Roca dels Bous: A Review of the Excavation of Summer 2021

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Spain: Roca Dels Bous

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Roca dels Bous, an archaeological site in Catalonia, Spain just outside the small city of Sant Llorenç de Montgai, was discovered in the early 1970's, and has been revisited multiple times since for excavation. The site is situated above the Rio Segre at the base of a large limestone rock shelter, below what is now a popular climbing spot for tourists and locals. This location is understood to have been utilized by various groups of Neanderthals during the Upper Pleistocene, likely as they seasonally and nomadically followed game along the river. Periods of their occupation can be seen through the presence of hearths, as well as in accumulations of bones, stone tools, and other remnants. In general, when attempting to study an archaeological site, understanding stratigraphy, or the layers associated with a specific time period is important in understanding a site's sequence and characteristics of each layer and time period. However, the stratigraphy of this particular site is especially convoluted, rising and falling irregularly in unpredictable locations (Mora et al. 2012). Dividing the site into directional cross-sectioned areas for excavation like a traditional site didn't allow for a clear understanding of the history and stratigraphy of Roca dels Bous. Instead, it is necessary to follow the direction of the irregular layers, applying the principle of superposition in a different way. This is how we started excavating Roca dels Bous and where our learning experience began.

Many of the natural formation processes that occur at Roca dels Bous made understanding and excavating the site more difficult, such as the regularly eroding limestone rock shelter above and constant downhill erosion that has occurred over the history of the site. It also has "two alluvial fans located" on the east and southwest areas of the site (Mora et al. 2014). This, in addition to the site's relatively recent use to shelter livestock and as a climbing destination, has eroded and obscured the site to the point where finding and identifying each

level of occupation is difficult. Because of all these obstacles, the stratigraphy of the site is infiltrated by falling rocks and irregular erosion. Not only does this move around and damage the items within the layers of the site, but it affects the way sediment and artifacts are displaced as they fall through these rock layers over time. Therefore, the levels of the site as we understand them are defined by palimpsests and accumulations of materials such as lithic remains, bones, and hearths, separated by sterile layers. Each layer represents repeated occupation by various groups in relative succession over hundreds to thousands of years that have been homogenized and mixed into a single layer (Mora et al. 2012). During the course of the month, our group excavated and connected N-14 through N-18.

Whenever we found an artifact while excavating that was deemed significant— whether it be a chunk of charcoal, a sizable fragment of bone or a broken flint flake— that artifact was coordinated in the context of the site using a total station. The artifact was left in place, as close to its original positioning as possible. Then, using a prism and the total station, the exact location of the artifact was taken. The artifact — now associated with a location, a number, and a QR code— was recorded via a tablet through the system known as "Arqueo UAB" by number, material, and clear characteristics such as identifiability. By associating each artifact with a QR code, it reduces labeling errors. The QR code serves as a connection to the information associated with it, called the DM. The DM remains the same while the QR is continuously updated (Martinez-Moreno et. al 2016). This allows us to visualize artifacts by their organic or inorganic nature, view trends in the site's stratigraphy based on location and material, and document as much information as possible for each artifact to also allow for different types of possible future scientific analysis.

Largely due to the irregularity of the site, we had to collect data that allows for a variety of visual representations. For analysis, the site was split into North-South and East-West sections, as well as diagonally, in order to provide a better visual of the distributions of the artifacts and thus shapes of the levels relative to each section as we excavated. At Roca dels Bous, we rely heavily on modern technology to give us comprehensive data, analysis of which has the potential to change the way we approach the excavation on a day-to-day basis. Because this type of data analysis is used and can also give us useful visual representations of artifact coordinates, we can better understand how the stratigraphy dips and rises in all directions. This is significant because it affects how we understand the layers of the site while working, and consequently how we follow them as we excavate.

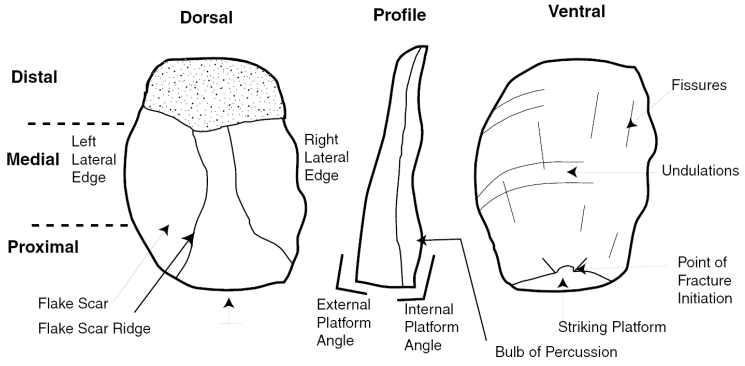
There were many occasions when we observed hearth interstratification or encountered artifacts and hearths outside of a predicted area or our understanding of the shape of a level, forcing us to reassess how we labeled various levels and thus change how we understood the stratigraphy of the site and worked through each level. As a result, it was challenging dividing the stratigraphy into clear levels even with technological assistance. Due to the fact that archaeology is also a destructive practice, it was critical to pay attention and excavate carefully so as to not destroy any artifacts or possible evidence in the site's makeup. This site is also used as a learning opportunity for visitors and students during the year, another reason why clean excavation is important.

Collections of similar items were another factor used in the identification of layers. For example, when I was working in level N-18, turtle bones and seeds were found fairly commonly. When finding bones we could easily identify turtle, it was important that we coordinate the location where we found it and bagged it as an individual item. Seeds were also recorded in a

"non-coordinated" bag or vial that was still associated with a QR code and the same level. Both of these types of findings gave us information about the objects and fauna that may have been common at the site during each level it was occupied, not only revealing information about Neanderthal diet and lifestyle, but also helping us follow levels as we excavate.

Lithic remains that were chosen for coordination at Roca dels Bous mostly included flint and quartzite flakes or debitage. Limestone flakes were rarely documented; while homogenous bits of limestone can be used to make tools, it is a common material at the site and difficult to identify as a tool making material, thus were generally documented as eolits or geofacts. Contrastingly, flint is a common tool-making material, but not a material found naturally at the site. Rather, it had to have been brought from at least 10 miles away. Flint is also a commonly recognized material used during the Mousterian. Because of this, flint encountered during the excavation is thought to have been intentionally transported into Roca dels Bous by Neanderthals either carting ready-made tools or materials to make tools. When flaked, it creates an incredibly sharp and structurally strong edge, ideal for tool use. While excavating, flint can be identified by its texture and shine. It is an unusually homogenous and smooth material that tends to contrast with the rest of the ash and dirt. Due to its homogenous nature, flint also tends to have a very clear flake structure when used to make tools, and the parts of each flake tend to be very defined.

Quartzite is also a common tool-making material found and documented at Roca dels Bous. It is also not naturally found in that site either but is a bit more common than flint. Quartzite can be identified during excavation by its bluish-black, coarse yet uniform texture with particles that also sparkle when sufficiently cleaned off. When flaked, it creates very strong edges that can also be utilized for tools. It also tends to have a distinct, albeit less obvious, structure than flint that is used to identify it as a product of knapping.



Generally I used characteristics such as the bulb structure or the presence of percussive lines emanating from the point of impact, both found on the ventral surface, to identify flakes while excavating. These features, amongst many others, are a result of intentional flaking caused by the impact of a hammerstone, or cobbled rock of some sort, on a striking platform edge of a core material. Key features of flakes used to identify significant lithic finds at the site can be seen in the included image (Shea, *Stone tools*).

Hammerstones were also documented artifacts at the site, identified by their cobble structure and possibly chipped edges. Hammerstones are solid stones that fit comfortably in the hand so it can be used to more easily and precisely create tools. The optional flint-knapping session we attended during the program was also useful in understanding the tool-making process, and thus the significance of each of the lithic types we encountered. It also demonstrated how flakes and retouched tools are created, the type of skill and practice needed to create these stone tools, and what different by-products and debitage created from a flint-knapping session looked like and why.

When significant lithic artifacts were found and coordinated, they were classified in the tablet by their structure within “Arqueo UAB” using a coded system. The codes and definitions are listed in the following table:

BNA	an untouched and natural base, like a raw material (a river rock or cobble for example)
BNE	Volume of the original material has been reduced; like a used hammerstone or a mortar and pestle that shows loss, yet most of the object remains intact

Bn1g	Material is losing volume, but more so than a hammerstone or a used cobble, such as a flint core
BP	Full flakes with identifiable parts, considered the positive to a core's negative loss
BPF	Fractured flake, can't find the platform or point of impact on the flake, can still use the cortex to distinguish the ventral and dorsal if present
BPI	Can identify that the flake is fractured but can't identify key features such as the bulb and the platform.Can't distinguish sharp edges and dorsal and ventral sides
BP2G	debitage, results from flaking activity, very small pieces and fragments

In the lab, we were tasked with cleaning off each artifact and labeling it with the QR code it was coordinated with. This process required us to prep an appropriately flat and ideally ventral surface with a clear polish, attach the code on top, and seal it in quickly with a thin enough layer that doesn't obscure the code. Carbon samples collected in aluminum foil were carefully unfolded without contamination to dry and kept with their QR codes, so that they could later be analyzed for chemical makeup and ideally provide information about what had been burned in the hearths we were unearthing. All of the other artifacts were scanned after labeling to make sure the QR code had been attached appropriately, and were organized to be taken to the computer lab. At the computers, we processed a series of artifacts from Roca dels Bous, as well as a few from a different site, Cova Gran. We scanned each item within Arqueo UAB, which brought up information associated with each code. Information for each artifact was recorded, such as if each item was a bone or a lithic material and it's species or form and material if they could be determined. Most flakes, apart from BP2G findings, also had their dimensions and mass recorded, in addition to certain characteristics such as: if concretion was present, if the item had been exposed to fire, if it had been worn down by water, or if there was patina present in it. These characteristics reveal important information such as age or environment each item was exposed to, important factors when trying to understand the significance of each artifact in place.

We learned and perfected all of these practices and procedures over the course of the month we worked at Roca dels Bous. On our first day, we were instructed on how to use the prism correctly so the vertical and horizontal location of each artifact we found could be coordinated correctly. We were also taught how to take specific measurements of artifacts whose angle and orientation within a level was deemed necessary to record. Throughout the program however, we predominantly used the total station and rarely took orientation measurements of artifacts. When excavating, we were each assigned a location to work, also leaving us up to be moved around the site as needed. I was first assigned to level 16, and sat on top of a wooden board positioned on a few beanbags. The bean bags were there to preserve an exposed level 18 below it without causing damage to that level or any possible artifacts, a common practice at the site.

Over the course of the next few days, we worked through level N-16 and down to the sterile layer below it. There were no artifacts in the sterile layer, but we started to notice a change in sediment color, indicating we had reached the end of the sterile layer and reached N-18, so we changed our angle of excavation. I was moved to excavate the top of a boulder adjacent to my original position to work through the rest of 16 and the sterile layer which we thought made up the sediment above on top of this rock and that level 18 sat below it. While brushing through the ashes accumulated in this area, I found a few materials at first, then hit a layer of mostly ash, some flint and quartzite, then was moved to work on level 18 directly below it. As I understood it, I was moved down to 18 to expand it and understand how it interacted with the boulder. It is also possible that there was a sterile layer above the boulder and 18 did in fact sit below it, or 18 involved the boulder, which we sadly didn't end up removing during the month and have yet to find out what types of artifacts sit beneath it.

Other students worked in their respective sections, following mapped stratigraphic layers on N-14, 16, and 18, and creating reference spots to be able to connect them all. There was a point where level 16 and level 14 met in an unpredicted way, causing us to have to relabel that portion of N-16 to N-14. It also shaped the way we approached the rest of the dig, opening up multiple sections of N-16 to use as more references. This was all necessary to give us a clearer understanding of the site's various stratigraphic layouts.

I ended up closing my section of 18 off and having to call the end of the layer, although I hadn't quite stopped finding materials. My colleagues had reached the sterile layer beneath 18, but I was still finding significant artefacts deeper than what we predicted. I believe this may have been a result of the geography of the site and sediment falling through fallen rocks more in certain spots. At the end of the dig, we opened every section up, removing all sacks and mats to reveal the entirety of the site. The site is used throughout the year for children to learn about Neanderthals and Roca dels Bous, so we began prepping the site for that purpose.

Overall, learning how to excavate for the first time was a challenge that I am grateful to have experienced. Due to the Waldbaum scholarship, I was able to cover my tuition for the program and further my career in archaeology. I learned to improve my brushing and sifting techniques, how to quickly and more easily identify artifacts in situ and how to not miss significant ones before sifting. I also learned what it was like to exist and work for an extended period of time in a culturally unfamiliar area, needing to exist harmoniously with individuals I never met before, which was an overall beautiful experience I am grateful to have had. I do feel like I grew both personally and professionally during my time studying at Roca dels Bous and I feel inspired to continue developing my career in archaeology.

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