

There are many other factors which may play a role in producing both complex and constant-diameter stalagmites. The degree of saturation of the drip waters may well have an influence.

For a fine discussion of speleothem architecture, see Chapter 7 of Fairchild and Baker (2012). The book's diagrams and images are available online.

References

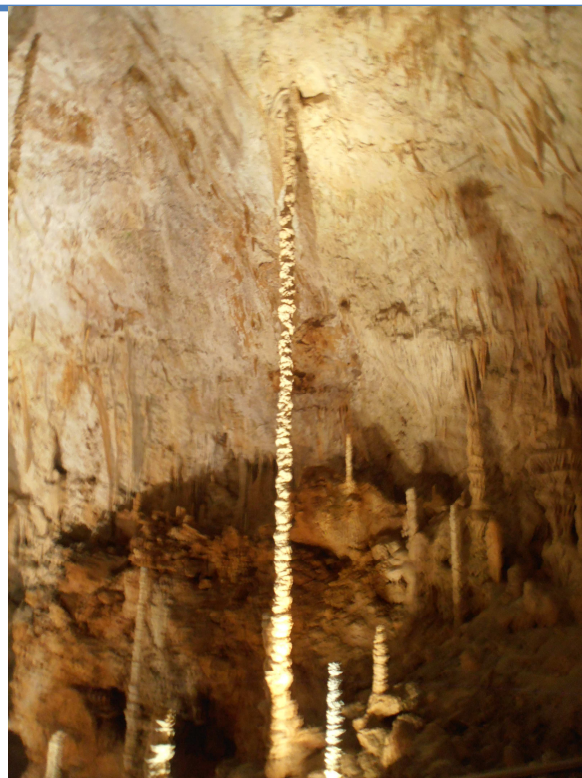
Curl R, 1993, Minimum diameter stalagmites, Bulletin of the National Speleological Society, 35:1-9

Fairchild, Ian J. and Baker Andy, 2012, Speleothem Science: From Process to Past Environments, Wiley-Blackwell.

{Wonderful reference!!}

Parmentier J, Lejeune S, Maréchal M, Bourges F, Genty D, Terrapon V, Maréchal J-C, Gilet T, 2019, A drop does not fall in a straight line: a rationale for the width of stalagmites. Proc. R. Soc. A 475: 20190556. <http://dx.doi.org/10.1098/rspa.2019.0556>

{Andy B can send a pdf to anyone interested on request (please e-mail a.baker@unsw.edu.au).}



Column, Aven D'Ornagac: Tim Moore

Visits to ancient cave art sites in France

Tim Moore

For several decades, I have been fascinated by the story of the discovery of the Palaeolithic cave art at Lascaux and had promised myself that, should the opportunity arise, I would like to visit. This interest was compounded by the broadcasting on SBS of Herzog's documentary entitled the *Cave of Forgotten Dreams* about the Neolithic cave art discovered in the Chauvet Cave near Vallon-Pont d'Arc in the Ardèche Gorge. Indeed, several years later, my family and I went whitewater kayaking down the Ardèche River past the location of the Chauvet Cave.

As time went on, I read with interest of the intention to make an appreciation of the beauties of the Chauvet Cave available to the world in a fashion that preserved integrity of the cave itself – with this to be achieved by creation of an replica with associated interpretation and educational facilities. The complex for this, known as Chauvet 2, was opened in 2012. I mentally put Chauvet 2 and Lascaux on my “bucket list”.

A visit to France for December 2019/January 2020 to have Christmas with my eldest daughter and her family provided an opportunity for me to fulfil these desires. Study reasons for my youngest daughter's HSC in 2020 meant that she and her mother would leave me and my 15 year old son (who shares my interest in caves and caving) with 10 days in France to indulge my desire to visit Lascaux and Chauvet, amongst other locations.

With careful planning, although these two sites are some 600 kilometres apart (going “the long way” via

Carcassonne and Rennes-le-Chateau), I crafted an itinerary that permitted us to visit them both as well as tick off several other locations on my “bucket list” unrelated to caves (not to be dealt with in detail, but, for those interested in the “*Jesus' bloodline still exists in France*” conspiracy theory underlying Dan Brown's *The da Vinci Code* and its thematic basing on the conspiracy theories in the book *The Holy Blood and The Holy Grail*, a visit to the small hilltop village of Rennes-le-Chateau is fascinating).

As part of our cave related itinerary elements, I included a visit to L'Aven d'Ornagac (enabling me to contribute a photograph to the Andysez above and to interview my 15 year-old son for the purposes of the piece following this one about his adventure caving at this site).

To round off our cave related itinerary elements, I included visits to Grotte de Font-de-Gaume, a Neolithic cave art site near Lascaux, and to La Roque Saint-Christophe, in the Vézère River valley, used as a human habitation site from the Neolithic period to 1588. Grotte de Font-de-Gaume is described in this article and a short piece about La Roque Saint-Christophe will be published in the June journal.

Before commencing my description of the three sites we visited, there are some preliminary observations to be made. First, as a matter of practicality, photography is not permitted in any of them. While, for Chauvet and Lascaux, the reasons for this are practical (as flash photography would not damage the reproduction of the artwork, but would it significantly inhibit the visitor experience), at Grotte de Font-de-Gaume, it could damage the pigmentation of the art itself.

All three locations have images available on their websites. At each location, consent was given to reproduction of those images.

Second, in my preparation for the trip, I had read an article published in *The Guardian* in April 2015 savagely criticising the appropriateness of the visitor experience at Chauvet 2 because of its lack of authenticity and advocating that the only way to get an appreciation of Neolithic cave art was to visit a site where access was available to view the originals in situ. As will be obvious from what follows, I reject this proposition.

Both Chauvet 2 and Lascaux 4 provide not merely an opportunity to appreciate the beauty of the art itself (and the sophisticated skills that those creating it needed to employ) in a fashion that avoids damage to these precious World Heritage sites, but also the range of additional educational material provided in each complex (particularly the school group oriented educational materials and activities) means that these two facilities provide, in my view, extraordinarily valuable cultural and educational experiences.

That is not to say that my son and I did not find the opportunity to get within a few tens of centimetres of original Neolithic art in Grotte de Font-de-Gaume equally fascinating and an experience of a different but still enriching type.

It is appropriate to note, before embarking on a detailed description of either Chauvet 2 or Lascaux 4 that neither Chauvet Cave nor Lascaux Cave were habitation sites. Each of them appears to have been visited over quite long periods of time by the artists who have decorated the walls of each cave. This superb artwork is sufficiently deep in each of the caves that it must have been carried out using burning torches as no natural light reaches any of the artwork locations in either cave.

The second point that is to be made is that, in each instance, many elements of the artwork can only have been completed by more than one artist with two or more working in teams. This is evident from the fact that many of the artworks are at levels higher than could have been accessed by standing on the floor levels (as they were at the time of the painting).

A third point of relevance is that the artists took advantage of the leans and twists of the walls of each cave to import perspective and to convey elements of movement of the subject being depicted. Although there is some commonality of the animals depicted in each of the caves, there is a distinctly different emphasis in the number of animals of the various species that have been painted.

Finally, it is appropriate to note that, in each cave, the paintwork is not monochromatic but uses different crushed rocks of various oxides to obtain the colours (with smudging and shading also used to convey perspective and depth). Because none of the artwork used vegetable based materials, dating has had to rely on other artefacts such as animal bones.

Although the artwork at Lascaux Cave had been regarded as amongst the oldest cave art (being dated to approximately 20,000 BCE), dating of the artwork in Chauvet Cave now knows it to be from approximately 30,000 to 32,000 BCE – pushing back our cultural knowledge by some 10,000 thousand years or so.

It is, perhaps, trite to say it but the sophistication of the images in each of Chauvet Cave and Lascaux Cave coupled with the skills that were necessarily involved in their painting means that those ancient artists cannot be regarded as being unsophisticated primitives. To regard them so is to seriously underestimate and undervalue what had been achieved by them in each of these caves.

Finally, to round off this rambling introduction, although our visit to Lascaux 4 was fascinating, we had a minor twinge of disappointment that we were unable to visit Lascaux 2 – as it is only open in spring and summer for the major tourist visiting season each year.

Chauvet 2

Chauvet 2 is perched on a ridge line some 4 km to the east of Vallon-Pont d'Arc. There are, essentially, three educational aspects to the activities carried out on this site's campus. They are the reproduction of the Chauvet Cave; an educational facility dealing with the life of the Aurignacian people who had painted the decorations within the Chauvet Cave; and a series of workshop facilities within which various learning experiences pitched at an older primary or early secondary school student level that related to various aspects of the lives of the Aurignacian people.

My son and I visited the reproduction of Chauvet Cave; visited the displays about the lives of the Aurignacian people; and went in, for a short period of time, to one of the workshops being conducted for young French school students. The workshop was about the creation and use of fire in Neolithic society. It is appropriate that I describe a little of each of these activities.



The building housing the cave replica. Photo: Grotte Chauvet website

Visiting the Chauvet Cave replica site

We visited at the tail end of the winter (Christmas) French school holidays with an external temperature at or below zero during most of the day (without taking wind chill into account!). All visits through this facility are conducted in small pre-booked groups.

Our visit was on a Friday and the tour groups were pretty well booked out throughout the day, but primarily comprised adult participants. Booking is available online or at the site and, according to our guide, usually sells out weeks (and sometimes months) in advance in high season. We booked the afternoon before our tour the following morning.

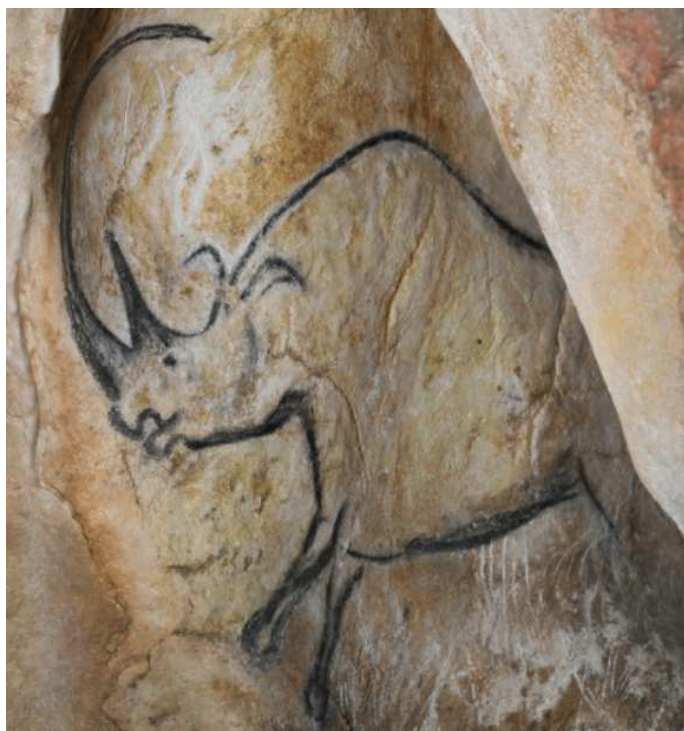


Photo: Grotte Chauvet website

Each tour takes approximately an hour. The tours are conducted in French, but the facility utilises quite advanced technology for those who need information in other languages. The English guiding, through headphones, operated on a basis whereby each of the points where the tour guide was stopping to give a presentation to the remainder of the group (of some 10 other people), our receiver sensed where we were in the facility and delivered us an appropriate English commentary for that location.

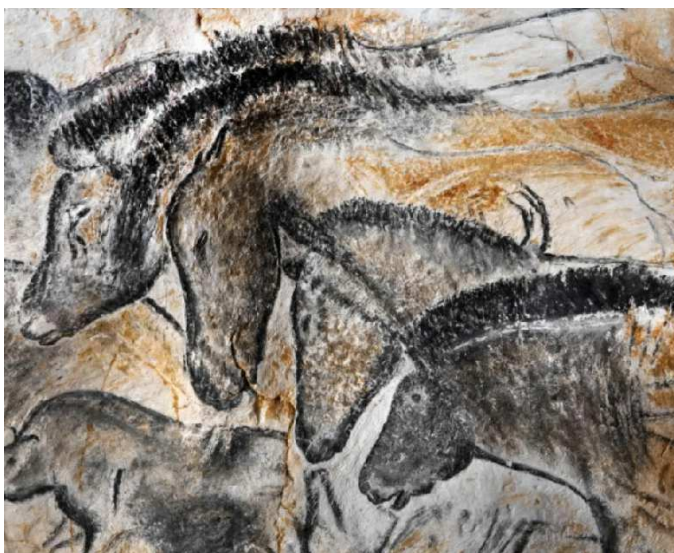


Photo: Grotte Chauvet website

The Aurignacian Gallery

Visiting this gallery commences with an audio-visual presentation which must be watched before accessing the display area. This comprises a series of dioramas with comprehensive multilingual explanatory material and display cases depicting cultural materials or faunal relics that have been discovered in the Chauvet Cave or in the local region (where these relate to the Aurignacian people). This facility was well presented and incorporated a comprehensive explanation of the various elements of the display.



Photo: Tim Moore

School education facilities

There were some three or four workshop rooms available for conducting the more intimate and specifically focused educational activities for younger people.

My son and I sat in on the workshop concerning Neolithic use of fire, a workshop that was conducted despite the fact that there were only four children wanting to observe. Although my French language skills permit me to operate at survival level, they did not enable me to follow the full detail but I understood sufficient to know that it was comprehensive and pitched at level appropriate to the young people participating.



Photo: Tim Moore

Lascaux 4

The Lascaux Cave complex is located on the outskirts of a small town named Montignac on the Verzere River (a tributary of the Dordogne).

The present, major visitor facility is known as Lascaux 4. How, you might ask yourself, does Lascaux get to 4 while Chauvet is only 2? The answer is because Lascaux has undergone greater evolution of its visitor facilities since the decision was taken in 1963 to close the Lascaux Cave proper to public visitation.

Public visitation had been taking place in Lascaux Cave proper since July 1948. It was only after some 15 years of direct access that the potential for degradation as a consequence of regular, comparatively high frequency (although regulated) actual visitation placed the artwork values of the Lascaux Cave in danger of being damaged. As a consequence, in 1963, it was decided that Lascaux Cave should be closed and a replica constructed comparatively nearby on the ridge to the south of the town where Lascaux Cave is located. This replica of Lascaux Cave, opened in 1983, is known as Lascaux 2. As earlier noted, it is still operational as a tourist facility but is only open during an extended tourist season from approximately mid-April until the end of September. As we were visiting in midwinter (early January), we were unable to visit Lascaux 2.



Photo: Lascaux 4 website

We were also unable to inspect anything associated with Lascaux 3. This is because Lascaux 3, a comparatively recent addition to the Lascaux Cave complex, is an itinerant exhibition that tours schools in France to expose them to the beauties of Neolithic cave art and the lives of the Neolithic artists.

Lascaux 4, however, is a modern tourist facility opened in 2016. Like Chauvet 2, it is a replica precisely mirroring important elements of Lascaux Cave. Unlike Chauvet 2 where the elements of that complex are spread across a campus of some 10 hectares, all the elements of Lascaux 4 (including a quite splendid restaurant) are in a single building. We arrived late in the morning on a Tuesday just after the conclusion of the French winter school holidays. Several school groups were present, undertaking school excursions.

Access to the reproduction of Lascaux Cave is also controlled with tourist access being confined to groups of a maximum of eight people plus a guide.

I enquired at the ticket counter whether it would be possible for us to join a tour group, preferably one where the commentary was conducted in English. The helpful concierge made an enquiry and advised that a tour could be undertaken, with an English speaking guide, if we were to wait some 15 minutes for the group to assemble. Unsurprisingly, we agreed.



Photo: Lascaux 4 website

A little later, our tour group assembled and we were introduced to Christian, a qualified cultural mediator, who was to be our guide. To our great delight, we discovered that we were the total membership of a tour group of two – resulting in us getting a personal guided tour in English and with a highly qualified guide, to the Lascaux 4 reproduction of significant elements of Lascaux Cave.

We had, effectively, an intimate question and answer session with Christian for some 1.5 hours. His knowledge of technical matters concerning the artwork and the palaeontological theories concerning the lives of the artists was comprehensive and extraordinarily good value for the €20 entry fee for each of us.



Photo: Lascaux 4 website

After a long period with Christian in the reproduction of the element of Lascaux Cave, we continued on a self-guided basis to the other two elements of Lascaux 4.

The first of them, in a large high hall, contains duplicates of various of the elements that have been put together to make Lascaux 4. Each of these elements is linked to a multilingual audio explanation delivered through headsets with language selection on the controller. The explanation not only tells of what has been reproduced, but also how it was reproduced and assembled. Although entirely different from the nature of the presentation at Chauvet 2, this element of Lascaux 4 was also fascinating.

The final element of Lascaux 4 was a sequence of audio visual presentations across five or six rooms outlining elements of the history of Lascaux Cave and the theories concerning the lives of its Neolithic artists.

Grotte de Font-de-Gaume

Grotte de Font-de-Gaume is a much smaller cave art site on the edge of the village of Les Eyzies-de-Tayac-Sireuil in the Vézère River valley. This The Dordogne Valley and its complex of river valleys tributaries are rich in ancient art sites, many of which are in private hands and are run as small-scale tourist operations.

The five or six ancient art sites we attempted to visit during our few days in the vicinity of Lascaux 4 were closed for their “*fermeture annuelle*”. Fortunately, Grotte de Font-de-Gaume is a publicly owned site that continues to operate throughout the winter months. Although there is a small visitor facility, it is quite modest in scale. Accessing Grotte de Font-de-Gaume requires a walk of some 400 m or so from the car park along a well-made but somewhat steep path.

There are two principal differences between Grotte de Font-de-Gaume and the Chauvet and Lascaux complexes. Grotte de Font-de-Gaume is a site where direct access is permitted into the principal, but quite short cave passage where its art is located.

The second difference between Grotte de Font-de-Gaume and Chauvet Cave and Lascaux Cave is that Grotte de Font-de-Gaume was also a habitation site with support points for structures carved into the walls of the rock overhang just outside the entrance to the cave.



Photo: Tim Moore

It is clear that the rock art at Grotte de Font-de-Gaume may have played a role in the day to day lives of its residents, a position distinctly different from Chauvet Cave and Lascaux Cave.



Photo: Font de Gaume site

Grotte de Font-de-Gaume is also a small group visitation cave with access being tightly controlled. Limited numbers of groups per day, and in groups of six or so, plus a guide are all that is permitted. The tour, including walking to and from the visitor facility, takes a little more than an hour. Again, because we were visiting out of season, our tour group comprised, in addition to my son and me, a French woman and her sixth grade daughter. Our guide was multilingual and gave a commentary to the French participants in their language and then a commentary to us in English.

Conclusion

There can be absolutely no doubt that the cave art in Chauvet Cave and Lascaux Cave warrants the careful and controlled preservation which it is now afforded by the virtual total exclusion human visitation. Equally, there can be no doubt, in my opinion, that making an appreciation of this art available to a wide public audience provides desirable understanding of not only its spectacular beauty but of the extraordinary skills of the ancient artists who created it.

It would not be sufficient, for a proper appreciation of what was achieved by those ancient artists merely to show recorded images as such images lack an ability to appreciate the subtleties of use of the shapes of the walls of each cave to give depth, perspective and a sense of movement to the animals there depicted.

While a visit to Grotte de Font-de-Gaume was, for us, unique, the overall scale and interpretation available at Chauvet 2 and Lascaux 4 (including the associated interpretive materials in conjunction with the cave replicas) provide experiences not to be derided as lacking authenticity.