Traditional Potters of India

Ethnoarchaeological Observations in America

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We stood on a hillside surveying the landscape for just the “right spot.” M. Palaniappan preferred the low, more level area near the base of the hill, while Jhithru Ram favored the more sloping crest. Three others of us stood by observing as they spoke animatedly in Hindi.

The day, a steamy one in early June, marked the beginning of a research project that was to last some two months. It included two village potters from India who had come to the Smithsonian Institution as participants in the Aditi Exhibition, and three archaeologists with interests in ancient pottery. The project involved the study of the production techniques used by traditional Indian potters and their ability to adapt to new materials and to produce their ceramics in a new environment. Today, we were selecting the site for the kilns in which they eventually would fire their ceramics.

The Aditi exhibition, subtitled “A Celebration of Life,” originally was put together in New Delhi. In 1985 it was brought to the Smithsonian to mark the year of India. The 2000 objects and 40 artisans and performers gave visitors to Washington, D.C., an unparalleled glimpse of life in India. The two potters were commissioned by organizers of the exhibition to serve as representatives of traditional craftsmen from India. Each day they practiced their craft in the halls of the Museum of Natural History at the Smithsonian. They also spent time at the Smithsonian’s Museum Support Center in Suitland, Maryland, where they built the kilns described in this article.

Potters at Work: A New View for Archaeologists

Our study revolved around three concerns, two of which pertained to our interests in the production process, and one of which was a result of the special conditions of the potters’ presence at the exhibition. The first involved observation of the methods or techniques used in producing the pottery and related equipment, such as kilns; the second involved ethnographic data on how the potters set up their workshops at home, information to be acquired through a series of interviews. The third was related to
After the hard clumps of clay are compressed into smaller particles, water, sand, and rice harks are added to increase the workability range of the clay.

4. Palaniappan mixes the sand thoroughly by "working" the clay with his feet until it is completely mixed.

M. Palaniappan

In the context of the Aditi Exhibition, M. Palaniappan was involved only in the construction of votive figures, primarily horses, which are built up by hand and strengthened with a paddle and anvil. In his village he uses hand-building methods but also throws pottery on a fast wheel. At home, ceramic vessels are slipped and painted prior to firing, while the figures are generally colored after they are fired. His wife and mother assist him in obtaining raw materials and in mixing and wedging his clays. They also help with the paddle and anvil work during manufacture, with the painting of the vessels, and with the stacking and firing of the kilns. As a consequence, the first adjustment Palaniappan had to make was working without his usual helpers. To provide him with the necessary assistance, one of us, Mark Kenoyer, and a local potter from a Washington pottery, Rene Altman, assisted him throughout the project.

In India, both potters procure their clay from local reservoirs or from the river banks. Clay used during the Aditi exhibit was obtained from a large deposit at Maryland Clay Products in Beltsville. It is an extremely fine clay with about 6 percent iron when the various clay pockets are mixed together. Palaniappan selected and processed the clay for himself and for Jhithra by picking out the dark grey and red clays that most resembled those he uses at home. Later, he mixed the two together in a proportion of two parts grey to one part red. By mixing them together, he hoped to achieve in the final firing the soft red color that he prefers for his pottery.

After the clay was collected it was dried in the sun for a few days and then broken into small nodules by hand or with a wooden plank. Large concentrations of iron were picked out by hand, and then the clay was put into a tub and slaked by sprinkling water on it. The wet clay was left for one day before mixing in the various temperers such as plant material or sand that are added to the clay to make it more workable. Palaniappan uses two kinds of temper for his clay, regular "sand-box" sand and ground rice harks. In India he gets the sand from the banks of the reservoirs or rivers and the rice harks from a local rice mill. Before arriving in the United States he had sent us samples of both the sand and the rice harks which he normally uses. In preparation for his arrival, we obtained the rice harks from a mill in Arkansas, and they were ground to the exact specification (10/50 ground rice harks) that Palaniappan's sample indicated.

Figures 3 and 4 above Palaniappan processing his clay. After the clay is
A collection of the small votive figures and utilitarian pots made by Jithru.

Jithru Ram builds his figures differently. His technique involves throwing the parts on a wheel. The wheel, which he brought from India, is common there but was new to us. As Figure 1 shows, it consists of a small circular piece of wood with four radiating spokes. The spokes are joined at the outer edge with a hoop made from strips of bamboos tied with hemp cord. This webbed hoop is parked with wood clay and then bound with more cord. After the cord has dried, additional layers of clay reinforced with cord are applied until the wheel is sufficiently heavy and perfectly balanced. Centered on the underside of the central wooden plate is a short, pointed stake. In order to spin the wheel, the stake or pivot is set in a depression that has been made in a terracotta brick. The particular brick that Jithru uses has several depressions on each side, showing reused paste. The brick itself is firmly set into a low mound of clay so that when the wheel is placed on the brick it is one


Palanippa makes both small and large figures by hand building. He forms the wet clay into six different segments, which are assembled when the clay is leather hard. Here he prepares the head of a horse, which will be attached to the body and the legs (seen at left).

Jithru Ram also uses a different construction method from Palanippa. He first throws the separate pieces of each animal from a lump of clay and then sets them to dry until they are leather hard. His small animals are made of the same pieces as Palanippa’s—four legs, one body, and a neck and head (Fig. 6 and 7). When they are suitably dry, the legs are attached to the body by piercing holes in the bottom of the body piece, arranging the clay and pressing the pieces together. The final bonding is done by pressing and smoothing the joined portion. The neck and head are then attached in the same manner. When all pieces are sufficiently dry, he applies various decorative motifs with applique or by impressing the designs into the body. Figures were taken outside to dry before application of the slip which Jithru had brought from India.

Jithru was at first very cautions and uninterested about the materials he would be using. He had brought some clay with him from Delhi and he also had the local clay processed by Palanippa. He did not test either clay before using it and initially decided to make some vessels and figures without adding any temper. "At home," he said, "I would need some sand, but there clays do not need anything." In addition, the slip he brought from India was a bag of red ochre (gundu) which he planned to use in Delhi. In his own village he would have mixed the ochre with a fine clay slip, but he believed the red ochre mixture from Delhi was already prepared in such a manner. Later, he decided to experience a 50 percent loss of his pottery due to the poor clays, and the ochre rubbed off to the touch due to the lack of fusion.

Conducting the Kilns

The clay on which we built the kilns was the start of our understanding of the different ways in which the two potters were adapting. It was then that we realized how markedly different had been the two potters’ reactions to their new surroundings. Initially, the kiln structure and an updraft type—were significantly different both in scale and in design. In India Jithru would have built his kiln into the slope of a hill or against an abandoned mud wall. Jithru explained that in his village when houses (traditionally made of sun-dried mud brick or packed mud) are abandoned, potters use them as the back wall of their kilns. The fuel for the kiln consists of layers of straw, wood, and dried cow dung patties set in a semi-circle which emanates from the corners of the abandoned house wall or from a "wall" made by cutting into a pre-existing hill slope. Vessels, small and large figures, and component pieces are stacked on top of this fuel layer and additional combustibles are placed over the entire lot. Finally, the pile is covered with straw and then plastered with mud, leaving an opening at the bottom for introducing fuel. The pottery is fired away from three to four hours and then allowed to cool overnight.

Like Palanippa, Jithru makes his figures in separate segments, but instead of making them by hand, he uses the potter's wheel, creating small, narrow cylinders for the four legs and wider ones for the neck, head, and body. Decorative elements, such as handles and ornamental jewelry fashioned of clay, were added when the clay was leather hard.
to "sweat" or dry out and began to burst with the first blast of heat. Pyrometers inserted in the kiln to measure temperatures gave readings indicating that the heat at the center of the kiln climbed from 45 to 457 degrees C. in 24 minutes. In addition, temperatures varied some 470 degrees C. from the back to the front of the kiln. Although the increase in temperature was reasonably gradual for an open firing, the jars were covered entirely with hay and mud, with additional scrap terracotta tiles set along the back of the kiln to serve as baffles.

At Jhithru’s second firing he stacked his kiln with small, kindling-size pieces of wood rather than the thick blocks he had selected the first time. He placed the kindling in rows at the bottom of the pit and set a second layer on top of that, leaving air space between the pieces. The unfired pottery, altogether 70 pieces, was set directly on top of this wood. Additional pieces of small wood and charcoal left from the previous firing were set in front of the pottery. Terracotta roof tiles were placed over the wood and the kiln was covered. A layer of straw was placed directly over the tiles, the straw was covered with mud, and additional straw was placed at the front of the kiln. The upgraded kiln built by Palaniappan was filled with a variety of ceramic pieces, but in view of the large size of the two horses, the loading proceeded more slowly. Each large horse consisted of eight pieces. (Larger figures had a bead ornament added.) The individual pieces were fitted gingerly against the metal grate on which they were being stacked. Tiles were set beneath or around the individual pieces to stabilize them. The tiles also were water receptacles for smaller pieces that might have fallen through the grate (Fig. 10). As Jhithru had done, Palaniappan covered the loaded kiln with roof tiles, then laid a thick covering of straw on top, followed by a “mattar” of mud. A second and thinner layer of straw and mud was applied. Twelve small holes were poked through this cover to let out smoke and to draw the fire.

This entire process took a little over an hour, by which time a large crowd had gathered. Among them were Ed Boye and David von Endts of the Smithsonian’s Conservation Analytical Laboratory. They had agreed to set up and to monitor the pyrometers which recorded temperatures in the kiln and to install instruments with which to extract gases. This information would allow us to reconstruct the range of variation in temperature and air throughout the firing. Since we had photographed the placement of individual ceramic pieces, we could assess the effects of these variations on the specific objects. A small ceremony or ritual preceded the actual firing of the kiln. Palaniappan set a straw fire just outside of the mouth of the kiln, and a coconut was broken as a sacrifice to insure success of the firing. A pack of incense—jal was and marigolds were placed over the smoke holes on the top of the kiln. Palaniappan built an additional small fire at the entrance to the fuel box of his kiln, where he allowed it to burn for one hour during which time it was gradually introduced into the box. The procedure was intended to heat the kiln and its contents slowly to avoid cracking the sides of the kiln or its contents. It insured that the pottery had dried out gradually before the full firing began. The timing was based on a test known to Palaniappan. He said the time would be right when the top layer of tiles (which he reached by pushing his fingers through the smoke holes) could be touched for only a second. Throughout the firing, the potters devoted their entire attention to adding fuel and to controlling the drafts in the kiln. The latter was managed by opening and closing the smoke holes which each potter had made in the straw and mud cover.

There were other concerns as well, and the potters yelled back and forth about these as they stoked their kilns. Something that troubled Jhithru was the wetness of the soil, which he said would affect the fire.
and blacked his pottery. Since it had been raining off and on for the previous few weeks the soil was damp, and he had wanted to cover the bottom of the kiln with a piece of iron sheeting to keep the dampness out of the kiln.

When asked how he would deal with such a problem in the village if he had no iron sheeting available he said that he would burn a fire inside the kiln to dry out the soil before stacking the pottery. In this culture there is a gulf between the two potters centered around whether or not their pottery would turn out black. In a way it is so easy to humorously accusing the other of not knowing what he was doing. Jhitru, who did not want to have to see an udapt kiln before said, to Palanippan, “Your horse will be black because your kiln is open.” While Palanippan jokingly said that the wet soil would turn Jhitru’s pottery black.

The firings lasted a number of hours and were the most dramatic part of our study. Temperatures reached their peak an hour before the potters stopped stacking them, while we were still observing the effects of the—breathtaking firing, clouds of smoke, and visibly transformed clay, now hard and permanent. Palanippan timed the end of the firing by the color of the pottery, which was peeling away from the sunlight (Fig. 11). This glow was observable through the smoke holes made to control the draft of the kiln. When the glow was completely extinguished we were able to monitor our pyrometers. The timing varied—3 hours for the pit kiln and 5 hours for the upright one. The kilns were then sealed off so that the heat would be maintained and the pottery would cool slowly. This cooling lasted until morning, when the firing would be complete.

The Rewards

It was nighttime before we were able to stop and to think over the day’s results. We noticed the holes that we had made for our pyrometers, we could watch the smoke coming out of the holes, and one could see it illuminated inside as it cooled in the night air. Each of us, lost in thought, moved over the events that had led to that peaceful moment. For the two potters, the challenge of working with new and strange materials had been met. We archaeologists remembered excavations of ancient kilns and incorporated insights from our observations on the firing procedures into our interpretative framework. In all, the work had come full circle and we anticipated the excitement of the morning, when the pieces would be unloaded and each would be examined for its finished characteristics—clarity and evenness of color, lack of cracks, breaks or spalls, and so on.

In the morning, when that moment came, we lifted the roof tiles from the top of the two kilns and took out the individual pieces one by one (Fig. 12). First came the horse’s legs, then its torso and head—all perfect except for a minor spall on the tip of one leg, probably the result of an air bubble, since Palanippan remembered having patched the piece while finishing it. For Jhitru, his entire lot, with the exception of one piece, had survived, although many were blackened.

For each of us the project had been rewarding. We got to experience something firsthand, and the archaeologists, have valuable factual information: a body of observational data on building techniques, wheel throwing, kiln construction and firing; scientific measurements of firing curves and gas analyses; physical evidence of the results of kiln use. And we also benefited from intangibles: a heightened awareness of the episodic nature of pottery making, an increased understanding of the roots of potters’ conservatism. The potters left with tangible and intangible rewards. Palanippan had earned sufficient money to complete a new house and acquired new ideas about glazes from observing Rene Altman’s work. Jhitru had plans to build a new two-room brick house and to buy some more land.

The Smithsonian’s Addi Fest has ended and we are left with our more familiar archaeological evidence: the debris from the firing, but also the end result of the production process, the pottery itself. Through this study we have seen how these two potters maintained the core of their craft—their varied techniques of forming and shaping—while the other components, the raw materials and firing circumstances, had changed. In this case the large change was brought about by the potters being physically transferred out of their village environments. In prehistoric situations, various factors could have required potters to adapt to different raw materials or to change their firing procedures. For example, the chemical content of clay deposits would result in the use of alternative raw materials with different firing characteristics. Decreasing availability of wood brought about by pressures of expansion would also force potters to search for a more “cost effective” method of firing—larger quantities for wider firing areas and longer firing layout, and so forth. An expanding population could also force the removal of pottery production and firing loci to more peripheral locations, leaving archaeological evidence of sequentially used production facilities.

In these cases, the end products of the process—the pottery objects themselves—would appear to be static, changing, and nullifying stability as did the horses and pots resulting from the Addi study. Character changes in the other components, however, might speak of variables operating on the social or physical environment.

Bibliography


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