

# WORKED BONE FROM THE SITE OF LA MONTESITA (AGUASCALIENTES, MEXICO)

El hueso trabajado del yacimiento de La Montesita (Aguascalientes, México)

MARTA BLASCO MARTÍN\*, NIKLAS SCHULZE\*\*, KENIA HERRERA  
BUENROSTRO\*\* and GILBERTO PÉREZ ROLDÁN\*\*

**ABSTRACT** We present a study of the bone industry from the archaeological site of La Montesita (Aguascalientes, Mexico). This settlement is being studied in the project led by Dr. Schulze and Dr. Pérez Roldán. La Montesita is located in the state of Aguascalientes, and it dates back approximately to the Epiclassic period, from 600-900 AD. The settlement has a semi-sparce distribution, where most of the housing units are located on the Montesita hill, hence the name. We analyzed a set of 24 objects made of bone. Within the set, the presence of awls stands out. Our analysis will focus on both its typological classification and a technological and functional analysis through the observation *de visu* of the pieces, a microscopic study and their comparison. Likewise, we emphasize the distribution of the bone tools in the different spatial contexts of the settlement. This allows us to obtain a global view of the recovered bone industry at the Montesita site, and thus reach a better understanding of the material culture in the North-Center of Mexico —a region of great archaeological value to which little attention has been paid by researchers.

**Key words:** Bone industry, Epiclassic, Technology, Awls.

**RESUMEN** Presentamos el estudio de la industria ósea del sitio arqueológico de La Montesita (Aguascalientes, México). Este asentamiento es objeto de estudio del proyecto dirigido por el Dr. Schulze y el Dr. Pérez Roldán. El sitio se localiza en el estado de Aguascalientes; fechado aproximadamente para el Epiclásico, del 600 al 900 d.C. La distribución del asentamiento es de tipo semidisperso, donde la mayoría de las unidades habitacionales se encuentran sobre el cerro La Montesita, de ahí el nombre del sitio. Se presenta un conjunto de 24 piezas realizadas sobre hueso. Dentro del conjunto destaca la presencia de punzones. Nuestro análisis se enfocará tanto en su clasificación tipoló-

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\* Dep. de Prehistòria, Arqueologia i Història Antiga (Atracció del Talent - VLC Campus), Grup de Recerca d'Arqueologia del Mediterrani, Universitat de València. [marta.blasco@uv.es](mailto:marta.blasco@uv.es)

\*\* Facultad de Ciencias Sociales y Humanidades (UASLP, México). [niklasschulze@yahoo.com.mx](mailto:niklasschulze@yahoo.com.mx); [keny\\_hbuenrostro@outlook.com](mailto:keny_hbuenrostro@outlook.com); [gilbertoperezroldan@yahoo.com.mx](mailto:gilbertoperezroldan@yahoo.com.mx)

Fecha de recepción: 27-04-2018. Fecha de aceptación: 20-04-2019.

<http://dx.doi.org/10.30827/CPAG.v29i0.9762>

gica, como en su análisis tecnológico y funcional mediante la observación *de visu* de las piezas, el estudio microscópico y su comparación. Asimismo, enfatizaremos en la distribución de los útiles en los diferentes contextos espaciales del asentamiento. Todo ello nos permitirá obtener una visión global de la industria del hueso recuperada hasta el momento en el sitio de La Montesita y, por tanto, a través de esta cultura material, acercarnos a una comprensión más detallada de los distintos modos de vida en este asentamiento del centro-norte de México, una región de gran valor arqueológico a la que se ha prestado menor atención por parte de los investigadores.

**Palabras clave:** Industria ósea de hueso, Epiclásico, Tecnología, Punzones.

## INTRODUCTION

The archaeological site of La Montesita is located in the common land of Las Negritas and Los Campos, both found in the municipality of Asientos in the eastern extremity of the state of Aguascalientes, bordering Jalisco, Mexico. In fact, it is in the state of Jalisco, but in the National Agrarian Register Las Negritas is considered to be part of the state of Aguascalientes (fig. 1). The settlement, identified as one of the biggest in the region, was mentioned in several publications, mainly in relation to its rock art (Valencia, 1991, 1992, 1993, 1994).

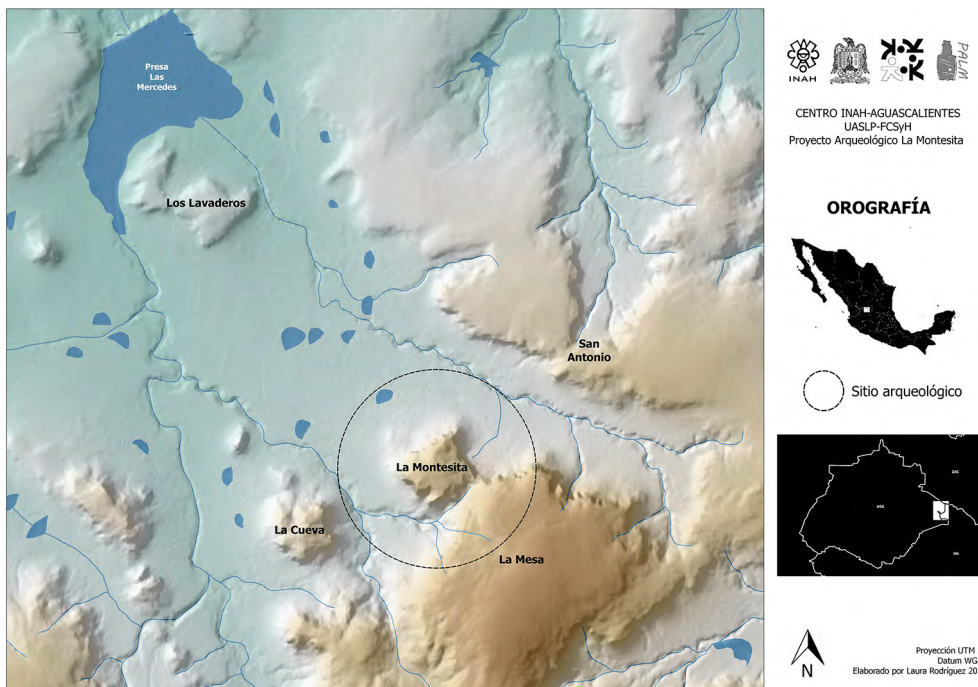


Fig. 1.—Location of the site. Modified from Rodríguez 2017.

In 2011, in response to a report of the discovery of archaeological material, representatives of the INAH office in Aguascalientes surveyed the area and found evidence of intense looting. Around the pits dug by the looters they found fragments of pottery, bones and stone. They also identified remains of structures, some of which were clearly bigger than household units. Since then six seasons of fieldwork have been carried out in the framework of the Archaeological Project of La Montesita (PALM).

The site, which is tentatively dated to the Epiclassic period, offers the chance to learn about the way of life of the societies that were starting to experiment with agriculture and a sedentary lifestyle in the northern borderlands of the cultural area known as Mesoamerica. The use of animal resources, which in this case were bones used as raw material for the production of tools, is an important line of evidence for the relationship between people and their environment. In the central-northern region of Mexico, new explorations that are part of the PALM present us with the opportunity of carrying out studies that promote a better understanding of the dynamics of this osseous industry.

## **SITE AND SETTLEMENT**

The hill found in La Montesita is a rocky outcrop with a maximum altitude of 2246 m a.s.l. In southeast La Montesita is bordered by the elevation of La Mesa, which reaches an altitude of more than 2300 m a.s.l. In the northeast and southeast, La Montesita is framed by seasonal streams that drain the water that flows from La Mesa to the flatland that is now used for agriculture, and then to the dam of las Mercedes. The region is characterized by a semi-dry warm climate with spiny desert forest vegetation over alluvial soil and igneous or metamorphic rock derivatives. Today, this site is a crossing point for shepherds heading to the seasonal water sources.

Following the topographical divisions of the area and the location of concentrations of archaeological remains, the site was subdivided into five sectors that were named alphabetically from A to E (fig. 2). Sector A covers the area between the hill of La Montesita and La Mesa, south and west of this sector, and to the stream located on the foothills of Mt. San Antonio, in the north. Great amounts of pottery (polychrome, plain and fragments of figurines), stone and bone have been found in this part of the site. Some of the bones that were found in this sector were human, and locals call this part of the site “cemetery of the indians”. Two female child burials were found associated with a structure in the excavations. Sector B is the crag known as La Montesita, where ceramics and stone were found. In the archaeological surveys, rectangular structures, a platform, mounds and terraces were located (Rodríguez, 2017). In the entrance to sector B three walls were identified, although, at present it is difficult to establish dates for their foundation. We excavated two rectangular structures that were tentatively identified as a housing unit. Sector B, together with parts of sector D, has the greatest construction volumes. Sector C is the area between La Montesita, La Mesa and the Cerro de las Cuevas,

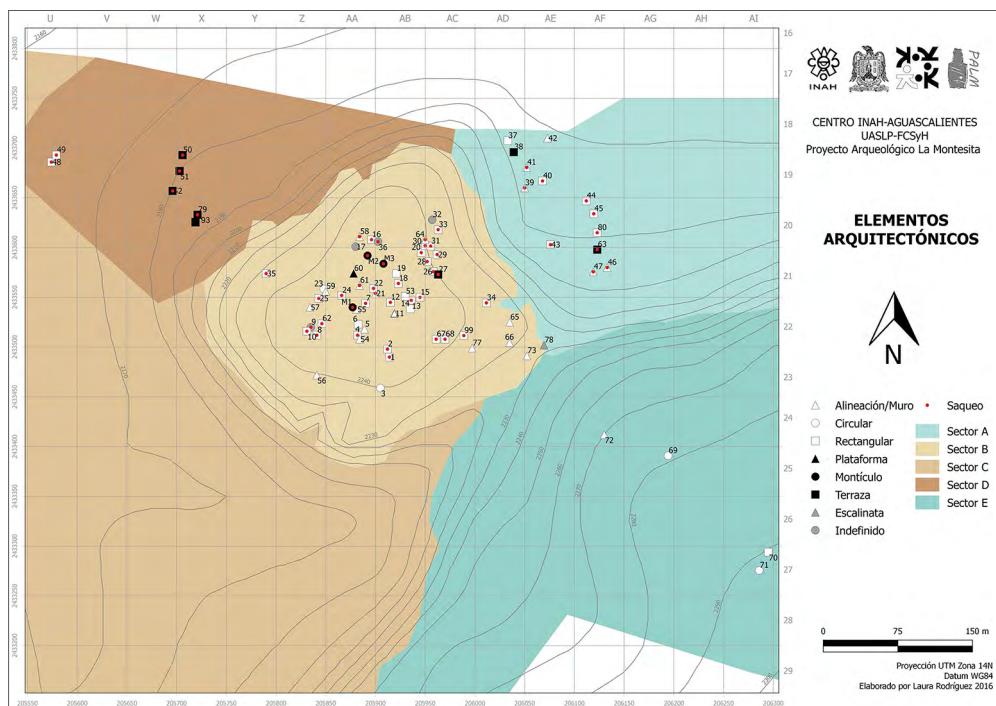


Fig. 2.—Division by sectors of the site. Taken from Rodríguez 2017.

which is located to the west of the sector, where there is a seasonal stream. Apart from some rock alignments and possible structures, the only artefacts recovered were stone. Sector D reaches from the north-western slope of La Montesita to the flatland that presently is used for agriculture. Here, there is a possible terrace, which is marked by a pronounced slope, on top of which some voluminous constructions were located whose use and constructive system have not yet been established with certainty. The sector yielded pottery, stone and bone objects. Together with sectors A, B and C, sector D is bordered to the north by the limit with the common land of Los Campos. Lastly, sector E covers the top of the hill of La Mesa, which makes up the eastern part of the site. Rectangular and circular structures were identified, but the lack of clearly Pre-Hispanic remains in the area casts doubt upon an early date.

In the peripheral area, outside the described sectors, the concentration of findings diminishes as one moves away from the site's centre, but remains of human activity from different periods of occupation were nevertheless recognized.

Even if the site has not been dated independently, the similarity of ceramics between this site and El Ocote (Aguascalientes), which has been dated using the radiocarbon method (Arellano, 2014:99), allows us to propose a date during the Epiclassic period (600-900 AD). The excavations that have been made so far generally do not show different construction stages of the structures, something that

seems to indicate a single occupation phase for most of the site. However, it is not yet possible to tell whether the different occupation concentrations (i.e. sectors A, B and D) are sequential or contemporary, nor whether they represent a social or functional difference.

One of the main challenges for the research of this site is the notable impact of looting in most of the identified structures. Most of the materials found on the surface were left by looters.

## MATERIAL AND METHOD

There is a total of 24 worked osseous objects, 21 of which were made from Cervidae (87.5%) and 3 from Leporidae (12.5%) (table 1). Almost all of them come from sector A, quadrant AF20 (50 x 50 m) in La Montesita, except for piece HT-17, which was located in sector C, quadrant W20. We have not recovered bone or antler remains worked in the other sectors of the site; neither in excavation nor in surface surveys. Excavations in sector A, which took place during the 2011 field season and then continued in 2016, uncovered two infant burials, a delimited structure (structure 80) and possible post holes that would mark the existence of a possible open space west of structure 80 (Pelz *et al.*, 2013). It should always be considered that objects must be understood in relation with the place where they were found (*see* Discussion).

The first step in our analysis focused on identifying the anatomical part of the animal that was used to make the tools. Using the reference collections that are available at the Archaeozoology Laboratory of the UASLP, as well as specialized comparative literature (Cornwall, 1956; Schmid, 1972; Barone, 1976; among others), we were able to determine the anatomical part and, at least, the taxonomic family from which the tools were manufactured. In some instances, we were able to determine the side of the anatomical element, as well as the animal genus and species.

The typological classification of the objects was carried out following previous studies that highlighted the typological variability of the objects that were made with hard materials of animal origin in the Mexican territory (Pérez Roldán, 2005, 2013).

In the technological and functional analysis of these artefacts, both direct observation of the pieces (macroscopic analysis) and microscopic analysis with low magnifications (binocular magnifying glasses of 10X, 20X, 45X) were made. A stereoscopic Amscope T050 microscope was used to characterise the use wear on the objects that still preserve their distal part.

## RESULTS

The taxonomic analysis showed that 21 artefacts were made from Cervidae and three pieces from Leporidae. We were able to document an artefact made on *Silvylagus floridanus*, two on *Lepus* sp., seven on Cervidae and 14 on *Odocoileus*

TABLE 1. CLASSIFICATION OF THE ARTIFACTS ANALYSED

ID	Taxon	Bone	Extraction tech.	Production tech.	Object	Length (MM)	Width (MM)	Depth (MM)
HT-01	<i>Odocoileus virginianus</i>	Left metatarsus	Fracture	Abrasion	Awl	175	13	5,5
HT-02	<i>Odocoileus virginianus</i>	Right tibia	Fracture/cut	Abrasion/Polishing	Awl	82	10	8
HT-03	<i>Odocoileus virginianus</i>	Metacarpus	Indirect fracture	Abrasion	Chisel	47	9	3
HT-04	<i>Odocoileus virginianus</i>	Right metatarsus	Fracture	Abrasion	Awl	73	12,5	4
HT-05	<i>Odocoileus virginianus</i>	Right tibia	Fracture/cut	Abrasion	Tool. Probable awl	87	22	12
HT-06	Cervidae	Right metatarsus	Fracture/cut	...	Tool. Probable awl	53	17	9
HT-07	<i>Odocoileus virginianus</i>	Tibia	Cut	Abrasion	Tool. Probable awl	30,5	13	6
HT-08	Cervidae	Diaphysis of metapodium		Abrasion	Fragment of tool	19	7,5	4
HT-09	<i>Odocoileus virginianus</i>	Metapodium	Fracture	Abrasion	Awl	22,5	6,5	4
HT-10	Cervidae	Metapodium	Cut	...	Tool. Probable awl	33	12	3
HT-11	Cervidae	Metapodium	Cut	...	Tool. Probable awl	35	16	4,5
HT-12	Lepus	Left femur	Fracture	...	Waste	39	14	12
HT-13	<i>Sylvilagus floridanus</i>	Right humerus	Cut	Abrasion	Tool for perforate	25	7,5	5
HT-14	Cervidae	Metapodium	Cut	Abrasion	Rod	40,5	7	5
HT-15	<i>Odocoileus virginianus</i>	Antler	Fracture	...	Pressure flaker	40	13	12
HT-16	Cervidae	Diaphysis of tibia	Fracture/cut	...	Fragment of tool	29	13,5	7
HT-17	Cervidae	Diaphysis of femur	Cut	Abrasion	Awl	28	8	2,5
HT-18	<i>Odocoileus virginianus</i>	Diaphysis of tibia	Grooving	Abrasion	Fragment of tool	46,3	10,6	6,6
HT-19	<i>Lepus</i> sp.	Diaphysis of tibia	Fracture	Polishing	Fragment of tool	42,5	5,5	6,5
HT-20	<i>Odocoileus virginianus</i>	Distal epiphysis of right tibia	Fracture	Abrasion	Fragment of tool	19,6	17,2	16,7
HT-21	<i>Odocoileus virginianus</i>	Diaphysis of tibia	Fracture	Abrasion	Tool. Probable awl	36,5	9,5	4,6
HT-22	<i>Odocoileus virginianus</i>	Diaphysis of radius	Grooving	Abrasion/Polishing	Tool. Probable awl	36,7	15,4	4,2
HT-23	<i>Odocoileus virginianus</i>	Diaphysis of metapodium	Grooving	Abrasion	Tool. Probable awl	67,5	14,3	4,2
HT-24	<i>Odocoileus virginianus</i>	Left antler	Fracture	Abrasion	Pressure flaker-hammer	92,5	25	22,9

*virginianus* (which represent 58% of the total sample) (table 1). These taxa are also represented at La Montesita. However, other mesomammals that were present in the faunal remains, like the *Canis familiaris*, are not represented in the osseous industry. The same occurs with the remains of turtles (*Kinosternon* sp.) and birds (*Zenaida* sp.) which, although present in the unmodified faunal sample, were not used as tools.

Without doubt, something that stands out in the typological classification is the presence of awls (fig. 3), which account for 54% of the sample. The rest of the finished artefacts also have an utilitarian nature. Furthermore, we have been able to identify four fragmented tools (HT13, HT19, HT20, HT21). Given the use-wear present on the active part, we can say that one of them (HT13) was employed in making perforations on soft materials such as skins. Despite being fragmented on the active part, object HT03 may be compared to a chisel. The only two objects that were made on antlers correspond with a retoucher (HT15) and a hammer-retoucher (HT24). Both pieces are in a poor state of preservation (fig. 4). It is usual for retouchers or hammers to be made of deer antlers because of the hardness of this raw material compared with bone (MacGregor, 1985:28).

On the other hand, HT12 and HT14 do not correspond to finished tools, but they are proof of other steps in the operational chain (fig. 4). HT12 is a waste manufacturing material, specifically, a left femur fragment of *Lepus* sp. Furthermore, HT14 is a fragmented long bone rod of an *Odocoileus virginianus*. Despite its poor conservation state, its shape and size suggests that it is an unfinished artefact.

Only one of the pieces is decorated: HT22. It is a fragmented object with a semi rectangular shape, with a convex section. It is made on a radius diaphysis of white-tailed deer. It is carved with zig-zag motifs (fig. 5). Given its shape, it was identified as an awl, although the fact that it is decorated makes it different from the rest of the bone tools at La Montesita.

## Technology

We divided the sample into two technologically distinct groups. The first includes finished objects with manufacture and use-wear marks. This group is made up of fifteen awls, a hammer-retoucher, a retoucher, a chisel, and four tool fragments, totalling 22 artefacts (92% of the entire sample). The second group with two objects (8% of the sample) includes unfinished tools and reflects the manufacturing process, with a rod and waste material. Bone rods can be used to make needles or pins among other things (Pérez Roldán, 2013:119).

We must explore the case of the awls given that they make up the majority of the sample. Awl is the generic term used to refer to an object that is tapered on the distal end. They are usually manufactured with percussion or cutting techniques, and abrasion in order to form the artefact. Among the La Montesita sample there are  $\frac{1}{2}$ ,  $\frac{1}{3}$  and  $\frac{1}{5}$  awls, as well as a  $\frac{1}{8}$  rod. This refers to the cuts that were made to the bone in order to obtain the tool (Pérez Roldán, 2013:118). This means that



Fig. 3.—Awls and fragments of bone awls.



Fig. 4.—Other bone and antler tools and wastes.

in order to obtain a  $\frac{1}{2}$  awl it was necessary to make two longitudinal cuts to the long bone, separating it into two halves and selecting one of the ends to make it pointed. For  $\frac{1}{3}$  and  $\frac{1}{5}$  awls and for the  $\frac{1}{8}$  rod, it was necessary to make three, five and eight longitudinal cuts, respectively.





Fig. 5.—Detail of decorated artifact HT22.

A large majority of pieces (87.5%) show some kind of thermal treatment. Eight of them are boiled, eight of them were burnt at 300-700°C approximately, and five of them were roasted cooked, following the work of Pijoan and collaborators (Pijoan *et al.*, 2010). The rest of the sample, which includes three pieces, does not show any sign of apparent thermal treatment.

Awls are the best preserved artefact in the sample. Some of them present use-wear polish in their distal part (HT01, HT04, HT09). We believe that they could be used for basket making (fig. 6). The awls would be useful in the actions of interweaving, rolling or weaving vegetable fibres or skin stripes in order to make objects meant for different uses such as storage, transport or decoration. This is an ethnographically documented practice among people of the Seri (Northern Mexico)<sup>1</sup>. However, we have to be aware that these kinds of utilitarian objects could be polyfunctional and may have been used to work different soft raw materials.

1. In the collection of osseous worked of the Archaeozoology Laboratory of UASLP there is a seri awl donated by Mrs. Alma Rodríguez. This artifact was made of a left metacarpus of *Odocoileus virginianus* and it was used for the work of *Jatropha cuneata* stem.



Fig. 6.—Experimentation with vegetable fibers for basketry.

## DISCUSSION

Practically all the osseous tools from La Montesita were recovered in sector A, quadrant AF20, a fact that must be highlighted. It should be considered that it could be a special location or that the presence of these bone remains (considering that sector A and especially quadrant AF20 are places where more remains of fauna were found) could be due to the physical characteristics of the natural and archaeological strata. In sector B (structures 67 and 68) we have carried out phosphate, carbon, protein residue, fatty acids, carbohydrate, pH, and chemical

analyses (Campos, 2017) with the purpose of characterising different activity areas (Manzanilla, 1986). Despite being able to identify areas of preparation, dicing and consumption of foods in these structures (among which we can include animal remains) we did not recover a single bone during their excavation. Soil pH conditions could affect the preservation of bones. In the future, it would be good to expand the chemical analyses to other sectors and structures in order to obtain more spatially representative results that, compared with the material culture that was recovered in excavations, could allow us to identify potential differential preservation conditions at La Montesita.

If the accumulation of fauna and worked pieces in bone and antlers found in quadrant AF20 of Sector A does not correspond to different post-depositional conservation criteria, it would be feasible to think that its limited distribution could be related to a specialised area for bone and antler work. Thus, considering the distribution of the osseous utensils in the excavation that was carried out in sector A in 2011 and 2016, we can point out that there is a predominant distribution of artefacts in a possible open space (in which we have documented several possible post holes) located west and south of structure 80 (fig. 7). The fauna concentration is also significantly higher here. It is possible that they are waste materials that were generated by everyday activities, both related to bone usage and work in different raw materials in this exterior zone, or that could have been discarded from the interior of a domestic space (structure 80). It seems probable that the concentration of finished osseous artefacts in this area reflects an ideal working space, with access to light, comfortable space, tools and raw materials.

On the other hand, pieces HT12 (waste) and HT14 (rod), which could give us more information about the possible place at which osseous tools were manufactured were not found in context. HT12 was recovered during a survey of sector A, and HT14 was found in a large looted pile located in the northeast corner of the excavation reticule in the 2011 season. Even so, we consider it possible that bone and antler manufacture was also done outdoors, for the same reasons mentioned above. On the other hand, none of the osseous objects are associated with funerary objects from sector A burials.

Finally, we must point out that in Pre-Hispanic Mexico the practice of working human bones for votive and utilitarian reasons was common but we have not recovered any evidence of worked human bone in La Montesita. Nor have we documented any cultural markings on bone remains from infant burials in sector A. In other archaeological sites in northern Mexico that were inhabited during the Epiclassic (600-900 AD) we have identified tools and blanks made of human bones (Pérez, 2013:34-41). Such is the case of El Ocote (Aguascalientes) where archaeological excavations led to the discovery of 125 artefacts made from bones and antlers. Among them, seven were manufactured with long bones of *Homo sapiens* (Silva, 2017). Another case is that of the 184 human skulls with intentional perforations, cuts, impact and thermal treatment found in the fortified settlement of La Quemada (Zacatecas) (Valenzuela and Santos, 2013). Therefore, it is interesting that this human bone treatment that was common in other nearby Pre-Hispanic sites, is not



Fig. 7.—Excavation process in the 2016 season of structure 80.

present in La Montesita. It would be possible that this absence is due to different ideological practises related to the treatment of the human body, or perhaps because the site is still being excavated and we have not yet found this type of artefact. It would be best to wait and analyze the results obtained in future archaeological interventions.

## CONCLUSION

“Studying the worked osseous industry is understanding how they achieved the transformation of a raw material into an artefact that could be used as a tool or ornament” (Pérez and Robles, 2012: 396). Therefore, osseous tool analysis allows one to understand a work process and the use to which such object was put by the people who inhabited this settlement. That’s the main goal.

In the future, we must compare the findings of objects that were made with bone and antler with the rest of the material culture of the settlement. Despite the fact that specific studies could allow us to gather very detailed information about the type of artefacts, only a global vision will bring us closer to a total knowledge of the ways of life in this Mexican territory that was occupied during the Epiclassic period.

The site of La Montesita suffers from a serious problem of vandalism and looting, so we must make scientific and promotional efforts to reclaim the archaeological and historic investigation in the area. This study highlights the importance of this place, emphasizing a specific part of its material culture: the bone and antler industry.

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