under a pot with the air vented outwards (Rice, 1987, p. 159). They can be constructed either in cylindrical or rectangular shapes, with fuel being fed in openings under the firing chamber, and with a vent leading upwards (Rice, 1987, p. 159). Downdraft kilns differ from updraft kilns in the placement of the pots and heat flow inside the kiln (Rice, 1987, p. 160). The heat source is deflected by a bag-wall and forced to travel upward, and then pass down through the chamber(s) holding the pots, where it is then vented through an exterior chimney at the other end (Rice, 1987, p. 160-161). Downdraft kilns are primarily used in the Near East; Korea, Japan, and China (Rice, 1987, p. 161). Pit kilns are small pits excavated in the earth and are surrounded by four low walls. Pit kilns are similar to open firings, as fuel is placed above and below the pots. Compared to open firings pit kilns are able to achieve higher firing temperatures, and the firings last longer than open fires. Pit kilns would have been used for making non-glaze ware, as the fuel is in direct contact with the pots (above from Rice, 1987, p. 158).

After firing, pottery could be left as just plain ware or treated with post firing treatment to improve surface seal, appearance, and permeability. In Nigeria, Ibibio potters treat pots with a resin from an avocado pear tree that is known to give a glaze-like appearance. In West Africa, potters are known to boil pods from locust trees in water, then splash the water on the pots while they are still red-hot, which closes the pores and coats the surface. The Shipibo-Conibo of Peru use tree resins, which give a white appearance and waterproof the pot. Resins used to coat pots and which are derived from trees are also popular among potters in Ethiopia and the Philippines (above from Rice, 1987, p. 163).

It is rather interesting that we find similar pottery-making technologies all over the world. How can this be? If you ever work with clay you will find yourself embracing several of the techniques described. One finds that there are really relatively few ways of working clay and creating pots; perhaps this is the drive behind the convergence among pottery-making technologies used in different societies? Therefore, these common features of the medium of clay limit culturally conditioned choices in how to make pots.

Chapter 3

Use: Functionality of Pottery

What was the function of ancient pottery? Traditional views suggest that much pottery was used for kitchen-based functions such as cooking, preparing food and drink, transporting food, food storage and serving (Scarlett, 1999, p. 170). By using pottery, people were able to store surpluses of food and feed large, sedentary populations (Rice, 1999, p. 8). Evidence has also been found that clay may have been used in “clay cooking;” the practice of encasing meat in clay, prior to baking in a fire. This was a common practice among Southeastern Native Americans, Chinese, Mesoamericans, and people of India (Rice, 1999, p. 7).

There is no conclusive evidence as to what roles ceramics played in prehistoric societies, or how pottery vessels functioned, without direct documentation of those activities (Rice, 1996, p. 139). Potters created specific pottery vessels for processing, storage, transportation and other functions. In addition, potters not only made culinary vessels but also fashioned pottery containers for other purposes, such as oil lamps, and in a wide assortment of other common wares (Poblome, 2004, p. 495).

Scholars may infer the use of a particular vessel found at a site without actual written documentation of what a specific vessel’s function was (Rice, 1996, p. 140). An

archaeologist's main challenge is trying to interpret and reconstruct behaviors based on discarded material fragments and, thus, to tell the story of how a people lived. For example, in Honduras between 1000 BC and 100 AD there are small clay figurines that show humans with small cylindrical ornaments piercing their ears, i.e., ear-spools (Joyce, 2008, p. 27). These ear spools have been found in burial sites from as early as 800 BC. Therefore, scholars may infer, based on the clay figures, that people wore ear spools and the bodies found at burial sites, therefore, were probably of people who were buried with their ear spools intact. Therefore, scholars could assume that the people of this part of Honduras did, in fact, wear such decorations, without written documentation supporting this view; though in this specific case there are written accounts of such adornments from the Spanish invasion during the sixteenth century (above from Joyce, 2008, p. 27).

Early potters left behind few documentary records to determine how their pottery vessels were actually used for. This has not hindered scholars from trying to understand what potters were trying to accomplish with their pottery vessels (Scarlett, 1999, p. 169). Scholars have drawn conclusions on vessel uses which are based on scientific technologies, such as analyses of organic residues left behind in pottery vessels, including wine, olive oil, fatty acids, liquid oils from animals and plants, cacao, caffeine and plant sterols (Rice, 1996, p. 144).

It is evident that pottery was a part of daily life, and cooking, storing, and serving food and drink in vessels were the primary functions of early pottery (Poblome, 2004, p. 492; Rice, 1999, p. 31). With the production of utilitarian vessels, pottery was adapted to cultural and social needs within prehistoric societies. Pottery began to be used for more than utilitarian functions; there was an emergence of cultural traditions and values

associated with pottery vessels. Even architectural traditions may have been related to the development of pottery within sedentary societies as noted above.

Scholars can infer the use of pottery by material remains left behind, and most importantly, by the context of their recovery. What a pot is found with in a specific deposit says a lot about how it was used. Based on such evidence, it is evident that people in diverse societies used pottery in the same general ways, e.g. cooking, storing, etc. This brings us back to questions of how and why these similar tendencies were developed in different societies across continents. It is obvious that pottery changed the production of food processing, but also led to a cultural emergence of specific belief and practices associated with pottery.

Chapter 4

Meaning: Social Relationships

How did ancient pottery affect social status? Did these factors play significant roles in determining the form and decoration of ancient pottery? These questions are not easily answered as ancient pottery comes with no written documentation, and we cannot see ancient pottery production and use happening in situ. Scholars can make significant assumptions and look at more recent past societies for answers to these questions. One major issue concerning the ideological significance of pottery has to deal with the classic problem of trying to identify social boundaries within prehistoric societies, as modern-day scholars lack the ability to observe ancient interpersonal interaction directly (Gosselain, 2000, p. 188).

Early scholars dismissed the study of the origins of pottery as being unimportant (Rice, 1996, p. 153). They did not consider the questions dealing with why, when, and where pottery developed to be important. It has only recently been a renewed topic of interest among scholars. When we establish the when, where, and why of early pottery, and any technological development, we begin to develop a cultural understanding of the social networking, values, and ideologies of early peoples. For example, in the Andean

zone of western South America, which is today known as Peru, Bolivia, Colombia and Ecuador, scholars have observed the development of copper and bronze metallurgy (Lechtman, 1984, p. 1). Metallurgy in the Old World was considered a giant technological leap for societies. Therefore, it could easily be assumed that the peoples of the Andes would hold metal in high esteem, as it played an important part in their existence, e.g. in warfare (Lechtman, 1984, p. 1). However, this is not the case. Metal may have been used in their everyday lives; however, they were just as comfortable with a club or using a sling in battle (Lechtman, 1984, p. 1-2). The people of the Andean zone actually considered cloth to be their most valuable item, as cloth told a person's rank, power, and wealth (Lechtman, 1984, p. 2). Scholars have been able to make this conclusion based on drawings and burial sites as well as ethnohistoric accounts (Lechtman, 1984, p. 10-11). Among Andean people it was customary to bury the dead wrapped in cloth that denoted the individual's rank and status within the community; for example, someone of high status would have gold sewn into the cloth (Lechtman, 1984, p. 11-12). It is by understanding what a culture finds most valuable and important that scholars begin to understand values and ideologies that societies might have held.

There is a broad spectrum of opinions concerning how ancient pottery has affected cultures and societies. Each society is unique in its values; however, pottery production might have drawn communities together in many places. By bringing together the community, potters would have retained their cultural heritage, which was expressed, in part, by fashioning pots. For example, among the modern-day Hopi, women potters working in social groups often joke and laugh (Charley & McChensey, 2007, p. 88). It is not difficult to see them practicing this type of social interaction in the past. Hopi potters

even talk to the pots as they work, as if sharing the past and present so future generations can hear their voices (Charley & McChensey, 2007, p. 87-88). In this way, making pottery is as much a social and cultural process as it is a technological one.

Shared cultural values/premises are essential underpinnings for interactions among individuals; they also connect to particular moments of design and technology in the learning process (Gosselain, 2000, p. 194). For example, Stanislawski (1978, p. 216) states that “Hopi potters feel strongly that they should share their skills and designs, and should aid one another. It is common for a younger woman to paint for her mother, aunt, or neighbor of a different clan.” Cultural values/premises would have played significant roles in creating and reproducing social identities, e.g. those based on gender and age (Sarauw, 2009, p. 31). Scholars have argued that women probably were the early potters within their societies, and men replaced women after societies became more industrialized (Joyce, 2008, p. 43). Among the Hopi, until the mid-twentieth century pottery was considered women’s work (McChesney, 2007, p. 244). Among the Sepik River Kwoma of Papua New Guinea, pottery production is done by men who have reached the third stage of their initiation, or by married women who have borne two or three children (Rice, 1987, p.124). In all of these cases, making pottery was an essential practice that defined one’s gender.

As individuals participate in specific social and cultural contexts, they become parts of social networks that help to promote the development of cultural traditions (Gosselain, 2000, p. 194). Pottery would have contributed to creating the shared values crucial to the functioning of those networks; it would also have linked rank and social status within and among communities (Sarauw, 2009, p. 30). For example, among the

Hopi of the First Mesa there is a strong belief that they should share their designs and skills among each other (Stanislawski, 1978, p. 216). Modern-day Hopi pottery traditions are taught within social webs composed of such pairing as mother-daughter, aunt-niece, mother-in-law/daughter-in-law, and neighbor-neighbor (Stanislawski, 1978, p. 219).

It is through social networking that individuals near other populations would have shared in the same activities, markets, and other forms of social interaction. Potters would have had the opportunity to share technologies, goods, and ideas without maintaining a close and continuing relationship (Gosselain, 2000, p. 200). This would have led individuals to develop new ideas to improve, or at least change, their modes of pottery production. As these ideas and relations grew and spread within a region, one would see an outward expansion of pottery production into different regions. Perhaps this would explain why pottery is consistently found in different areas, geographic regions, and continents. Interactions among people from different cultures may have had a domino effect. Pottery production and technologies can easily be borrowed and imitated by people in multiple cultures. For example, studies of roulette pottery in the southwestern Sahara indicate that this style gradually migrated from west to east around 4,000 years ago stopping in 500 AD (Gosselain, 2000, p. 1999). Among the Hopi who rarely copied or change production techniques, there is evidence of designs and styles being borrowed from the Rio Grande Pueblos and Zuni through learning networks that seemed to cross clans and villages (Stanislawski, 1978, p. 18-20). Thus, the diffusion of pottery technologies was part of the social interactions linking diverse populations.

Were there really barriers to the spread of pottery technologies and styles? Or is there no evidence of pottery being exchanged among prehistoric societies? At one time,

scholars thought that prehistoric people did not travel through the Alps, but with the current findings of the “Iceman²,” we know this is not true. The discovery of the “Iceman” has opened up new doors, casting new light on what is perceived and inferred versus what new empirical evidence reveals. The idea of networking among cultures cannot be thrown out based on past assumptions. If there is no definite proof for certain interactions among cultures, it may be that the proof has been discredited or has yet to be discovered.

Therefore, it must not be assumed that social networking and trading did not exist. Evidence suggests that major styles are borrowed or traded among the Southwest Indians. Stanislawski (1978, p. 216-217) states:

For example, Acoma potters are now using the ‘typical’ Zuni deer with red lifeline to the heart, and Zuni potters have long favored Hopi styles, just as the Hopi, since 1850, have used Zuni designs and layouts on locally used painted pottery.

Pottery representing such contacts may not have survived erosion, freeze-thaw environments and other climatic changes.

Potters within a society might also have shared a social identity; artisans could have been drawn together due to their association with pottery production (Gosselain, 2000, p. 204). Among the Hopi, pottery production is a social activity and work is done together in groups (McChesney, 2007, p. 229; Stanislawski, 1977, p. 19). This would have been associated with sharing social and technical ideas. Pottery producers within a group could have shared manufacturing techniques, finished pots, as well as beliefs and attitudes towards the materials used (Gosselain, 2000, p. 190).

2 The “Iceman” was discovered in September in 1991 by two Austrian hikers in the Tyrolean Alps. The “Iceman” was a Neolithic trader; his body was discovered on an ancient trade route between what are now Austria and Italy.

Pottery production would sometimes have been located in urban centers and/or within an individuals' household. Individual workshops might have produced goods on a small scale; rural and urban workshops could have been considerably larger. No matter how small or large the workshop, it would not have prevented potters from forming mutual support groups, e.g. by creating and forming guilds (Poblome, 2004, p. 499). In fact, the larger the group involved in pottery production, the more complex its organizational structure is likely to have been. For example, among the Hopi it was common practice for one woman to mold pots while others, scraped, polished, smoothed, and/or painted the vessels (Stanislawski, 1977, p. 19). Potting that took place within an urban center would have been more complexly developed in some ways, especially if highly concentrated groups of potters were encouraged to pool their resources to solve problems and share technology (Poblome, 2004, p. 493).

Problem-solving and -fashioning techniques would have created strong bonds within social groups (Gosselain, 2000, p. 208). Among the Hopi pottery techniques are shared and learned among matrilineal kin and through non-clan relationships. An example of the latter process is the spread of Zuni-influenced designs among the Hopi mentioned above (Stanislawski, 1978, p. 214- 215). Gosselain (2000, p. 209) further elaborates in his article on social relationships:

My main argument regarding the production of material culture is that the contexts in which technical behaviors are constructed and reproduced correspond to the same networks of social interaction upon which identities are themselves constructed and reproduced. One learns specific ability and acquires specific tastes by interacting with relatives, friends, neighbors, or members of any form of social group to which one belongs or with which one interacts, within or across boundaries. This is how individuals come to do things in their own particular ways or to consume particular kinds of goods, all of which may be used subsequently as symbols of differentiation and belonging. As social networks expand, contract, and interconnect . . . people are thus likely to accumulate a wide range of dispositions, including knowledge, skills, tastes, and habits,

pertaining to different facets of their identity . . . technical traditions may incorporate elements of multiple origins . . . all cultural elements do not necessarily evolve in the same way.

Production would be linked to a socio-technical system that would bring together diverse social and nonsocial components that would include: techniques, tools, identity, social drama, ritual, as well as process of consumption, appropriation, resistance, dominance, reproduction, and production (Scarlett, 1999, p. 168). It is through these values that potters would have infused their pottery with meaning to reflect more than just superficial appearances. They would have created works that would have represented the many different facets of their identity (Gosselain, 2000, p. 191). For example, among the Hopi pottery making is a nurturing process. The molding and forming of pots is not the initial stage of creation and formation; it is also the inception of forming and strengthening social relationships (Charley & McChesney, 2007, p. 89).

Pottery technologies often vary based on the societies that practice them. Still, everywhere the production of pottery involved multiple people united by social as well as economic ties. It is through these processes of making and teaching pottery that one would be able to form bonds and reinforce social connections. Therefore, the social connections formed were actualized within the manufacturing process; and the pots would have stood for the essence of the social relationships that can be found in the operation and manufacturing process. These bonds and social interactions may have been widespread in many pottery producing societies, in some cases they may have also been intended to be reproduced beyond the local community (Charley & McChesney, 2007, p. 89-90).

Chapter 5

Conclusion: The Secrets That Will Never Be Revealed

In retrospect, there is much about the history of pottery that we do not know. Scholars may never be able to answer the question of how pottery technology spread. Where did it come from? Why does it cut across all cultural boundaries? Why is pottery production in South America similar to that of Africa? How were they linked? Was there a link? We may never be able to answer these questions and know the actual story of how pottery spread around the world in prehistoric eras. Random sampling and excavation will never replace direct observation and participation (Stanislawski, 1978, p. 16). What we do know is that pottery everywhere materializes a complex mix of historical, economic, geographic, and social factors that differ in their specific expressions among human societies. Pottery is the result of practical and/or prestigious technologies that were developed in different places and different times (Rice, 1999, p. 43). Scholars must sift through this mixture to determine their conclusions (Rice, 1999, p. 2).

In many respects, studies of pottery give us insights into our shared past and help us to define where we came from and what past societies were like. One should not look at a prehistoric pottery vessel and just assume that it was used for utilitarian functions alone. Pottery vessels are filled with history and cultural significance that scholars are

only now beginning to understand. In pursuit of understanding pottery's cultural significance some scholars will base their theories on assumptions while others will focus their work on uncovering answers. There are unlimited possibilities for the story behind a pottery vessel. The scholar's main goal is to try to interpret and understand what past societies left behind; and how what we know of contemporary societies can help to inform this process. She/he is trying to resolve the unknown, which is not easily answered. I think Stanislawski (1978, p. 208) stated it best, "we always must move from the known to the unknown ..."

However, we will never really know the "true" history or story behind the shattered remains of ancient pottery. We should embrace the unknown and possibilities of pottery if we want to continue to advance the study of pottery cross-culturally. Such analyses may help to unlock the history that surrounds prehistoric pottery. And in so doing, a better understanding and interpretation of past cultures may develop. We may learn more by studying pieces from all cultures together rather than each culture's remains individually. The similarities among cultures cannot be ignored and should be the basis for future study. Our goal should be to step outside of our assumptions, as this may lead to greater understanding of past items and cultures.

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