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The Ethnoarchaeology of Salt Production in the Lake Cuitzeo Basin, Michoacán, México

Research Year: 2003
Culture: Michoacán
Chronology: Prehispanic
Location: Lake Cuitzeo Basin, Michoacán, México
Site: Simirao and Araró

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Abstract

Salt has always been a strategic resource of primary importance. In Prehispanic times salt was used mainly for human consumption, and after the Spanish conquest, it became in addition an important commodity for silver processing and cattle raising. Salt

production and trade in the Lake Cuitzeo Basin are analyzed from the perspective of ethnography, archaeology, and ethnohistory. Contemporary salt-producing sites and methods are described, including the amount of brine and earth used, and the average yield of each *finca*, or salt-producing unit. Modern and ancient techniques and processes are compared, and found to be similar. The "archaeological visibility" of these activities is assessed, to illustrate the archaeological features and artifacts connected with salt making.

Resumen

La sal siempre ha sido un recurso estratégico de gran importancia. En la época prehispánica la sal se usó principalmente como parte de la dieta, y tras la llegada de los españoles fue vital para la minería de plata y para la ganadería. La producción y comercio de sal en el Lago de Cuitzeo, Michoacán, se analizan desde la perspectiva de la etnografía, la arqueología y la etnohistoria. Se describen los sitios contemporáneos productores de sal y los métodos empleados, incluyendo la cantidad de salmuera y de tierra utilizadas, y la producción de cada finca. Las técnicas y procesos productivos de la antigüedad se comparan con los actuales, resultando bastante parecidos entre sí. Se analiza la "visibilidad arqueológica" de estas actividades productivas, para ilustrar los elementos y artefactos arqueológicos relacionados con la producción de sal.

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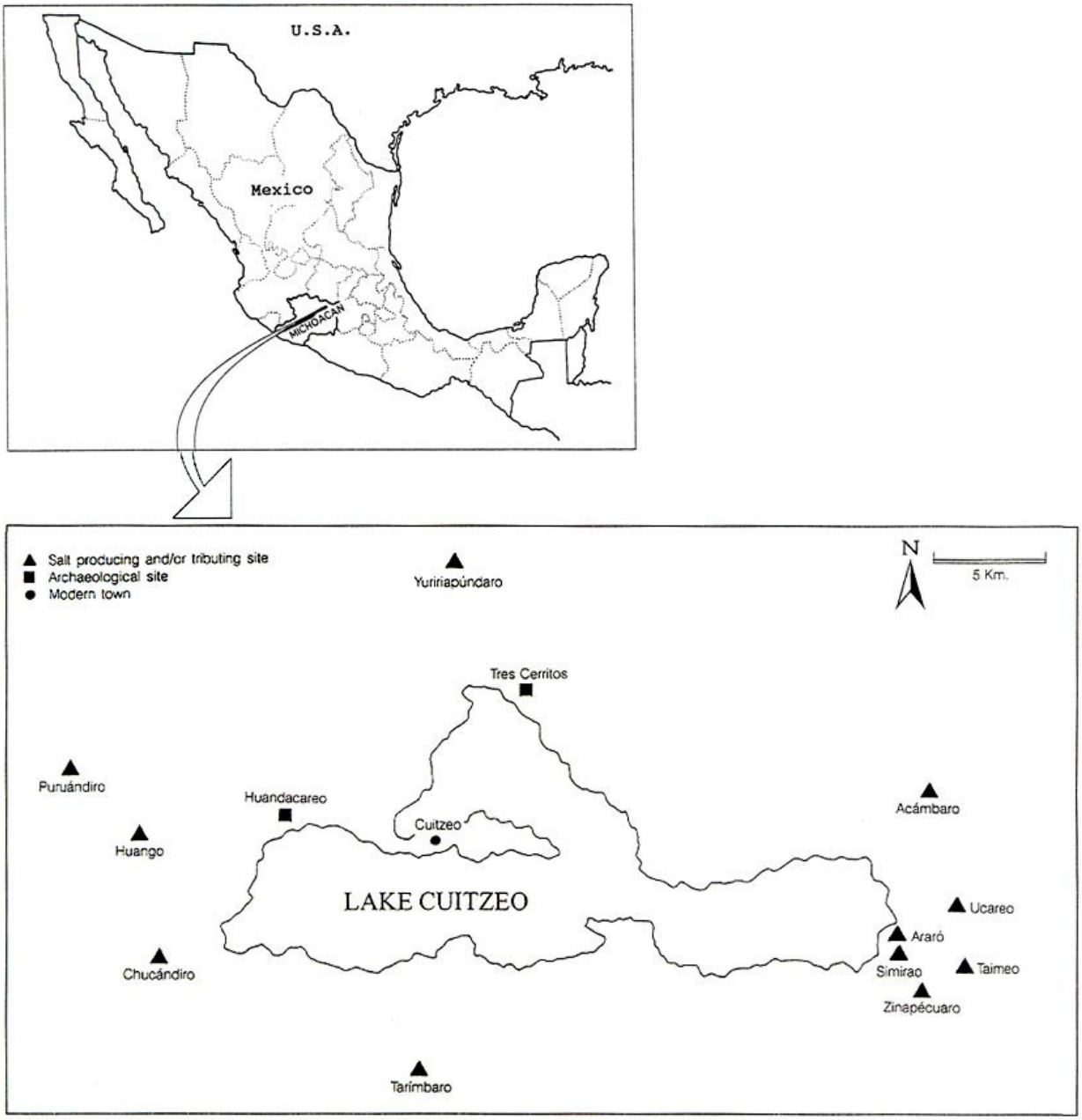

Figure 1. The Lake Cuitzeo Basin, Michoacán, México, indicating major salt-making sites, as well as those towns that paid salt as tribute in the sixteenth century.

Introduction

Common salt (i.e. sodium chloride) was a strategic resource for human subsistence in ancient Mesoamerica. Since at least the origins of agriculture, both in the Old and the New Worlds, salt was always among the most important elements of trade. In the pre-industrial world, salt had several important uses apart from its role in the diet, particularly as a preservative of animal flesh, as a mordent for fixing textile dyes, as a

medium of exchange, and as a principal component in the preparation of soaps and cleansing agents (Parsons 1994: 280).

This study concerns salt production in Simirao and Araró, two towns located within the Lake Cuitzeo Basin, Michoacán, México (Figure 1). This report deals with the latest fieldwork season, carried out between February and June, 2003. This analysis follows an ethnoarchaeological perspective, which is based on the observations of present-day salt-making techniques and processes. The aim is to contribute data and insights that will assist in the interpretation of the archaeological record and to understand Prehispanic salt making.

The primary goals of this study are to document the technical processes and material culture associated with contemporary salt making in the study area, in particular the tools and features used by the saltmakers and their archaeological visibility; and to determine the importance of salt for the cultural development of the Lake Cuitzeo Basin in ancient times.

Salt Production in the Lake Cuitzeo Basin[1]

There are several thermal springs in the eastern end of the Lake Cuitzeo Basin, in a restricted area around the towns of Araró and Simirao. This water, which has a high mineral content, is used for the production of salt. Several canals connect the thermal springs with the saltworks, as the constant flow of water between them is critical for the production of salt.

[1] In order to contextualize the research results summarized in this report, I include a discussion of salt making based on information already published elsewhere (i.e. Williams 1999a, 1999b, 2003).

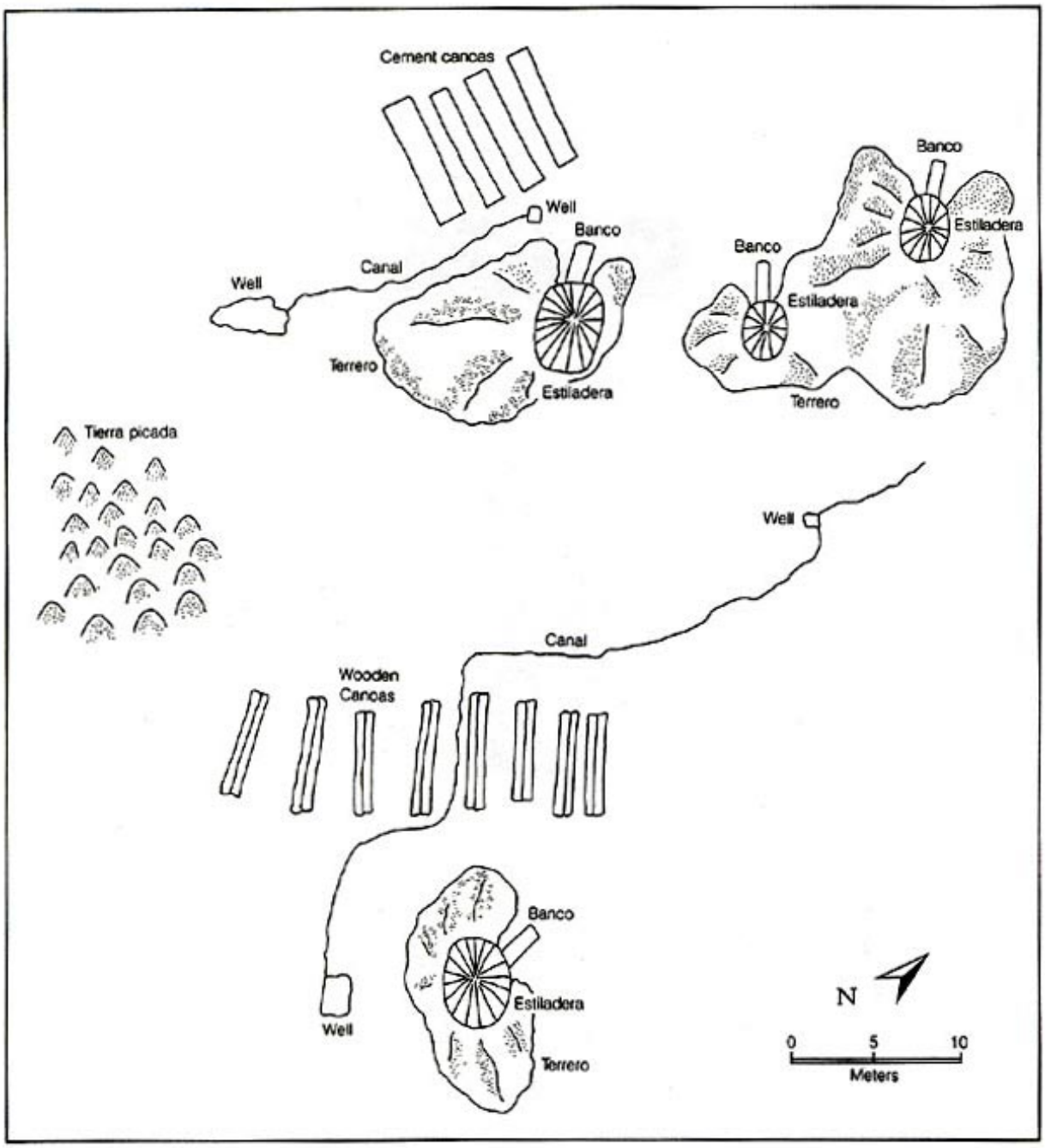

Figure 2. Salt-making unit, known as finca, indicating all features and work areas.

Figure 3. Estiladera, wooden element used to extract brine from the earth by leaching.

Each salt-producing unit in Araró and Simirao is known as a *finca* (Figure 2). The *finca* consists of two or more *estiladeras*, wooden structures that are used as filters to separate the salt from the earth by leaching. These funnel-like structures are oval-shaped at the top, and measure some 1.5 m in height (Figure 3, shown above). In every *finca* there are several *canoas* (wooden troughs, manufactured like dugout canoes, or new ones made of cement) (Figure 4, shown below) measuring between 6 and 10 m in length, where the brine that has been filtered in the *estiladera* is evaporated by the sun.

Figure 4. Wooden troughs, or canoas, used in the solar evaporation of brine.

The tools used by the saltmakers or *salineros* are quite simple, and do not differ from tools used in agriculture or other work, such as house construction: shovels, hoes, and picks to excavate the soil, wheelbarrows to take it to the *estiladera*, buckets to take the water to the *canoas*. The tools used in the past, however, were quite different: a type of sack made of jute fiber called *guangoche* was used to carry the earth, and clay vessels known as *chondas* (Figure 5a, shown below) were used to carry the water within the *finca*.

Figure 5a. Clay vessels, known as chondas, formerly used in the study area to carry water and brine; they have been replaced by plastic buckets.

The process of salt production can be divided into four stages in Araró and Simirao: (1) soils are extracted, mixed and prepared; (2) brine is obtained by leaching the earth in the estiladera; (3) brine is evaporated by the sun in the *canoas* and salt is collected; (4) the finished product is packed and sold.

All activities linked with salt making in the study area are highly seasonal, and carried out by men only. During the dry season–from September to April–work in the *fincas* is carried out more intensely, ceasing entirely in the wet part of the year, when the salineros work in their agricultural fields. Rain makes it more difficult to extract the salt-bearing soil, and the greater cloud cover diminishes solar intensity for evaporation. But more important, during the rainy season abundant fresh water causes the salty soil to "lose its strength," in the words of the *salineros*. During the rainy season (usually from May to September, although it varies from one year to another) the saltworks are idle, and the *salineros* are engaged in other types of work, either inside the Lake Cuitzeo Basin or away from it.

Two types of soil are used mixed together in the process of salt elaboration: *tierra tirada* and *tierra picada*, both of which are found in the *finca*. *Tierra picada* is extracted with a shovel or hoe from the top layer of soil of the *finca*, to a depth of ca. 10 cm. *Tierra tirada* is recycled from previous operations, and once its salt content is diminished after being leached, it is taken out of the *estiladera* and piled on top of the *terrero*, the mound of earth that surrounds the *estiladera*. After a few months, once *tierra tirada* has accumulated to form a big mound (up to three meters high and more than eight meters wide), it is removed with shovels and wheelbarrows, spread out on the floor of the *finca*, sprinkled with salty water from the springs, and is used again after soaking up the salty water for one or two days.

Once both kinds of earth have been mixed in the appropriate amounts, several wheelbarrows of earth are put into the *estiladera* (the amount of earth used is variable, from a minimum of four to a maximum of 24 wheelbarrow loads, each one weighing ca. 100 kg). After the earth has been put in the *estiladera*, water from the springs is poured on top of it (the amount of water used is also variable, from a minimum of 19 to a maximum of 60 buckets), which starts trickling down and falling into the *banco* (a trough below the *estiladera*). A wooden *canoa* holds between four and eight buckets of water (each bucket holds 20 liters), while the new *canoas* made of cement hold up to 14-15 buckets of water. Approximately one bucket of brine is obtained for every wheelbarrow of earth that is put in the *estiladera*, or two buckets if the earth is of very high quality. The final yield is variable, but a medium-sized *canoa* may produce one 65-kg sack of salt every 15 days. Once the water has been filtered through the earth (this process normally takes 24 hours) and the salt has been leached, the earth is taken out of the estiladera and is piled on top of the *terrero*, where it will remain until it is extracted to be recycled and used again as *tierra tirada*. After the brine has evaporated completely in the *canoa*, the crystallized salt is gathered and packed.

According to several informants, in the old days there was a trade network that linked Araró and Simirao with other towns in the region and beyond. Before paved roads existed, salt was transported by muleteers from one locality to another. Furthermore, the *salineros* themselves used to go to the markets and sell their product or exchange it for fruit or other agricultural produce. This lasted until some 50 years ago; nowadays common salt is industrially produced in mass quantities in México, and because of its relatively low price, it has replaced the salt from Araró and Simirao for domestic consumption.

Figure 5b. Pottery fragments found during the 2003 field season. They may have been used in ancient times to store or transport water and brine.

Implications for Archaeology

In the Lake Cuitzeo Basin during Prehispanic times salt, together with many other strategic resources (among others, obsidian, chalcedony, cinnabar, kaolin, rhyolite and opal [Cárdenas 1999]), played an important role in the economic, political and cultural relations between the local inhabitants of the area and its hinterland. The ancient salt-making sites in the area, however, are still undiscovered and undescribed.

Figure 6. Shallow pools, like the ones excavated in the bedrock near Chucándiro, at the western tip of Lake Cuitzeo, may have been used in Prehispanic or Colonial times for the solar evaporation of brine.

To identify archaeological sites that represent ancient salt-making localities, it is important to understand the processes involved in this activity, as well as to know the material remains or traces that these processes leave on the landscape, since salt itself is usually not preserved in the archaeological record. Prehispanic saltworks performed basically the same functions with similar tools as the ones we see in the area today, with stone, wood, clay, and fibers instead of plastic, metal, and other modern materials.

The features and artifacts linked with salt production that we would expect to find in an archaeological situation (Table 1) would be the following: floors used in the preparation and mixing of the soils, filters (pits?), vessels for storing water and brine, and for transporting them within the site (Figure 5b); areas for storing earth; elements for water evaporation (e.g. shallow pools) (Figure 6, shown above), great mounds of discarded earth (Figure 7, shown below), and lastly, "fossilized" canals (Figure 8, shown below) (see also Parsons 1996).

Table 1. Summary of Salt-making Activities and their Possible Archaeological Correlates in the Lake Cuitzeo Basin, Michoacán (compare with Parsons 1996: Table 2).

Activity	Modern Tool or Feature	Ancient Tool or Feature	Archaeological Correlates
Leaching brine	Estiladera	Pits or filtering devices of undetermined nature	Pits; stone alignments; concentrations of leached soil (mounds or *terreros*)
Water/brine transportation	Buckets	Clay pots	Potsherds; whole pots of a particular type
Solar evaporation of brine	*Canoas,* shallow pools	Shallow pools	Stone alignments, lime-coated flat surfaces; masses of large, shallow ceramic vessels
Carrying the salt from the *canoa*	Baskets	Baskets	Textile fragments (preserved by salt)
Moving *salitre* from the lake bed to the *estiladera*	Big sacks	Textile bags or sacks	Textile fragments (preserved by salt)
Scratching the surface of the earth; digging or cutting of *salitre* crust	Shovels	Stone artifacts such as obsidian knives or scrapers	Stone tools with worn surfaces, possibly with salt incrustations
Transportation and storage of crystallized salt	Textile or basketry containers (i.e. sacks, baskets)	Pottery vessels (mass-produced, therefore of low quality)	Potsherds or whole vessels of a "disposable" kind
Temporary residence near salt-making sites	Huts made of branches, thatch, etc.	Houses, workshops, storage facilities	Stone alignments, foundations, domestic refuse concentrations (i.e. lithics, pottery, bone, etc.)

Figure 7. This mound of leached soil, locally known as a terrero, results from the accumulation of discarded earth after each salt-making operation.

Figure 8. This canal is used to take water from the springs to the fincas. The water's high mineral content has "fossilized" this feature.

Final Remarks

Many technological, ecological and cultural changes have taken place in the Lake Cuitzeo Basin since the Spanish conquest, and the present ethnoarchaeological study should be considered in the context of these historical changes for it to be of some use in the reconstruction of the cultural processes that took place in the area in ancient times (cf. Parsons 1989, 1994, 1996, 2001).

The study of present-day production of salt in the Lake Cuitzeo Basin has revealed that some methods and features still in use bear a striking resemblance to what was reported in the sixteenth century (Acuña 1987). The diagnostic features and artifacts discussed here[2] can be used to identify salt-making localities in the archaeological record, thus increasing our ability to detect this activity long after its final product, salt, has disintegrated forever.

[2] See Williams (2004) for a full discussion of the fieldwork conducted during 2003 and its findings.

Acknowledgments

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