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## Palaeolithic uses of natural reliefs and geological formations in South Western French cave art: a few examples

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**Abstract:** Going to draw in the caves required a certain courage, but above all elaborate logistics, in order to be able to work there properly and then come out without a hitch. It is logical to postulate that such an organization in the underground movements also implies an elaborate program of decoration of the walls. In particular, the use of natural reliefs by Palaeolithic artists testifies to an in-depth study of volumes and rocky asperities, carried out in our opinion during a preparatory phase. The image of the solitary hunter-gatherer etching randomly from his visual impressions, guided by the shadow cast by his torch, is a scientific myth.

**Keywords:** Cave art – geology – natural reliefs

### Introduction

In prehistoric times, in our imagination, cave is a scary place: it is dark there, and lots of dangerous beasts live there, like this lion waiting for the hunter, after having slaughtered his entire family, depicted in the painting "A drama in the Stone Age" by Paul Jamin (1886). Primates, as a whole, do not like to go underground. Admittedly, the Chimpanzees of Fongoli, in Senegal, go into the caves to cool off, at the hottest hours of the day, as do the Baboons of South Africa or the Semnopithecines in China<sup>1</sup>, but if they leave the daylight zone to take shelter in the half-shade zone, they hardly venture into the dark zone<sup>2</sup>. Hominine fossils found in deep caves were brought there by a predator who feasted on their flesh (this was the sad fate of a *Paranthropus* dragged into Swartkrans cave in South Africa)<sup>3</sup>, or fell there by accident, like the unfortunate Neanderthal in the cave of Lamalunga, near Altamura (Italy)<sup>4</sup>.

There are, however, two cases where Man dared to overcome his apprehensions and progress, of his own volition, in total darkness:

- in order to deposit or throw corpses there, from 430,000 years ago for *Homo heidelbergensis* in the *Sima de los Huesos* (Atapuerca, Spain)<sup>5</sup>, and perhaps between 236,000 and 335,000 years ago for *Homo naledi* in the cave of Rising Star (South Africa)<sup>6</sup>; it is then only in the Gravettian in the caves of Vilhonneur (Charente) and Cussac (Dordogne) between 3100 and 29400 years (calibrated radiocarbon ages)<sup>7</sup> that *Homo sapiens* will find this "tradition", promised later to a bright future in the Neolithic with the "sepulchral caves".
- to practice activities there that we will quickly qualify as "symbolic": accumulation of speleothems to build circular spaces like Neanderthals in the Bruniquel cave (Haute-Garonne) around 176,000 years ago<sup>8</sup>; tracings engraved or

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<sup>1</sup> Pruetz, 2007,

<sup>2</sup> Pastoors, Weniger, 2011.

<sup>3</sup> Brain, 1969.

<sup>4</sup> Lari *et al.*, 2015.

<sup>5</sup> Sala *et al.*, 2022.

<sup>6</sup> Berger *et al.*, 2015, 2023a; Dirks, Berger *et al.*, 2015; Dirks *et al.*, 2015.

<sup>7</sup> Henry-Gambier *et al.*, 2007; Kacki *et al.*, 2020.

<sup>8</sup> Jaubert *et al.*, 2016. I just mention for memory the traces that *Homo naledi* would have left on the walls of Dinaledi Chamber. Their study has just begun and, if they are indeed anthropic traces, nothing

painted on floors and parishes, by Neanderthal<sup>9</sup> and *Homo sapiens*, non-figurative and figurative. This is what will concern us here.

### Problematic

For *Homo sapiens* and Neanderthal, the cave is a place of adventure. With grease lamp or torch, humans ventured deep into the galleries to decorate the walls. We imagine prehistoric artists working comfortably by the light of fire, after a long journey in the galleries. But you have to take into account all the logistics necessary to venture into this constrained space from which you had to be able to get out.

We know, for example, that they took food, and probably also something to drink, on their underground expeditions. It is hard to imagine, indeed, the artists of Lascaux going out for the lunch break! In this cavity, the excavations and work have brought to light the remains of one hundred and eighteen reindeer corresponding to at least fourteen individuals, including six young ones, plus the remains belonging to two deer, a young wild boar and a horse<sup>10</sup>. In the cave of Villars (Dordogne), it is the haunches of a young swine that the artists have shared<sup>11</sup>. In the "Chapelle de la Lionne" in the Trois-Frères cave (Ariège), the Magdalenians cooked bison meat<sup>12</sup>, and in the "Couloir du Faisan", two deers<sup>13</sup>; in the

cave of Isturitz (Pyrénées-Atlantiques), the Gravettians feasted on mammoth flesh<sup>14</sup>. Bone remains show that the Gravettians and Solutreans also ate in the cave of Ardalès<sup>15</sup>. It could also happen that a bivouac was set up for a few days in a corner of the rooms or galleries, such as at Portel (Ariège), 50 or 120 m underground<sup>16</sup> or at Trois-Frères<sup>17</sup>. At Fontanet (Ariège), the Magdalenians, who came between the end of spring and the beginning of August, would even have brought armfuls of grass, "probably to constitute a litter"<sup>18</sup>. Artists have even built up reserves of ochre or manganese, as in Cougnac (Lot), Sinhikole (Basque Country), Tito Bustillo (Spain), Les Trois-Frères and Lascaux<sup>19</sup>. These reserves constitute proof of a certain organization of the artists, who thus had at their disposal large quantities of colouring matter, without it always being necessary to come out of the cave to collect it. But they can also constitute residues of matter transported there for a specific use and then abandoned, like the small pile of charcoal used for the drawing of a horse, in the "Galerie du Megacéros" of Chauvet<sup>20</sup>.

Of course, the most important question remains that of lighting. Recent experiments have shown that the lighting that prehistoric men had was much less clear than that which we have today with our electric lamps. It was more orange,

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indicates that they were traced by this curious Hominine; other humanities were able to browse the galleries (Berger *et al.*, 2023b).

<sup>9</sup> I am only mentioning here the current controversy over the graphic activity of Neanderthals in the caves: if it is now proven that he was able to engrave or paint abstract motifs (Gorham's cave, Gibraltar, Roche Cotard I in Indre-et-Loire), Trinidad de Ardalès (Spain), in other sites dating and attributions are still questionable. For the moment, no convincing observation allows us to conclude that our cousin was also able to reproduce human or animal figures. See Rodriguez-Vidal *et al.*, 2014, Marquet *et al.*, 2023; Pitarch Martí *et al.*, 2021; White *et al.*, 2020.

<sup>10</sup> Bouchud, 1979.

<sup>11</sup> Delluc, Delluc, 2016, p. 108.

<sup>12</sup> Bégouën *et al.*, 2014, p. 106.

<sup>13</sup> Bégouën *et al.*, 2014, p. 141.

<sup>14</sup> Villaluenga Martínez A. *et al.*, 2022, p. 94-95.

<sup>15</sup> Ramos-Muñoz *et al.*, 2022.

<sup>16</sup> Baillis, 1997, p. 229.

<sup>17</sup> Bégouën, Fritz *et al.*, 2009, p. 235-236.

<sup>18</sup> Clottes, Rouzard, Wahl, 1984, p. 434.

<sup>19</sup> Lorblanchet 2018, p. 259; Garate, Bourrillon, 2017, p. 227; Balbín Behrmann *et al.*, 2002, p. 574; 2003, p. 95; Bégouën *et al.*, 2014, p. 173; Glory, 2008, p. 68. The manganese reserve of Lascaux, with a quantity of 10 dm<sup>3</sup> of black powder, would, according to André Glory (*ibid.*), have made it possible to "remake another Lascaux! "

<sup>20</sup> Clottes, Geneste, 2007, p. 372.

visibility was reduced<sup>21</sup>. Three types of lighting were used: the torch, the lamp and the hearth.

The torch, by its greater extent (it can illuminate over thirty meters<sup>22</sup>), although it partially dazzles its wearer, facilitates underground progress. However, it is impractical for prolonged station work; its lifespan is limited and it must be revived regularly. The lamp, of less range (about five meters), is dangerous for exploration in unexplored galleries, because the lamp creates a cast shadow which prevents the ground from being seen correctly. On the other hand, it is suitable for stationary work, provided that someone holds it so that the artist is not embarrassed by the shadow cast by his own arm; easily rechargeable, it has a greater autonomy<sup>23</sup>. Large hearths make it possible to envisage a large space of walls<sup>24</sup>, but it is necessary to carry underground a large quantity of wood, which imposes there also a certain organization. Lamps and torches are thus complementary. It is therefore highly probable that the artists who went underground had both: the torch to move around<sup>25</sup>, the lamp to work. Moreover, as we have just mentioned, there must be at least two people: the luminaire holder and the artist. This puts into perspective all the romantic ideas about the isolated explorer who braved danger. One thing is certain: the artists were not suicidal!

Another achievement of recent research: the development of underground spaces<sup>26</sup>, as well as the preparation of surfaces for drawing, whether by prior heating<sup>27</sup>, scraping, smoothing or flattening of microreliefs, removal of surface clays in

order to obtain a clean support<sup>28</sup> and luminous and/or make preforms to facilitate the composition of the decorated panel<sup>29</sup>. It can happen, as in the Gazel cave (Aude), that a layer of clay or pigment is spread on the wall to create a contrast effect with the engraved line<sup>30</sup>. It can also happen that the artists modify the relief of the wall, as Michel Lorblanchet noted in the Cougnac cave: a drapery was broken to allow the outline of the nose of the great red *Megaloceros* to be completed<sup>31</sup>, another in Villars to more easily draw a pseudo “ibex head”<sup>32</sup>.

All this long preamble to affirm that we are now practically sure that the representations of the decorated caves were not positioned at random from subjective visits, based on impressions born of the hazards of lighting and the dispersion of shadows. Apart from a few cavities which seem quickly decorated, with a few quickly elaborated drawings as if to date and indicate that someone has been there, most of the decorated caves seem to have benefited from a preparatory phase, during which the artist and his team carefully examined volumes and surfaces<sup>33</sup>. It is from this learned examination that we are going to try to get a glimpse, by detailing the ways in which the artists have integrated the rocky relief into their compositions. Of course, we will not forget that these are works of art and that an important factor comes into play: what art historians call the *kairos*, that is to say (to be quick) the opportunism of the artist, who moved by his inspiration will go beyond the initial intention and create an original work. This is unattainable in a scientific approach. We can only work upstream

<sup>21</sup> Hoffmeister, 2017; Jouteau, 2021.

<sup>22</sup> Pastoors, Weniger, 2011.

<sup>23</sup> Jouteau, 2021, p. 154-158.

<sup>24</sup> Traces remain in Cougnac (Lorblanchet, 2018, p. 453) and Chauvet (Salmon et al., 2021).

<sup>25</sup> « Wooden torches are the best lighting system for transiting wide spaces and exploring caves because they project light in all directions (illuminating the floor and the highest spaces correctly) » (Medina-Alcaide, Garate *et al.*, 2021, p. 19).

<sup>26</sup> Pigeaud, 2018.

<sup>27</sup> Ferrier *et al.*, 2014.

<sup>28</sup> Aujoulat *et al.*, 2001, p. 154.

<sup>29</sup> Fritz, Tosello 2004, p. 77 et figure 10.

<sup>30</sup> Sacchi, 2023, p. 80.

<sup>31</sup> Lorblanchet, 2020, p. 48.

<sup>32</sup> Delluc, Delluc, 2016, p. 128 et 146.

<sup>33</sup> I will not approach here the delicate question of the rituals nor of the existence or not of an iconographic program imposed by the group or the “sponsors”.

and downstream of the artist's work, discussing his intentions and the final result. What happens between his head and his hand is none of our business.

### 1. Direct the gaze

In lighting, as we remember, the shadows are denser and the volumes more accentuated. This is why it is not uncommon to see artists use reliefs to create their figures, as here in Niaux (Ariège), where a hole was transformed into a stag's head, with just two antlers drawn on each side<sup>34</sup>. The relief was first used to frame the figures, as here

at Lascaux. The animals run between the ceiling and the rock bench, that serves as an imaginary ground line (Fig. 1). The relief is also used for staging, like these two stalagmitic columns painted in red in Cougnac. The gravettian coloured them to make us understand that this ibex can only be contemplated without being deformed at this precise place, in a "surprisingly theatrical staging"<sup>35</sup>. The relief can also attract drawings, as here in the cave of "le Sorcier", where the engravings are concentrated around a large crevasse, like the famous "sorcerer", an ithyphallic anthropomorph (Fig. 2).

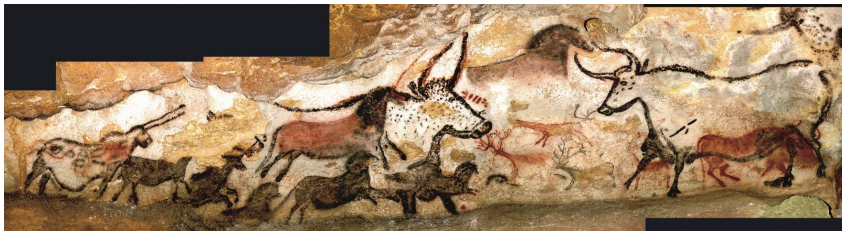


Fig. 1. Lascaux (Dordogne). The animals are positioned and framed according to the reliefs of the wall. The gaze is thus fixed and oriented. Photo Norbert Aujoulat. ©MCC/CNP.

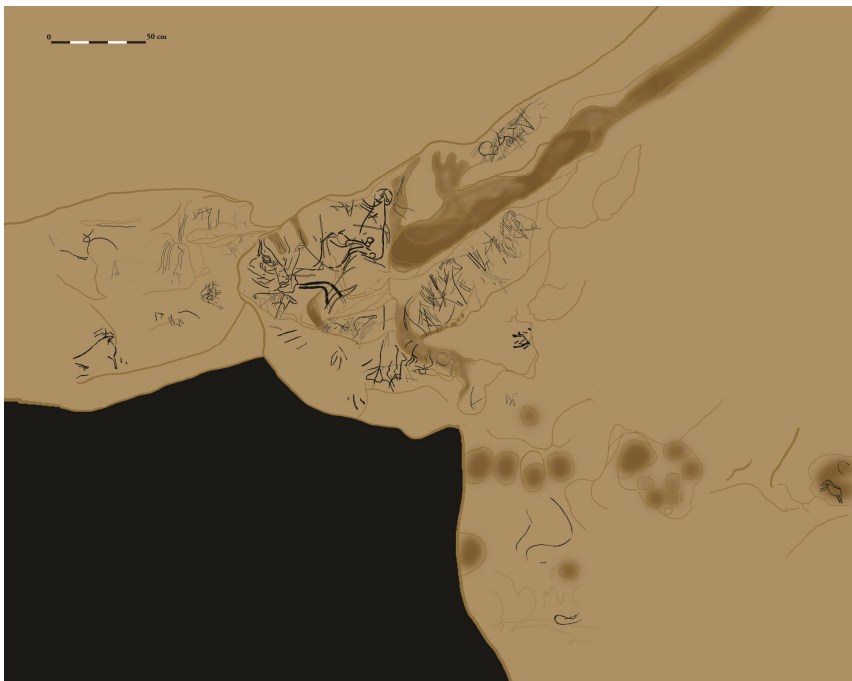


Fig. 2. Sorcerer's Cave (Dordogne). The engravings, including that of the famous ithyphallic nicknamed "the Sorcerer", seem to be concentrated around a large concavity. Drawing research team. DAO Romain Pigeaud.

<sup>34</sup> Clottes, 2010, p. 152 et figure 142.

<sup>35</sup> Lorblanchet, 2018, p. 304.



## 2. Emphasize or express reliefs

Cracks and crevices, from which water has sometimes flowed, appear under the lamp like « mouths of shadows », following Victor Hugo's poem<sup>36</sup>. Animals seem drawn to them, like here in Las Covalanas (Fig. 3), or come out of it, like this engraved rhinoceros of Margot Cave (Fig. 4). It also works for signs, like those lines of dots that follow cracks or rock ridges (Fig. 5).

Most often, the drawing is positioned on the volumes, in order to give them more life, this « jumping » cow springs from the wall, thanks to the exploitation of the different volumes, which makes its legs appear closer than the rest of his body (Fig. 6).



Fig. 3. Las Covalanas (Spain). These hinds seem to come out or enter a crevasse. Photo Jean Clottes.



Fig. 4. Margot Cave (Mayenne). The head of this rhinoceros was engraved at the edge of a crack in the wall, as if the animal was emerging from it. Photo Hervé Paitier (at top); drawing Philippe Thomas (at bottom).



Fig. 5. Moulin de Laguenay (Corrèze). Lines of red dots following a rocky ridge. Photo Jean-Dominique Lajoux.



Fig. 6. Lascaux (Dordogne). "Jumping cow" whose volume is accentuated by the rocky relief. Photo Norbert Aujoulat. ©MCC/CNP.

<sup>36</sup> « Ce que dit la bouche d'ombre » (*Les Contemplations*, livre VI).

### 3. Sketch of typology

But what makes the reputation of European cave art, that is thorough use of the reliefs through two modes of exploitation of the particularities of the wall. It has become commonplace to underline the optical illusions or the associations of shapes induced by the weak lighting of the lamps on the accidents and reliefs of the walls, what Michel Lorblanchet calls “the effect of emergence<sup>37</sup>”. For Derek Hodgson and Paul Pettitt, this ability was particularly developed among Palaeolithic hunters, because it allowed them to more easily identify prey and predators hidden in the landscape<sup>38</sup>. The novelty is to see to what extent artists have applied these visual principles, to the point of practically systematizing them, which obviously changes the perception of the role of the wall, as Georges Sauvet and Gilles Tosello point out:

*“When the use of morphological particularities is obvious in the first degree, it may have only anecdotal value, be only a game, but when it is so tenuous and subtle as a close examination, with illuminations varied, is necessary to identify it, we must admit that*

*the rock wall is not just a simple “support”, but that it plays a role, and undoubtedly a primary role, in the realization of the work”<sup>39</sup>.*

I have proposed a classification of these uses of reliefs<sup>40</sup>, which overlaps in part with that of Georges Sauvet and Gilles Tosello and is inspired by that proposed by Marylise Lejeune<sup>41</sup>. My classification, however, is the opposite of theirs, which starts from the wall, while mine starts from the graphic unit itself and, I postulate, from the artist’s primary intention.

First, we have an “implicit use” or “luminary”, there is the « plastic rhyme<sup>42</sup> », an expression coined by the painter Pierre Soulages. There is no direct insertion of the relief in the plot. This one is content to double or imitate it<sup>43</sup>. The graphic unit is glued against the relief, which serves as a graphic template; there are also imaginary ground lines, formed by the cracks or the edges of the walls directly above the representations. The shape of the wall constrained the artist here, by strongly suggesting which theme to choose for his drawing, like a graphic “pattern”. The layout follows or imitates a relief on the wall, like the head of this horse from Pech-Merle which itself imitates an animal



Fig. 7. Pech-Merle (Lot). Panel of “punctuated horses”. The head of the one on the right is inscribed in a rocky beak which already evokes the protome of an equine. Drawing Éric Le Brun. After Le Brun (2022).

<sup>37</sup> Lorblanchet, 2020, p. 85.

<sup>38</sup> Hodgson, Pettitt, 2018.

<sup>39</sup> Sauvet, Tosello, 1998, p. 57.

<sup>40</sup> Pigeaud, 2004.

<sup>41</sup> Sauvet, Tosello, 1998; Lejeune, 1985.

<sup>42</sup> Lorblanchet, 2018, p. 433; 2020, p. 93.

<sup>43</sup> Types 1 and 3 of Georges Sauvet and Gilles Tosello (Sauvet, Tosello, 1998, p. 60 et 73).



But, the most spectacular and what I call « revealing use » appears when the prehistoric artist integrates the relief directly into his outline<sup>44</sup>. The examples are countless. It can be a form which imposes itself immediately, like the hollows of the walls transformed into vulvae or the rocky edges, which have become lines of the back. Let us cite the most extreme case: a rocky form evoking a female figure, on which the Gravettians only had to place two red dots to represent the areolas, in the Great Cave of Arcy-sur-Cure (Yonne)<sup>45</sup>. There are also instances where the artist of Lascaux has made a larger composition, as here the assemblage of clay appeared to represent a turbulent stream through which a herd

of deer appears to be advancing (Fig. 8).

Sometimes the relief is so obvious that the artist adjusts it underlined by a few additions such as this rock block transformed into a sturgeon (Le Pergouset, Lot) (Fig. 9). But in some cases, they may be “discrete<sup>46</sup>” forms, such as, at Mayenne-Sciences, the microfossil that outlines the beginning of the neck of horse n°16 (Fig. 10). This particular and accentuated form of use of reliefs means that the wall has necessarily been inspected in detail. It is excluded that the artist discovered them while drawing; the insertions in the plot are too perfect.



Fig. 8. Lascaux. Frieze of "swimming deer", where an clay on the wall suggests the possible movement of water. Photo Norbert Aujoulat. ©MCC/CNP.

<sup>44</sup> Type 2 of Georges Sauvet and Gilles Tosello (1998, p. 61).

<sup>45</sup> Baffier, Girard, 1998.

<sup>46</sup> Sauvet, Tosello, 1998, p. 72.





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g. 9. Le Pergouset (Lot). Rock bank transformed into a fish (sturgeon?) by adding an eye and gills. Drawing Michel Lorblanchet. After Lorblanchet (2018).

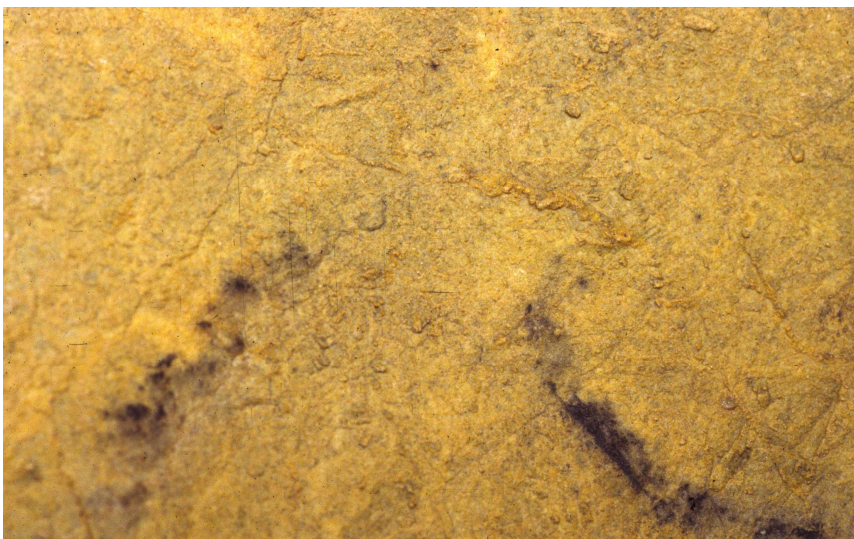


Fig. 10. Mayenne-Sciences (Mayenne). The origin of the neck of this horse is formed by a microfossil (black circle on the photo at top; detail at bottom). Photos Jean-Dominique Lajoux and Romain Pigeaud.

## Conclusion

The prehistoric artist has perfectly integrated the reliefs and volumes of the walls. By doing this he has somehow « domesticated » the underground space, transforming it at his convenience<sup>47</sup>.

This “rock science”, this knowledge rather, certainly based on the experience of several underground explorations, should not, however, deceive us: let us not fall into the opposite excess, which would transform all Palaeolithic artists into managers. Remember that this is a practice (the decoration of the walls of caves) that lasted about 36,000 years, covering a geographical area from England to Siberia and from France to the extreme tip of the Iberian Peninsula. Despite certain attempts, which defend a global intention to go draw underground in order to evoke a common myth of emergence (telling the exit of Humanity from a hole in the ground)<sup>48</sup>, there remain deep regional and cultural differences, which for us in the distant past seem homogenous, but which it is up to the prehistorian to differentiate and put in order. These tendencies that I have mentioned are not always

expressed in a refined way and are part of a cognitive baggage from which not all artists have benefited. It is in these differences that lies the possibility of an anthropology and of the updating of behaviours<sup>49</sup>, like our colleagues are doing since many years concerning lithic technology and the work on hard animal materials. In particular, what remains to be discussed is the intuitive perception that the Palaeolithic people had of underground geology, for example the vault channels, markers of the path in the galleries, as well as the traces of the passage of water, creating suggestive volumes. How much were they looking for them? Was this one of the criteria for selecting one cavity over another? Lots of research ahead!

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<sup>47</sup> Pigeaud, 2018.

<sup>48</sup> Le Quellec, 2022.

<sup>49</sup> Testart, 2021.

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