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ARTÍCULOS

THE MODERN AND ANCIENT POTTERS OF SOUTHERN PUEBLA

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Resumen: En este estudio procuro remontar la tradición alfarera del pasado prehispánico a la época actual en la región de Tepexi-Acatlán en Puebla meridional, que comienza con la producción de cerámica Anaranjado delgado en el periodo Clásico hasta los indígenas alfareros en tres actuales centros de fabricación de cerámica: Metzontla Los Reyes, El Rosario y Santa Ana Otzolotpec.

Palabras clave: alfareros, alfarería, Puebla meridional, cerámica Anaranjado delgado.

Abstract: In this study I attempt to trace pottery-making traditions from the prehispanic past to the present in the Tepexi-Acatlán region of southern Puebla beginning with the production of Thin Orange ceramic ware in the Classic Period to the indigenous potters in three modern pottery-making centers: Metzontla Los Reyes, El Rosario and Santa Ana Otzolotpec.

Keywords: potters, pottery-making, southern Puebla, ceramics Thin Orange.

INTRODUCTION

According to Leon (1903), the ancient inhabitants of this region were Popolocas, and according to Cook de Leonard (1953, 1957), Paddock (1966), and Rattray (1990) the makers of the famous Mesoamerican trade ware, Thin

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Orange. The climate is semiarid and hot with natural vegetation consisting of cactus, palms, palmitos, and mesquite. The region of study is limited on the north by the Rio Atoyac and the Rio Axamilpa and on the south by the montains and *barrancas* (figure 1). The region has suffered irreversible damage from deforestation and soil erosion, brought about by the enormous tribute burden and depopulation that left the terrace systems abandoned as a direct result of the Conquest. The region participated little in the economy and modernization of Mexico until approximately 30 years ago when the highway from Puebla to Ixcaquixtla was constructed. The pueblo of Santa Ana Otzolotepec remains isolated except for the terracerias (dirt roads that become impassable in the rainy season) to Huehuetlán el Grande and Zacapala.

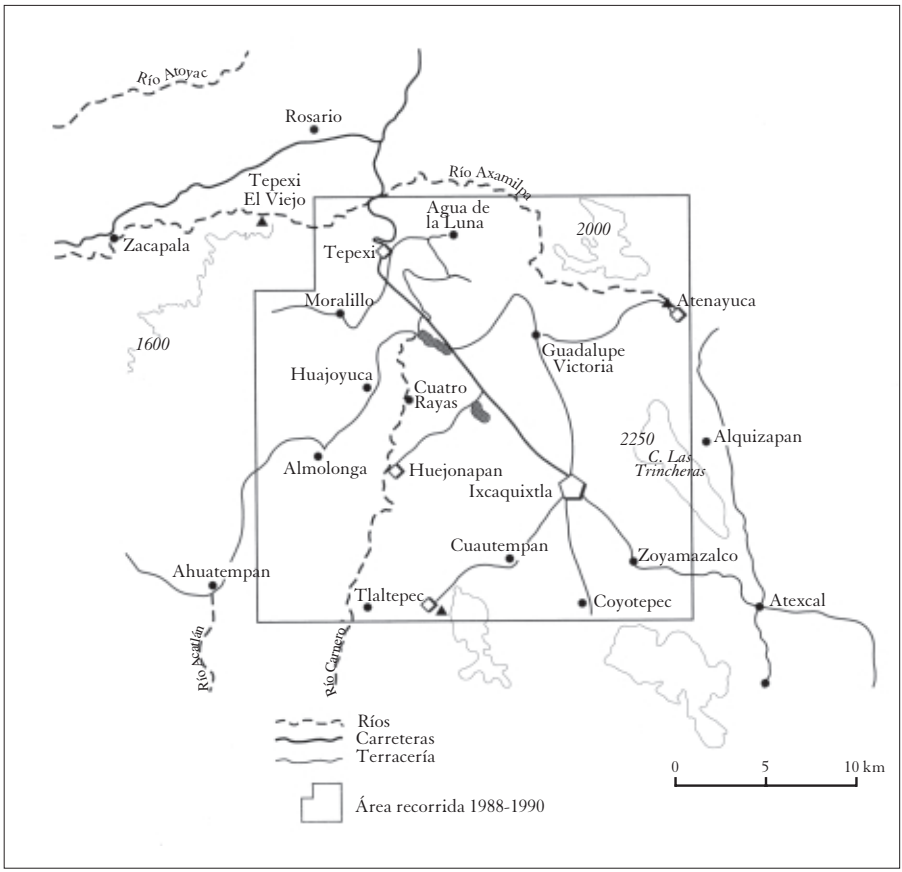

Figure 1. *Location of the study area: Tepexi de Rodriguez in the south of Puebla.*

Metzontla Los Reyes to the south is located approximately one and a half hours off the highway to Zapotitlán Salinas. Only El Rosario, Zacapala, Tepexi de Rodríguez, and Ixcaquixta are located close to major highways.

Tracing continuity in the culture is given credence on the basis of the survival of the Popoloca peoples in the region and their distinctive culture: the Popoloca language, an important survival feature, as is their distinctive habitation, an "eared" thatched roof dwelling (figure 2). We will be discussing the excellent orange-hued pottery of modern times manufactured from schist bearing metamorphic clay that bears a resemblance to the Thin Orange ware of the Mesoamerican Classic. The inhabitants of Southern Puebla at the time of the Conquest were Popolocan (León, 1903). A map of their distribution in 1951 by Cook de Leonard shows them greatly diminished and today only a few pockets remain (Jacklein, 1974: 32-33) dispersed among the more numerous Nahuas and Mixtecans.

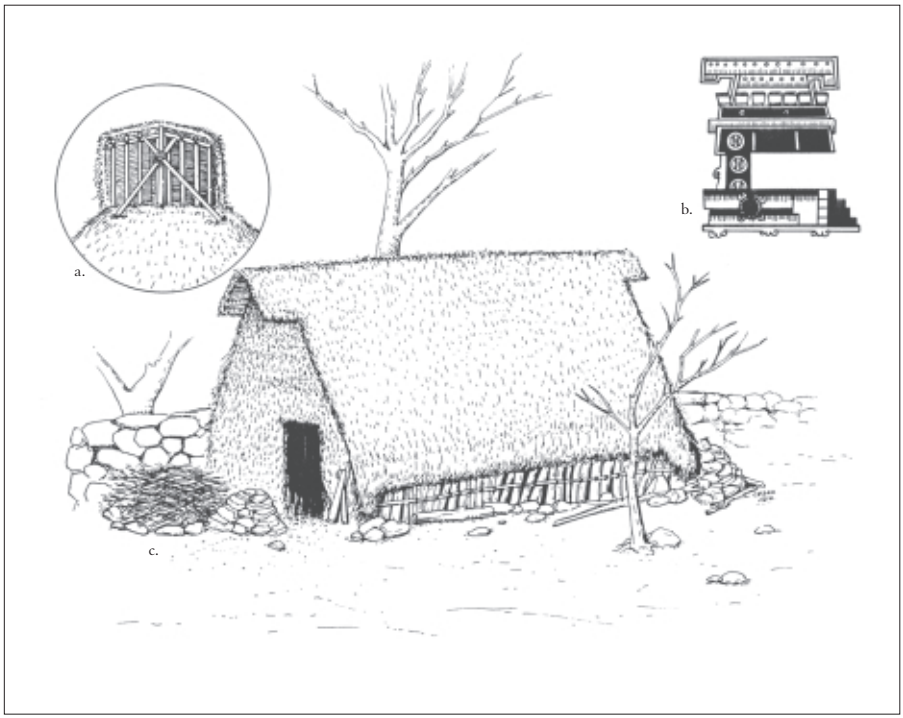

Figure 2. *a) Houses Popolocas: the "ear" seen from below; b) Temple with hoverhanging roof shown in as the* Codex Borgia*, plate 49; c) Modern House of Popoloca in the region of Tepexi.*

Ethnoarchaeology is a strategy for reconstructing the past. It can give insight into the workings of an ancient culture: the technology of manufacture, the uses of certain forms, and the distributions of artifacts. Modern potters and their products are a valuable link with the artisans of ancient Mesoamerica. Pottery-making was one of the principal crafts at the great urban site of Teotihaucan yet they imported their most widely distributed and elegant ceramic, manufactured for them to their specifications, from the southern Puebla region (Rattray, 1990; Rattray y Harbottle, 1992). I have been working with the modern potters to observe their methods of manufacture, their social organization, and the operation of the marketing system. This has provided new insights into the techniques used by prehispanic potters.

The Potters of El Rosario

El Rosario (located about 8 km north of the largest community in the region, Tepexi de Rodriguez) is a picturesque pueblo known for the extraordinary *comales* they manufacture. The following description is based on fieldwork carried out in 1990-1991. In addition to the various methods standard to both archaeology and ethnography, i.e., field notes, plans, maps, photography, I also used interviews and video recording.

Raw material procurement

The clays used by the potters of El Rosario come from the barranca (canyon) cut by the Axamilpa River approximately one hour away on *burro*, to the south of the potter Cruz's house. Two kinds of clay are collected, one light and sandy, the second red and coarse. Repeated beating with a tool that looks like a caveman's club breaks up huge clumps. At the clay mine itself they remove the impurities (rocks, roots) and pass the clay through a sieve made of straw matting to obtain as clean and fine a mixture as possible (figure 3). The clay is collected in bags (morrales) of maguey fiber, then covered with plastic and tied onto the burro. The amount that can be transported is a "carga," that is, the weight that one burro can carry–70 or 80 kilos. The potter often rides a second burro. The clay materials are spread out to dry on petates during the day, usually in the shade to prevent consolidation into huge, practically insoluble clumps.

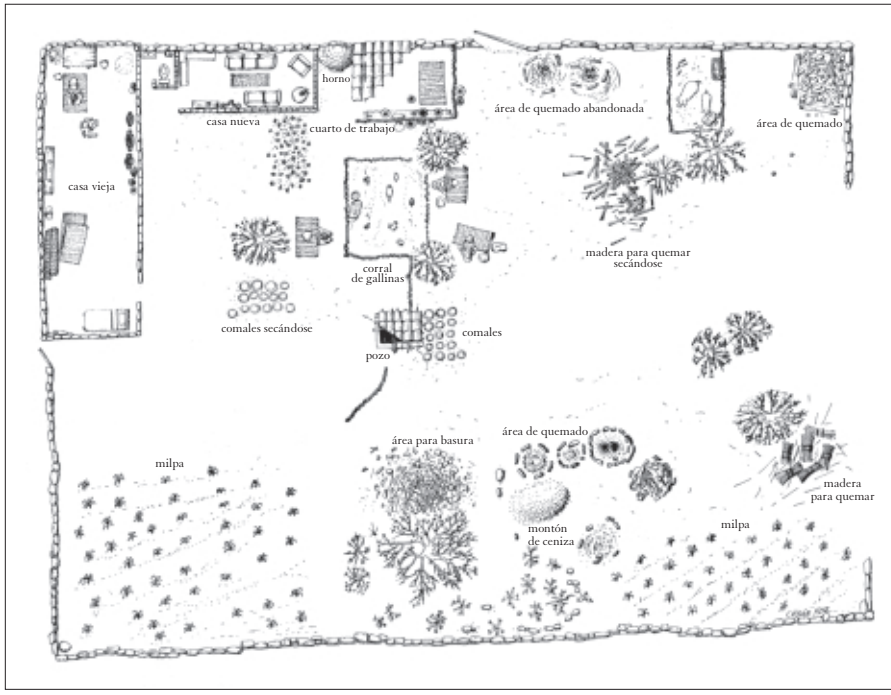

Figure 3. *Plan of the workshop and house of the potters of El Rosario, Zacapala, Puebla.*

Preparation of the clay

Work areas are changed to new locations frequently depending on the sun and the amount of breeze. The most comfortable for the potter is a special shed with walls of wooden slats or bamboo poles and a thatched roof that provides excellent ventilation for drying the vessels–but it is rather dark inside because the only light filtering in is that which enters between the vertical slats. Some living quarters are now constructed of stone and adobe. In the village of El Rosario they have constructed a shed solely for the purpose of providing a separate workroom for the potters to make their clay pots and *comales* (griddle-like pans) and store the *comal* molds. This shed is equipped with racks for the molds and numerous pegs for hanging things. A pail or *cantaro* of water (essential for pottery production) is always kept on hand and replenished frequently from the stream next to the house.

The potter sits on the ground on a *petate* where she prepares the clay mixture. Two measures of light sandy clay and four of the red clay (*barro*) from

the Acatlán source are prepared at a time. Later a third ingredient, collected from the Axamilpa River, is added to the two clays. "*Tierra negra*" or "*barro negro*" is extracted from a communal source located only 200m to the east of the house on the level plain and is said to give the clay mixture greater plasticity. A well is made in the mounded dry clay and the black mud, now in solution, is added little by little, until the entire amount is consumed. Much kneading is done throughout this process until many large loaves are formed these are piled up, then removed to a cool place, the work shed, and allowed to "cure" for several days or weeks.

Forming the comales

In preparation for making the comales, the potter assembles the prepared clays and tools around her. These consist of the *parador* used for turning, a corncob, the *otate* (smooth stick), olla-like molds, rags for wiping and smoothing, and gourd fragments. The *parador* or *tlamanalco* is a kind of manual turntable

Figure 4. *Potter forming the griddle on the tlamanalco.*

Figure 5. *The "*parador*" or tlamanalco with the* comal *on top.*

with a flat base and straight walls equipped with two handles and everted rim. It is crude in appearance, very rough on the exterior. The two rope handles soon become plastered with clay (figure 5). Its function is to support the comal on its mold as it is being turned. Each potter makes her own, starting with a ball of clay, building up the walls with clay coils.

Manufacture of the "comales" (figure 4, figure 5) is extremely rapid. First, a large ball of clay made as round as possible is placed on the mold, then it is flattened and thinned by pounding with the two open hands until it is made into a "tortilla" approximately 1 cm thick and 57cm in diameter–several centimeters less than the mold itself. The mold resembles a *comal* except that it is thicker and has a design on the interior, usually an animal, which will appear on the *comal* base. The potter owns about twenty different molds with different designs. Prior to this, dry clay has been placed on the *tlamanalco* to prevent the mold from sticking to it. A curved tool made from a gourd is used to stretch and smooth out the clay "tortilla" until it completely covers the entire mold. This operation is performed with the left hand, while the potter turns the *tlamanalco* by its handles with the right hand (figure 4, figure 5). Next a border "*la boca*" is added. A rope of clay, 4 cm thick, is applied around

the circumference of the "tortilla" pressing with the finger to make it adhere. A small piece of gourd is used to cut off the excess clay where it overlaps the edge of the mold. The central part of the strip is pressed firmly and the outer edge is raised up to form a vertical border. The *tlamalacacho* is rotating during this entire process. The edge is smoothed and made even using the wet gourd. Using a wet cloth, the *comal* in place on the mold is given a final going over starting at the center, working randomly or in a circular motion toward the outer edge with the hands; at this point the *comal* extends 1.5cm beyond the mold. This is repeated several times very rapidly. During the firing the *comales* will shrink to the same size as the molds.

Drying

The moist *comales* are allowed to dry in the shade of the open patio or in the shed until the following day. Direct sun would cause uneven drying and possible cracking. The next day they are set in the sun for two to four hours but if it is cloudy, drying could take as long as two or three days.

Polishing

The *comales* are removed from the mold after drying and placed on a *petate* (palm mat) at which time the potter gives the interior surface a final light polish with a moistened cloth. Before firing, the *comal* is set out in the sun to heat it.

Firing the comales

A fire is made in the reserved open space, "the firing area," that measures approximately 1.5m in diameter. A cement block and upside down broken vessels form the central support of the major firing area (figure 6). Large stones border it; some embedded in the ground in upright position to provide a support against which the *comales* are placed. The *comales* are subjected to a rapid light firing of 10 minutes prior to the major one to heat them and thus reduce the thermal shock during firing.

Thirty-six *comales* are fired at a time in the major firing; the *comales* in groups of six are placed against the stake, or central support, then broken *comales* are placed in between. Once carefully stacked, the entire lot is covered with the potsherds, the "wasters" that have been kept from one firing to another (figure 6).

Figure 6. *The man of the house preparing the* comales *to fire them on the open hearth; his wife carries two dry* comales *to burn.*

Once all is firmly in place, the exterior is covered by logs arranged vertically with as little space as possible in between. On the following day the fire has burned out completely and the *comales* are removed. They are carefully cleaned with a cloth and tested with a fist for toughness and the characteristic ring of a well fired *comal*. Most losses occur in the firing stage. It is not unusual for 3 of the 36 *comales* made weekly to be defective in one way or another.

Marketing

The entire village has become highly commercialized in recent years. The Cruz family does not sell in the weekly marketplace in Zacapala or Tepexi and only occasionally do local townspeople buy *comales* for their household needs. Large *comales* are commonly used set into a concrete or brick base where the family cooking is done, especially the preparation of *tacos* and *salsas*. The majority of the village's production is for a wholesale business. Buyers come directly to the houses in trucks to pick up the merchandise weekly.

Pottery making is a seasonal activity that is suspended during the rainy season and often during harvest time. Of economic importance are the crops

consisting of corn, beans, *tomate* and *nopal* cultivation grown basically for household consumption. Both pottery making and harvesting crops are family oriented activities in which all members cooperate. By late 1993 the two families I had studied three years earlier were no longer involved in pottery making. The older generation was unable to carry on the strenuous physical labor of procuring raw materials and making pots without the younger members who now live in the city of Puebla or in Mexico City.

The potters of Otzolotepec, Puebla

When I first visited this beautiful remote village in southern Puebla (figure 7), I was told that about half of 60 "heads of households" were engaged in pottery making, carrying on the tradition of their ancestors for over 300 years, they say.

Clay mining

The clay is mined north of the village in the mountains where the river has cut deep *barrancas* (canyons). It is a 20 to 30 minute walk along the riverbed

Figure 7. *Consuelo's home, in the town of Otzoltepec, Puebla.*

to the Actlán clays. *Burros* are used to transport the clay in *costales* (fiber bags) weighing about 30 kilos each. On longer trips a second *burro* may be brought along to carry the potter.

The workday begins at 7 am before the sun gets too hot as mining the clay is extremely strenuous. According to paleontologist Applegate (Institute of Geology, of the UNAM) both clays used by the potters are derived from the Acatlán formation, a sedimentary conglomerate. The clays now being exploited are located halfway to the summit of the sacred Tocotzin mountain. The two strata mined are weathered hardened black clay and loose, sandy cream-colored clay. The consolidated layer is broken up with a makeshift tool –a stick with a metal point driven into the end, a crude pick, or simply a pole.

Work is independent, although mining clay is a social event participated in by several women from different families in the village. Until fairly recently men had been involved in mining, but several serious accidents and the migration of males to the city has reduced their numbers. They go to Mexico City principally to work in shoe factories or to peddle, usually plastic goods, as their own products are less saleable and too heavy and cumbersome to transport.

Dolores's husband suffered an accident the previous year in which he lost several toes. Undercutting and landslides from digging the banks too deeply is one cause of accidents. The women also say some of their men suffer from silicosis, a disease caused by the inhalation of fine clay dust. Now only women mine although occasionally a son may be enticed to work as when we visited the mines.

The clay is collected in *costales* and carried to a small cliff where the women have created a special work area. Here the sifting and mixing of clays takes place (figure 8). Each woman has her own space but the area soon becomes quite congested with four or more women all working at the same time. They pound the clay with heavy wooden poles, somewhat similar to baseball bats, to break up the large clumps (present in the darker clay especially). They remove by hand some of the large hard pieces that remain. The two clays are placed side by side at this time. The actual process of mixing the two is done at the time of sifting. The amounts of each are carefully calculated and are reportedly mixed in proportions of 1:1. Nevertheless it seemed to me that the mound of the cream clay (the "talco") was slightly larger. Sifting is done with a bamboo mat or screen (sort of like a straw curtain) specifically made by a few males in the village who weave them from reeds (although scarce, I purchased one for 5 pesos). The screen is propped against several rocks on each side and sifting proceeds by throwing the clay up against it; the large pieces collect on the surface and are recycled frequently as mixing and sifting occur simultaneously. Sometimes

Figure 8. *Socorro at the mine the clay using a sifter mode of straw before mixing the clays.*

the larger grains are kept separate and used later for making *comales* for the household. Only the fine grains are suitable for *cántaros* and *cajetes*. Mining takes place about once a week as does forming and firing of the vessels.

A third ingredient, the black mud, comes from a completely different source, an open plain about a 15 minute walk from the house. After collecting the mixture is spread out on a *petate* in the shade to dry to prevent consolidation into hard lumps. Mixing the clay with water and kneading it takes place in the main courtyard of the house. The entire *costal* of clay is emptied into a *petate* –in a designated place, usually under a tree or makeshift shelter–always in the shade as kneading is a strenuous activity. The mixture previously prepared at the mine, cream-colored clay (*barro blanco*) and a darker colored clay (*café-negro*), is made into a well (figure 9). Alongside the potter are her tools and a huge tub of black mud in solution that she pours gradually over the clays, scooping it out with a sieve or basket, and straining it into the center of the well until all the ingredients are consumed and the mixture moistened and thoroughly kneaded. (Quantities used are 2 to 2.5 kilos of black mud dissolved in 10 litres of water; each *costal* of the dry mixture of cream and black clay weighs approximately 8-10 kilos). The amounts of each clay used are quite

Figure 9. *Socorro in the patio preparing the mixture of three clays and a black mud.*

precise and consistently used. A second vigorous slapping and kneading of each loaf (about 7 or 8 made at a time) is executed. The now thoroughly mixed and moistened loaves of clay are stored in the back corner of the sleeping room to "*madurar*" or cure. One day is sometimes considered sufficient.

Forming the pots

On the following day or the same afternoon, if "cured" clay is available, the forming process begins. Convex molds are used at some stage of forming for nearly all shapes except miniatures. The potter sits on the ground on a *petate* surrounded by her tools and molds (figure 10). The different sized molds of

20, 24, 60 etc., refer to the sizes of pots to be made and ultimately the number of pots a *burro* can carry. She starts with a large ball of clay that she flattens into a pancake. It is placed on the *petate* while she selects the olla-shaped mold, turns it over, coats it with dry clay. The clay pancake is patted and smoothed over the mold which has a striated rustic finish. A small wooden stick is used to smooth out wrinkles and plaster the clay closely over the mold. The walls are smoothed and evened out to the desired thickness. At this stage almost any shape vessel can be made. Work continues on the *cantaro* by adding lumps of clay to the sides and base for reinforcement. Its thickness is tested frequently by poking it with a finger. After the initial shaping, it is set aside

Figure 10. *Socorro, potter of Otzoltepec, Puebla, turning a jug on the tlamanalco.*

on its mold to dry for 1/2 to 1 hour while the potter prepares 5 or 10 more and allows them to dry. At this point each resembles an upside down paper bag.

Once the clay has dried sufficiently, the vessel is removed from the mold, set upright on the *tlamanalli*, a *comal*-like plate used for turning. The upper body of the *cantaro* is formed by adding clay coils using a corncob to press them together and onto the already formed lower portion. Before the neck is put on, the pot is once again allowed to dry and harden (this time without the mold), so that it will withstand further manipulating without collapsing. During the third stage it is placed once again onto the mold and a large amount of clay is added. As clay coils are added they are smoothed out with a corncob. The potter pulls the clay up from the outside at the same time pushing the top of the body in toward the center to make the neck smaller. The mold is once again removed. She now pinches the edge of the pliable clay like a piecrust making the neck smaller and smaller. This action is repeated two or three times, each time pinching the edge and tapering the upper body. Next she adds a strip of clay to the jagged edge to form the neck and rim and then reinforces it at the joint with more clay. At this point it can be made into the *cantaro* or jar shape. The jar will have a single handle whereas the *cantaro* has three handles. At various times throughout the forming procedure the potter smoothes the interior with her hand (figure 11). Nearly all vessels are formed in this way and never made completely on a mold.

Drying and polishing

The pots are set out in the sun to dry, carefully lined up in rows in the main courtyard (figure 12). Each *cantaro* is placed on a *tlamanalli parador* to hold it upright; others such as the large ollas are laid on their sides. Drying in the open air takes from 6 hours to 5 days or even longer if it is raining. The longer they are left to dry, the better. Wet vessels will warp and sometimes blister.

Prior to painting, the *cantaros* are vigorously polished with a cloth. This is one task that is executed by the males of the family (figure 10) as the *ollas* and *cantaros* are very large and require much maneuvering to polish them properly. The young girls or older members of the family polish small vessels. This is indeed a cooperative effort. In the case of widows, women by necessity must carry out the work of polishing and even firing by themselves. I was informed by the other potters that their pots are inferior and often crack during firing.

The "*pintura*" or "*grieta*" (an earth mineral, the substance that gives the pot the bright orange sheen) is brought from quite far away, the town of La

Figure 11. *Socorro's daughter of beginning a pitcher, smoothing it with the cane stick and her hand, while she turns it.*

Magdalena. Sun-baked pots, once they are thoroughly heated, are rubbed with a cloth that has been dipped repeatedly in the solution of "*pintura*". The liquid is absorbed and evaporates while it is being rubbed. At this stage the pots are light brown or chocolate in color whereas the unpainted vessels are a pale gray. Each *cantaro* is turned and wiped rapidly. Next, after they have dried, they are given a second polish which gives them a highly lustrous finish that they do not lose during firing. It is mainly the *cantaros*, jars and *ollas* that are given this treatment. *Cajetes* may be polished but more frequently they are left unfinished, or "*crudo*," undoubtedly the effects of providing for a wider market. Petra and Fausta, the two most skilled potters in the village, do polish sometimes as much as 15 minutes per vessel. Their finished product is considered superior and will eventually bring a higher price.

Firing the vessels

Firing is the touchiest of operations–and almost the only stage at which loss occurs. During the firing I observed some 50 vessels were fired; only one large *olla* had a crack on the rim and several *cajetes* were badly spoiled.

Firing area 1 is located 10m from the house in a level area. The area still contains charcoal and ashes from the first firing. Most houses have 2 or 3 firing places. In the center of one we found large refired sherds. Firing area 2, the major one, is located 100m from the house in the *barranca*. Socorro and Dolores's husbands cooperated in this enterprise (figure 13) –they had been collecting wood and cutting it up for two days. Types of fuel used are 1) *axuchitl*-long pieces of wood; 2) *cozahuate*-fibrous dry irregular twigs; 3) very dry, golden yellow grass or straw.

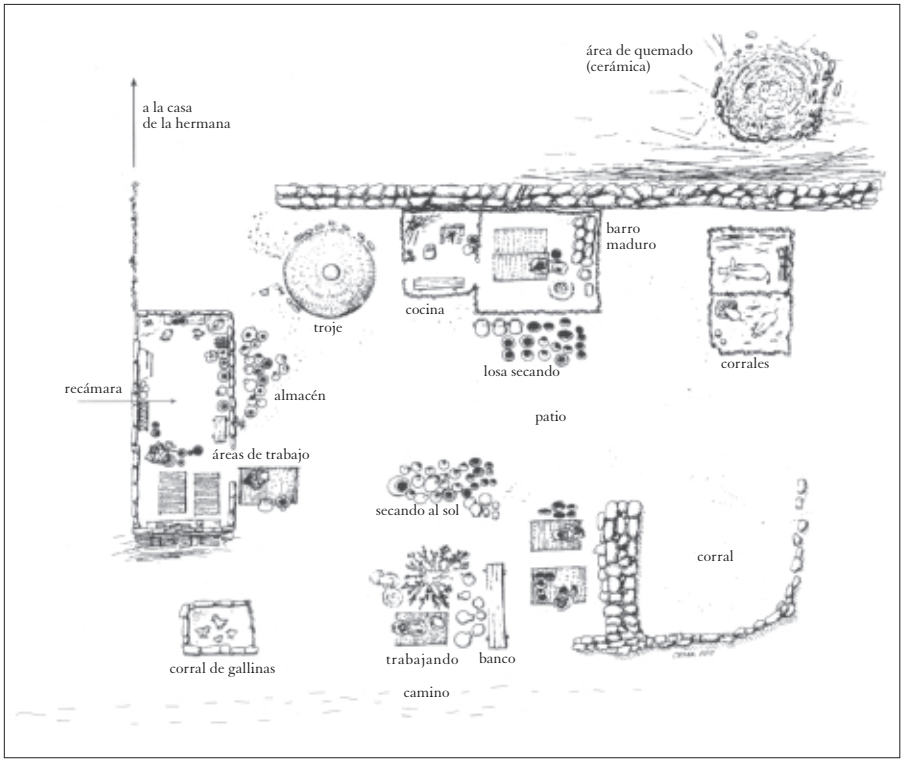

Figure 12. *Socorro and Consuelo's house in Otzoltepec, Puebla.*

Figure 13. *Preparing the fire placing the sticks and yellow grass over the bowls and jar completely dry.*

The children and adults help carry the pots down to the firing area from the house. The vessels are arranged on a fairly thick bed of twigs. Spindly twigs are placed between and inside the pots and a second layer of pots is piled on. Next the nested *cajetes* are placed on top until there is a large pile. Long pieces of wood are placed upright around the pots so that all parts of the vessels are covered. No old pots or wasters are used to cover the fire at potter Socorro's whereas at Maria's household a few old pots were placed around the fire. Then finally golden straw is placed over the entire construction (figure 13).

The fuel is ignited in the late afternoon and makes a roaring fire that lasts for 5 or 6 hours. At 10 pm the fire and pots were still glowing red. The next morning at 6 am the firing area looked like a Halloween backdrop. Dolores and Soccorro each retrieved their own pots from the many they had made. I have noticed that the sisters vary the decoration of the "ear" or tiny handle on the *cajetes* to help them identify their pots. The few defects were broken handles and a dented vessel. As pots are removed from the fire they are dusted or brushed with a straw broom to remove soot. Blistered and highly smudged pots are attributed to shortened periods of drying and even to firing on the wrong day.

The Metzontla Los Reyes Potters

In the Popoluca town of Metzontla, Popoloca affiliation has traditionally been expressed by distinctive houses with "eared" roofs (figure 2). The Popolocas of the Tepexi-Ixcaquixtla region still construct houses with this distinctive "eared" thatched roof. (An excellent description of the construction of the Popoloca house can be found in Jacklein, 1974). These are gabled roofs with prolongations that stick out at the ends. The same kind of "eared" thatched roof houses and temples are depicted in the Codice Borgia (Plates 41, 49). Other evidences of the survival of prehispanic culture can be seen in the crafts i.e., pottery making with a special formula using the Acatlán schist as well as the craft of weaving *petates*.

Cook noted the presence of tepetate-concrete floors, "*teteles*" (mounds), yokes and cylinder stones attesting to the presence of ancient cultures in the region. Metzontla is perhaps the only Popoloca town still making ceramics today. Other potters now live in an area that was once Popoloca and later invaded by Nahuatl speakers.

The potters of Metzontla, studied in the early 50s (Cook de Leonard, 1953; 1957) and more recently (De La Lama and Reynoso, n.d.) make pots by the traditional techniques that have not changed since the beginning of the century. Women are still the potters; they form the pots by a combination of convex molding and clay coils. In the mid 1950s they were still making *incensarios* or *candeleros* with 3 prongs and side handles. Other "fossil" forms are the copas, *patojos*, and the spout-handled jar, all present in the archaeological collections of the area.

Formerly, the Metzontla males mined the clay; today women carry out this task. Regarding the technique of crushing (*trituración*) the schist with poles, Cook de Leonard (1957) observed that the technique had been used by the ancient potters of the region to make Thin Orange ware for export and utilitarian forms for local use.

Women have taken over the task of pounding the red clay and the second ingredient, the black clay which they pass through a *criba* or screen onto a *petate*. The potters instinctively know how to mix the clays in a 50-50 proportion and always achieve a perfect mixture. The coarse fraction that does not go through the screen is reserved for the *comales*. The finest clays that are collected are used for making the *cantaros* and *cajetes*. Water from a stream a day's journey away is kept ready for the potter as she prepares to knead the mixture.

Thin Orange: a classic period mesoamerican ware

The production of Thin Orange was an extraordinary achievement for the ancient potters of Mesoamerica. Its appearance and finish are close to perfect; at the same time it is strong and durable, and very lightweight; qualities that contributed to its being one of Mesoamerica's most important trade wares. It was closely identified with Teotihuacan in the Classic Period, i.e. from about 300 to 700 AD.

Important attributes of the ware contributed to its popularity. It was made in a range of forms that encompassed both ceremonial and domestic activities; the bright orange annular-based bowls (figure 14), the tripod cylindrical vases and the human and animal effigies were inextricably tied up with burial and religious customs (interestingly, death is celebrated all over Mexico on the Day of the Dead by decorating the graves with vivid orange *sempaxuchitl* blossoms).

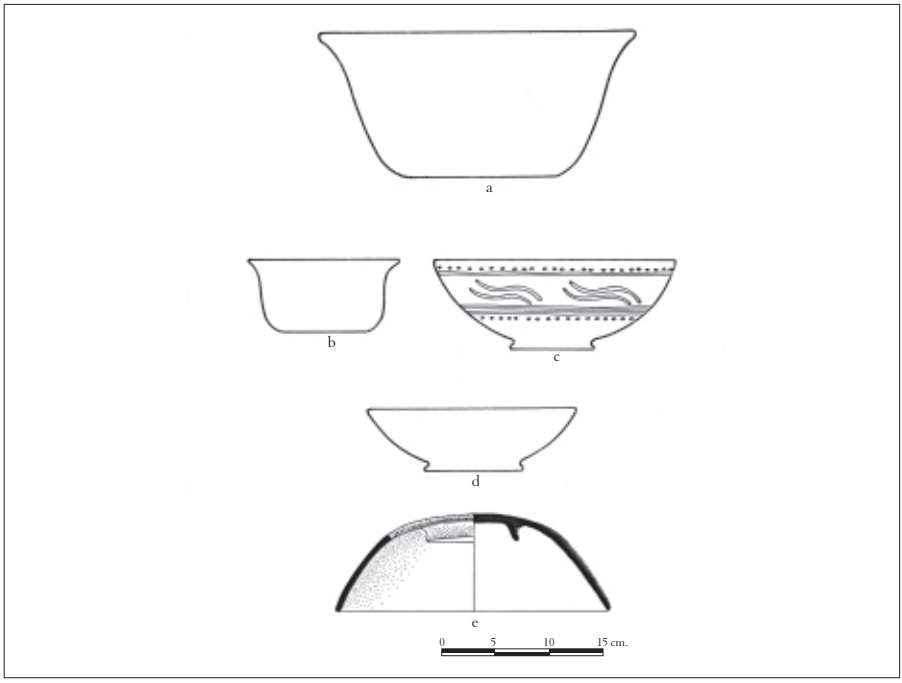

Figure 14. *Examples of ceramics Thin Orange bowls a-d and a molde of the workshops of Tepexi de Rodriguez.*

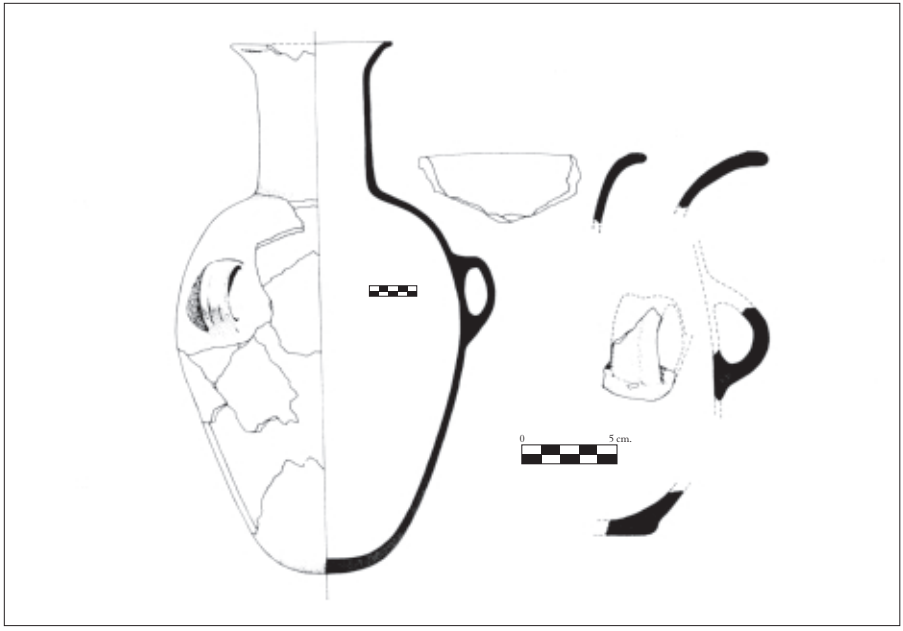

Figure 15. *The pitcher* ánfora *in ceramic Thin Orange.*

The utilitarian amphoras were excellent carrying and storage receptacles; *cazuelas* and large *cajetes* were apparently multipurpose as they appear in varying contexts at Teotihuacan (figure 15, figure 16). The amphora (*cántaro* is a better name than the Greek term), was used in various industries perhaps for transporting valuable commodities such as glues, and brewed and fermented drinks such as pulque and honey beer). At some stage in its use the amphora had to be heated either to cook in or to liquefy and extract the contents as the base and sides are vitrified and blackened at Teotihuacan localities although new vessels do not show this trait.

The Thin Orange amphora (tall, bottle-shaped) made up a good proportion of the trade to Teotihuacan in the Late Xolalpan and early Metepec phases. Sites on the eastern periphery of Teotihuacan (until recently a major pulque-producing area) abound in this type of "coarse" Thin Orange container. In the same period on the west side of Teotihuacan (the Zapotec barrio), peoples were engaged in a large Classic period industry that utilized the Thin Orange amphoras. By 300 AD large numbers of potters were involved in Thin Orange production for export.

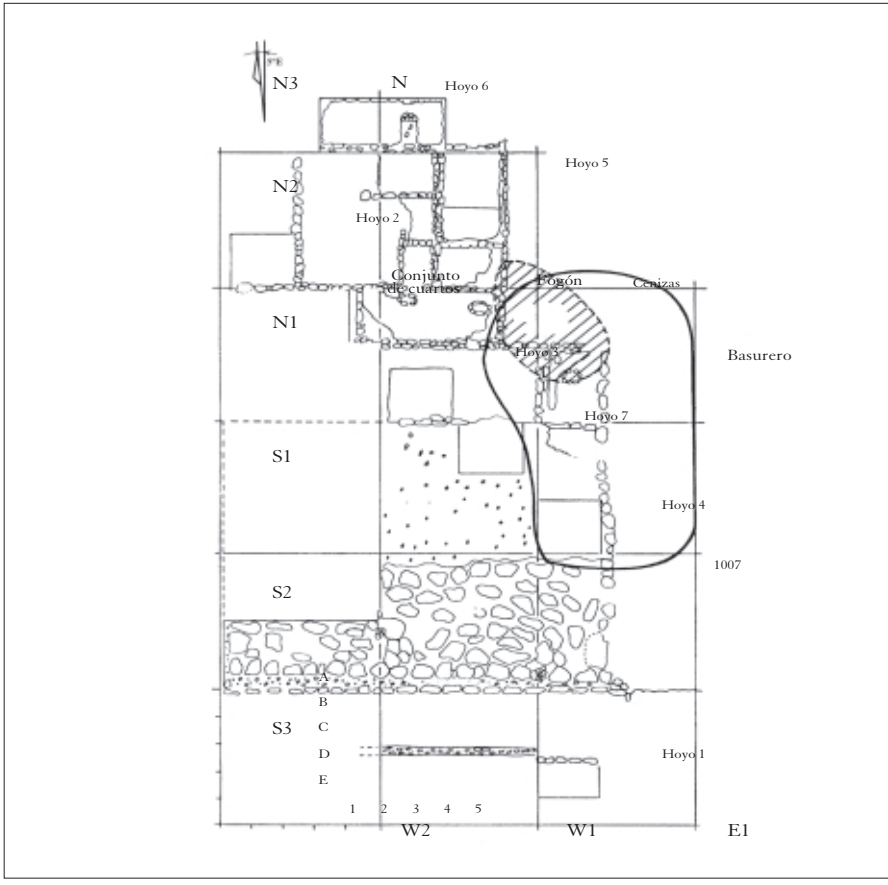

Figure 16. *Plan of the house of the ancient potters (ca. 600 dC) at site of Pedernal, Huajoyuca, Puebla* (excavations in 1989 by Evelyn Rattray).

In systematic reconnaissance of the Tepexi de Rodriguez – Ixcaquixtla region we found large concentrations of potsherds on the surface and delineated the region within which the workshops were located. Exploratory excavations there confirmed that many sites were the ancient pottery-making centers for Thin Orange ware (Rattray, 1990: fig. 2). The typical plan of the workshop sites consisted of a plaza group with a temple platform (5 to 8 meters high) on the east and lower range structures on the remaining sides. Dispersed habitation mounds surrounded the main plaza group. One mound we excavated extensively, the southernmost mound of the Pedernal cluster,

turned out to be a multi-roomed complex measuring 15 x 25m with a large terraced rock platform on the south. Workshop debris occurred all along the east retaining wall of the platform as well as under it. The potters had used enormous quantities of wasters accumulated over many years to build up the platform.

At the Pedernal workshop the *in situ* firepit and ash piles were located next to the habitation. The concentrated refuse, composed of workshop by-products is associated with two building episodes: the ash mound which is quite superficial and pertained to the last building episode; a sub-platform and rooms of earlier date associated with much workshop debris (figure 16).

The pottery making apparently took place in outside patios next to the house or between the house compounds. The concentrations of workshop by-products that comprised our evidence that this was a workshop consisted of defective and broken Thin Orange vessels; Thin Orange molds (figure 14; Rattray, 1990: fig. 6), Coarse Cream and Orange apaxtles (possible saggars) and the ash heap. There was a superabundance of Thin Orange ringbase bowls scattered over the surface of the entire site.

One hundred meters northeast of Pedernal is the Jaguey site. In this area we found enormous concentrations of Thin Orange ringbase bowls, Coarse Cream ware vessels (saggars) and numerous small "banana" polishers. Archaeological features consisted of an elevated stone construction, a possible platform with basinlike depression formed by the natural caliche substratum next to it, used for discarding ceramic refuse. We uncovered a circle of large stones associated with abundant charcoal and ashy soil that we interpret as an open firing area. The stones must have been used to support the ready-to-be-fired vessels, in the same manner that the El Rosario potters stack their *comales* around a circle of stones (see below) or the Otzolotepec potters stack their *cantaros* and *cajetes* for open firing.

Because the stylistic, commercial and religious functions of Thin Orange ceramics are the focus of other studies, I concentrate here on the compositional analysis of the ancient and modern ceramics and the raw materials of the region. Petrographic studies carried out by geologist Galguera (Rattray and Galguera, 1993) at the Institute of Geology of the National University of Mexico on selected sherd samples from the Pedernal, Rio Carnero source show that the constituents and proportions are identical to Thin Orange ware recovered from excavations at Teotihuacan (Rattray, 1990). In a recent paper we (Rattray and Harbottle, 1991) discuss the ceramic compositional problems of Thin Orange, relating them to the geology of the source region, the

settlement pattern and the techniques used by the ancient potters to produce this remarkable ware. Excellent hematite rich clays and schist occur in the deep *barrancas* that have been cut by the Rio Carnero. The Acatlán formation (named for the locality where it was first discovered), the oldest geological deposit of the region is exposed in several places, one being the hectare or so of exposed schist in the Barranca of Tecomaxuchitl in the vicinity of the Thin Orange workshops.

Further north following the Rio Atoyac is the pottery-making village of Otzolotepec where kilometers of Acatlán schist beds are exposed along the freshly cut cliffs of the new highway. The Otzolotepec potters use the Acatlan clays to produce their fine *cantaros*. Samples of sediments were collected from various geological sources in the vicinity of the pottery-making workshops along the Rio Carnero in the Tepexi region (Rattray, 1990: fig. 2) and the archaeological specimens were tested by neutron activation analysis (Rattray and Harbottle, 1992). We found that differences exist between the compositions of the archaeological pottery (Thin Orange) and the modern pottery (El Rosario and Otzolotepec), although both peoples (ancient and modern) have the same clay and temper resources at hand. Several lines of evidence (petrographic characteristics, present-day potters' clay preparation techniques) suggest that mixtures of several different clays were used and it may be difficult to determine the exact combination of clays used by the ancient potters. Experimental tests using fired briquettes with combinations of different clays, schist and *tobas* are underway. I have found that studying the techniques of modern potters living in the same region has provided excellent clues concerning the clay composition and the forming techniques used by the Thin Orange potters.

Modern potters seen in perspective

A long perspective on stability and change in the pottery-making industry has been traced from pre-Columbian times to the present in southern Puebla. This has been made possible by excavations in the ancient workshops and the survival of the craft during colonial and modern times. The region is well defined and approximately coterminous with the distribution of the Popoloca peoples at the time of the Conquest: it extends from Tepexi el Viejo on the north to Acatlán on the south. Throughout this strongly Popoloca region the expression of ethnicity is evident in the houses, the craft working and certain customs and myths as described by Cook de Leonard in the early 50's. Betancourt in 1919 brought

back a collection of pottery to the National Museum from the town of Metzontla confirming the long time span of pottery making in the region.

The Colonial and Precolumbian period

Carmen Cook de Leonard's (1961) careful study of an early 16th century document "The Painted Tribute Record of Tepexi de la Seda" (a single page document done in color on parchment) showed that it is apparently a tribute list prepared for the Viceroy to show the kinds of tribute possible from the region. In addition to agricultural products such as corn, squash, dried pepper, pepitas (dried sunflower seed), items woven from the ubiquitous palm are pictured, i.e. sandals, chairs (*icpalli*), baskets, and petates. Also prominent are clay pots including *cantaros, cajetes, tecomates, ollas,* pedestal bowls and slab-footed tripods shaped like the Postclassic vessels from Tepexi El Viejo. Mantas (cloth) and various clothing are shown. Bark and maguey paper may have been another product. Given the presence of bark beaters from Classic sites in the region it is almost certain that the region produced paper. Teotihuacan's great interest in the Tepexi region may have been to obtain paper, straw goods, and fabrics as well as Thin Orange ceramics. The Thin Orange "industry" functioned successfully for over five centuries, its survival dependent on Teotihuacan. The demise of Teotihuacan had repercussions in the Tepexi regions. The Thin Orange sites were abandoned. Several hundred years later, new kinds of pottery appear stylistically related to the Puebla-Mixteca tradition.

Modern times

This is undoubtedly the last generation of potters in Otzolotepec. The potters Fausta and Petra seldom sell at the Monday market in Huehuetlán el Grande due to low sales and low prices. In the past couple of years potters have begun to stockpile large quantities of *cantaros*, *ollas*, and *cajetes* for merchants from Tepeaca and Tehuacan, Puebla, who come to pick up the merchandise once a month during the dry season. The potters are now assured of an outlet and are beginning to experiment with new forms, but they cannot survive without some additional income.

Changes are taking place in the social organization that permeates the society. The absence of males either temporarily or permanently is a destabi-

lizing factor for the family as the production and consumer entity. One counter balance to this force is the parents who are expected to watch over the wives who must remain at home with small children. Family bonds are extremely important as protection against the hostile outside world. Even so, the trend is for large extended families to disappear and become replaced by the nuclear family. A long period of stability in the ceramic tradition, with some changes in technique and forms occurred throughout the Classic era. In modern times we can trace a century of stability with roots that extend back to prehis-panic times. The most drastic changes have occurred in the past 10 years and the process of modernization is accelerating.

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