

# 1: Paleoanthropology *Analyzing Evidence*

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## *Ice Age Humans*

Humans have lived in what is now Europe for thousands of years. How do we know? They left behind many kinds of evidence. For example, everywhere they lived, they made fires, leaving charred wood along with cut and broken animal bones. Scientific dating of this material (by measuring radioactive changes) indicates that humans began living in parts of Europe over 40,000 years ago. Europe then, up until about 11,000 years ago, was much colder than it is today, with long, icy winters and short, chilly summers. Glaciers covered much of northern Europe and, farther south, glacier ice covered mountainous areas.

Hundreds of caves in Europe preserve various kinds of evidence of early humans, telling us something about how they lived. **But there's a lot we don't know.** You'll look at the evidence from two caves, located very close together.

### Investigation: *Cueva de El Mirón* in Cantabria, Spain

*Study the photographs and other information that follows. Work with one to four others to infer the ways the humans who used the cave possibly obtained all they needed to live—food, water, protection from cold, etc. List your conclusions.*



The cave floor is about 260 m. (850 ft.) above sea level, about 21 kilometers (13 miles) from the northern coast of Spain, and 45 m. (150 ft.) above the stream in the valley below. The opening in the rock—the mouth of the cave—is about 13 m. (42 ft.) high, 8-16 m. (26-52 ft.) wide. The cave extends 260 m. (850 ft.) into the rock, but only about half this distance is the cave large enough to be easily accessible. The mouth of the cave faces west.

(This and following site photos by Antuan Ayllón, published at <http://donsmaps.com/miron.html>.)



<http://www.dailymail.co.uk/sciencetech/article-3021243/Mystery-Red-Lady-El-Mir-n-19-000-year-old-bones-stained-sparkling-blood-like-paint-baffle-archaeologists.html>

The cave entrance is in the rock-faced steep mountainside above the point where two streams flow together, near the town of Ramales de la Victoria.

Scientific dating of bones and charcoal from fires in the cave shows it was first occupied by humans about 41,000 years ago. Most of the evidence of human occupation dates from between about 27,000 and 11,000 years ago, though it was also occupied more recently.

Based on analysis of pollen in dated sediments, during the Ice Age the valley near the cave was mostly open grassland, with scattered evergreen trees, and a few birch trees.

Some evidence indicates that the cave was only occupied for a limited time each year, and was not used during cold weather.

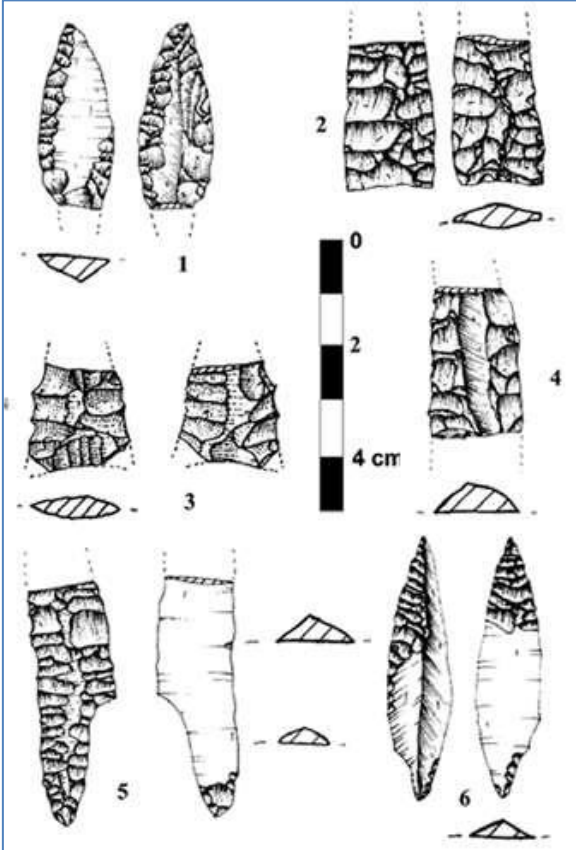
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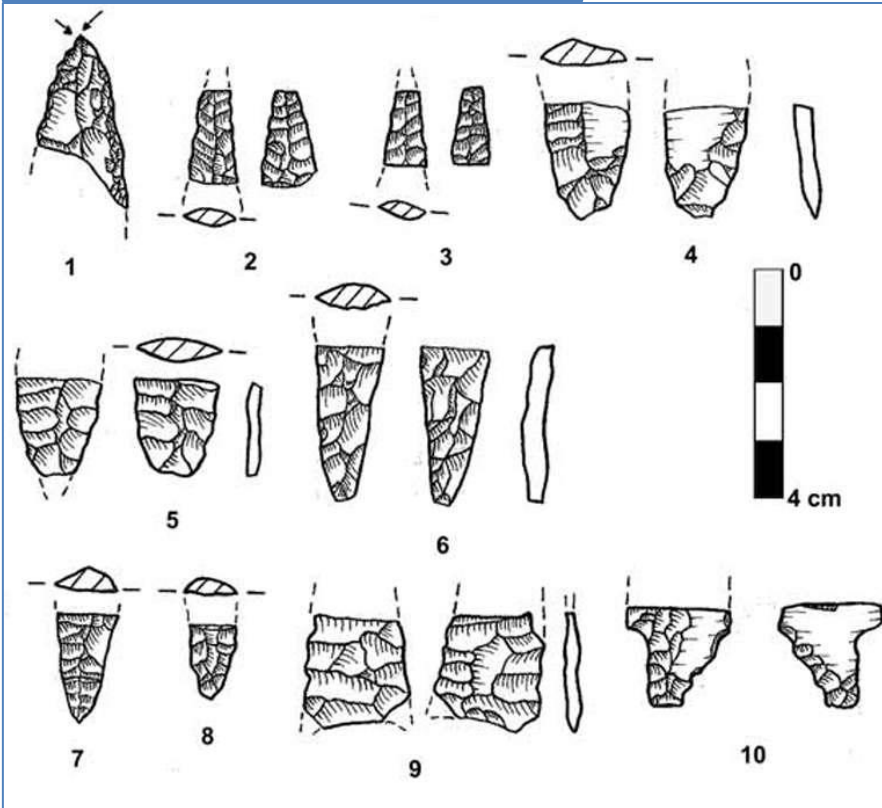
In the view above, the mouth of *El Mirón* is where the white arrow points, just above the center. The second cave you'll investigate (blue arrow), opens about 40 M. (125 ft.) above *El Mirón* on the steep rocky hillside. Below: View from the cave mouth. (*El Mirón* means "the watcher.")

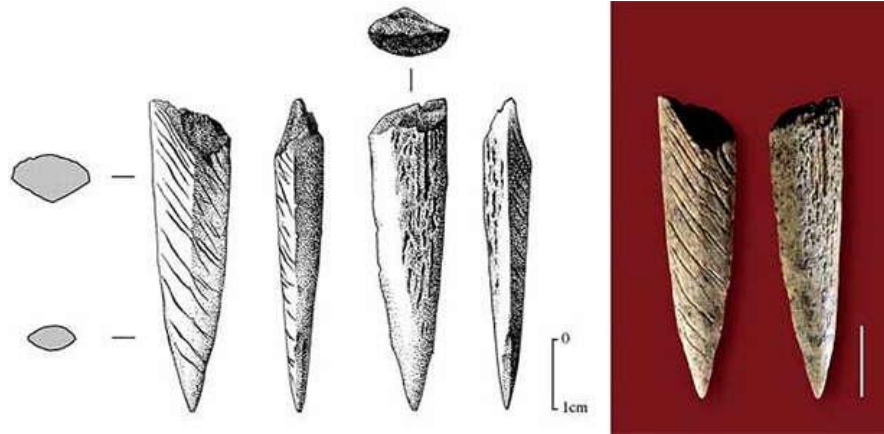




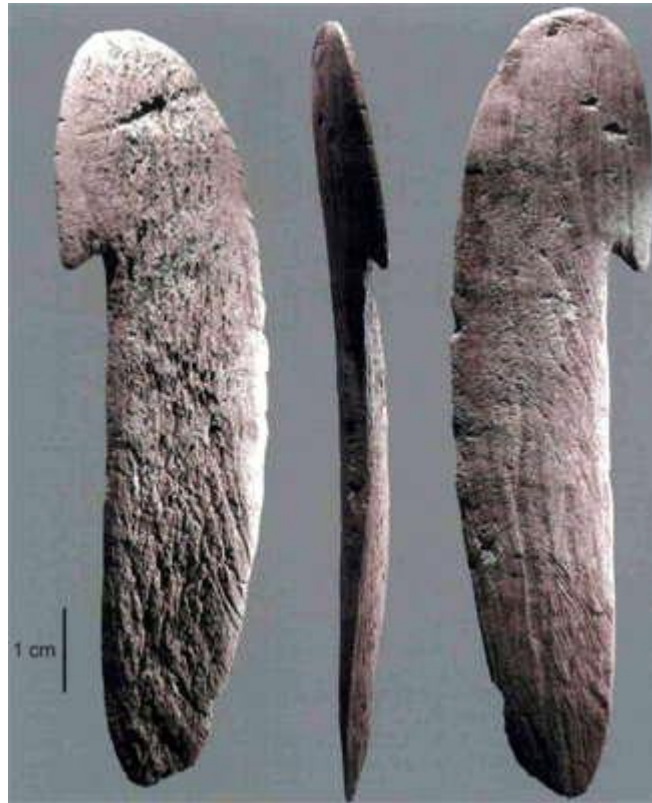
Drawings of two groups of objects found in the cave. Material: flint, with flaked surfaces. Note that most drawings show front, back and cross-sections of each object. The cave also contained many flint flakes and cores from which flint tools were split.

Straus, L., Gonzales Morales, M., 2009: A preliminary description of Solutrean occupations in El Mirón cave (Ramales de la Victoria, Cantabria), *Munibe (Antropologia-Arkeologia)* n° 60 117-137. Reprinted in <http://donsmaps.com/miron.html#reference>





Above: Drawings and photo of two points shaped from deer antler. Below: Three photos of another object, also shaped from deer antler. (Photos: M. González Morales, drawing by P. Burgeño)



In articles about this site by archaeologists, the lower object is called a “spear thrower” or atlatl (at-LAT-ul). But is it? (Experts are sometimes wrong.) Most spear throwers have a hook like this to fit in a notch in the back end of the spear shaft, but are much longer.

*If possible, figure out a way this tool either would be helpful in throwing a spear faster, farther, or more accurately, or else used for some other purpose.*

Below: objects formed of seashell found in *El Mirón*. The straight pieces are hollow tubes, fragments of shell from sea mollusks (*antalis*), called “tooth” or “tusk” shells. These shells are nearly straight, rather than coiled like those of most mollusks and snails.

([https://www.academia.edu/5302506/The\\_human\\_occupations\\_of\\_El\\_Miron\\_Cave\\_Ramales\\_de\\_la\\_Victoria\\_Cantabria\\_Spain\\_during\\_the\\_Last\\_Glacial\\_Maximum\\_Solutrean\\_period](https://www.academia.edu/5302506/The_human_occupations_of_El_Miron_Cave_Ramales_de_la_Victoria_Cantabria_Spain_during_the_Last_Glacial_Maximum_Solutrean_period))



*What might these objects be used for?*

Other materials and objects found in the cave:

- Much evidence of fire—wood burned to black charcoal residue in shallow firepits
- Large quantities of bones of deer. These bones are jumbled together, and many of the large bones are splintered. (Note that bone marrow is highly nutritious.)
- Some ibex (wild goat) bones, mixed in with the deer bones
- Fish bones (Atlantic salmon). Note that adult salmon live in the ocean, but migrate up rivers to spawn in the fall.
- Round sharp-pointed hard pieces of bone, 2 mm diameter, apparently broken and originally longer; one fragment has an “eye” like a sewing needle.
- Deer scapula (shoulder blade) bone, engraved with the image of the head of a deer (All deer bones are from “red deer,” the common variety in Europe then and now.)
- More than 3500 rocks showing cracks and surface changes caused by heating them very hot in a fire, then dropping them into water
- Human skeleton covered with a large quantity of red ocher pigment, buried far into the cave. The bones are those of a well-formed woman about 40 years old, who lived a healthy life. Burial occurred about 18,700 years ago. When the grave was first excavated, in 2010, the ocher was in the form of bright, sparkling crystals, but the sparkle has since dulled from exposure to air. (Red ocher is a brightly-colored soft iron ore found in pockets in stone, easily ground into powder. A known source of red ocher is about 20 km. from the cave.)

*In your conclusions, try to consider the importance of each item in the list above. You'll be doing some guessing, of course, but “hypothesizing” is an important part of science.*

Some materials (stone tools, for example) stay around for thousands of years, other substances used by humans decay and disappear.

- (1) *What materials used by humans fall into the “disappearing” category?*
- (2) *Why do you think most Ice Age human evidence is found in caves?*
- (3) *How might this affect our ideas and conclusions about Ice Age people?*

Wild ibexes in Spain ►  
(Photo by Howard Brady)



## Investigation: *Cueva Covalanas*

The second cave opening is only 40 meters (125 ft.) from the mouth of *Cueva de El Mirón*, higher up on the steep limestone hillside. Inside the opening the cave splits into two parts, but only one shows signs of Ice Age human activity.



There's no evidence that humans ever resided in this cave. Inside, too far to be seen with natural light, there are 22 paintings done at least 10,000 years ago, in red ochre paint. Most are of red deer hinds (females), but also one horse, one aurochs (extinct wild bull) and one stag.

Photos from <http://donsmaps.com/miron.html#reference>



Paintings of animals by Ice Age humans, many of them done with great skill and artistry, are in over 300 caves in Spain and France.

***With other members of your work group, hypothesize about possible reasons these humans made cave paintings of animals, and record your ideas to present to other groups.***





The buried remains of the woman described earlier were covered with red ochre, and red ochre was used to make the paintings. ***Why might the color red be important to these people? (What else in their experiences was colored red?)***

### Follow-Up: Survival Today

Unless you happen to live on a farm, it's likely that very little of what you need and use to survive—food, clothing, shelter and more—is produced by you or your family.

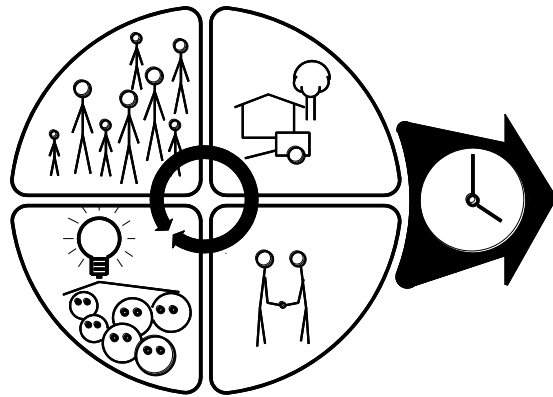
***Choose one food item and a piece of clothing that's important to you, and identify (as far as possible) their sources, the production processes they've gone through, locations the items or their materials have been, and the ways they've been transported. Record your findings in your journal.***

### Follow-Up: Why Create Art?

Art was and is an important part of human life almost everywhere, now and throughout history. Paintings by famous artists sell for millions of dollars. Most homes and public buildings have art of some kind hanging on the walls. We don't know for sure why cave art was painted. But why do people create and use art now?

***Interview at least two adults who are serious art lovers, preferably people producing, distributing or collecting art, and find out why they think art is an important part of life. Which of their reasons do you think might explain ancient cave art?***

***Prepare a report (written, video, slideshow, graphic, etc.) that shows what you've found from your interviews.***



## **For Teacher/Mentor—Overview:**

The rationale for *Investigating World History*, and general procedures recommended for the course are described in the “Overview for Teachers and Mentors.”

<http://www.marionbrady.com/worldhist/00Teacher-MentorOverview.pdf>

### *Getting started*

This unit introduces some of the fundamentals of active learning. The transition from conventional narrative textbook-based learning to active learning may be difficult for some students—particularly the ones that coped with passive learning effectively. We’ve heard students ask, “Why don’t you just tell us what you want us to know?”

To ease this transition, consider using one or both of the introductory activities suggested in: <http://www.marionbrady.com/Americanhistory/AdditionalNotes.pdf>.

**Co-author Ignacio Carral suggests that with some learners (particularly those who may need a boost to their motivations), turning the activities around and starting the unit with the “here and now” Follow-Up activities (p. 9) may be an effective approach to this and later units.**

### *Investigation: Cueva de El Mirón in Cantabria, Spain*

The first investigation isn’t easy. It will require real thought and insight, and this can be enhanced by working cooperatively with others. One problem that learners may recognize is that time and nature have destroyed tools and materials that were important in the lives of Ice Age people.

For example, if learners haven’t already considered it, you might bring up the subject of water. For people living in the cave, the likely source was the stream at the bottom of the valley below. As the learner materials indicate, many rocks within the cave show signs of being heated in a fire, then dropped into water, probably as a way of cooking meat or rendering marrow from bones. The people must have had a way to carry water from the stream up the trail to the cave, but there’s no evidence of how this was done. Other containers must have been used for cooking by boiling using heated rocks. Did they make and use containers of animal skin with seams waterproofed using evergreen tree gum? Or containers of birch or other tree bark, similarly waterproofed? One or both of these is possible, even likely, but there’s no way to be sure.

Note: Water could have been available within the cave. The article cited for background information on the next page states: “To this day, after intensive rains, especially in winter, rivulets of water (presumably infiltrating through the ceiling of the inner cave) run down the steep colluvial-alluvial ramp to the eastern end of the Corral area.”

One source suggests that the hot-stone boiling technique was used to render the fatty marrow from bones. They then may have put the marrow into cleaned intestines for preservation to be used later, perhaps as a high-calorie food during winter. That “sausage” hypothesis is certainly possible. The resourcefulness and ingenuity of early humans shouldn’t be underestimated.

The cold climate made the use of protective clothing essential. Articles were almost certainly made of animal hides, but functional clothing requires the hides to be shaped

and seamed. The presence of bone needles suggests the likelihood of garment seaming, but direct evidence is missing.

The only evidence of the diet of these people suggests they ate meat and fish obtained by hunting and fishing, but it seems likely that at least part of their diet was wild plants. The evidence of this, if true, is also missing, so what remains is probably misleading, biased by its permanence.

Even the evidence for life in caves may be misleading. The *El Mirón* people likely spent much of the year near the seashore, including the winter months, living in other caves or perhaps in above-ground shelters of some kind. Evidence of this hasn't been found, perhaps because it is now underwater. Sea level during the Ice Age was much lower. There is some indication that during this period the Gulf Stream followed a more southerly path than it now follows, and may have warmed the northern Spanish coast significantly, tempering Ice Age winter weather near the shore.

Other people living at the time may never have ventured into caves, but the data are biased. The caves have sheltered and protected evidence of humans far better than similar potential evidence of human activity above ground, which could be easily obliterated by exposure to weathering, erosion and other degradation.

### *Investigation: Cueva Covalanas*

The *Covalanas* cave paintings were done by mixing red ochre ground into powder with some other substance (egg? urine? animal blood?) to form liquid or paste paint. The paint was apparently applied by the artist dipping a finger into the paint then applying it to the cave wall in dots, often spaced close enough to form a continuous line. It is possible that a single individual created all the paintings in this cave, using the flickering light from a clamshell lamp that burned oil rendered from salmon or fatty deer marrow.

The color red almost certainly had special, perhaps religious significance. Besides ochre, red would have been unusual in their lives except in two places: The skies at sunrise and sunset, and human and animal blood. Symbolic/magical control of the primary food source, to ensure success in hunting, may underlie the urge to create paintings.

For more background information:

[https://www.academia.edu/5302506/The\\_human\\_occupations\\_of\\_El\\_Miron\\_Cave\\_Ramales\\_de\\_la\\_Victoria\\_Cantabria\\_Spain\\_during\\_the\\_Last\\_Glacial\\_Maximum\\_Solutrean\\_period](https://www.academia.edu/5302506/The_human_occupations_of_El_Miron_Cave_Ramales_de_la_Victoria_Cantabria_Spain_during_the_Last_Glacial_Maximum_Solutrean_period)

Note that this article only deals with occupation during one early period, and the cave has additional artifacts from later occupation.

### *Follow-up investigations*

We believe that learning is most meaningful when what has been learned is applicable “right here, right now.” This both motivates learners and reinforces what’s been learned. For this reason, we include follow-up activities that focus on aspects of learner’s lives.

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World history unit links: <http://www.marionbrady.com/WorldHistory.asp>.