

Auriga: An Asterism Depicted in Upper Palaeolithic Caves?

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Abstract

Despite constellations featuring in the skylscapes of all ethnographic cultures, including hunter-gatherer societies, there are only a few convincing representations of star clusters or constellations in Upper Palaeolithic cave art. We would like to raise the possibility that Magdalenian ‘tectiforms’ in Paleolithic cave art could represent another case. Tectiforms display a number of distinctive features that also characterize the constellation Auriga. These include: the pentagonal shape; similar relative proportions, similar angles of intersecting parts, and unique “undercut” sides. We think that Auriga was viewed by Magdalenians as representing a special structure in the heavens and that this structure was depicted in their art. If the tectiforms were meant to depict Auriga, this raises the question of why Auriga may have held a special status. Previous paleoart researchers have suggested that tectiforms were related to ritual symbolism, and indeed, caves seem to have been used for ritual purposes. If there was a ritual conceptual link between tectiforms and Auriga, one possible reason for such a link could be that tectiforms were representations of a special kind of ritual structure considered to have existed in the sky (like the *Nusmat’a* sky house of powerful spirits among the Nuxalk First Nations of British Columbia). Due to Auriga’s relationship to the Milky Way and the north polar region, and because its seasonal motions match important cycles of nature, Auriga may have been imbued with additional special ritual significance.

Introduction

Our aim is primarily to present a new possibility about art and skylscapes in Middle Magdalenian societies. Explorations of such observed links provide the initial steps in theory work in this domain. We would like to present, for consideration, the possibility that a geometric Upper Palaeolithic motif – the ‘tectiform’ – may be a representation of a very obvious asterism in the northern sky: the five bright stars of Auriga which, together, form a unique and distinctive pentagonal shape. We further suggest that both tectiforms in cave art and the constellation Auriga were viewed by Magdalenians as representing a structure important in their mythology, based on a special type of shamanic tent.

Although we find the similarity between the tectiforms and Auriga compelling, it is important to recognise from the start that all claims of Upper Palaeolithic representations of star configurations are necessarily somewhat speculative. Indeed, even trying to reconstruct the constellations of more recent societies, whose texts have survived and whose belief systems are much better understood than those of prehistoric people, is a difficult, and sometimes a seemingly impossible task (e.g. Lull and Belmonte 2009). Thus, rather than demonstrating or proving – if that is even possible in the rock art case – that Auriga was depicted in cave art, we present the following observations as an exploration of the plausible conceptual realms of northern prehistoric hunter/gatherers (Holbraad and Pedersen 2017, Silva 2022).

Beginning with Marshack's (1991) claims that some artifacts exhibiting marks or counts were lunar calendars, a number of extraordinary claims have been proposed about astronomical systems thought to have developed in the Upper Palaeolithic of Southwest Europe. Jeguès-Wolkiewicz (2000, 2007, 2008, 2014) has gone so far as to suggest that an entire animal zodiac along the ecliptic was depicted in Upper Palaeolithic art. After examining the ethnographic information on astronomical observations among complex hunter/gatherers, Hayden and Villeneuve (2011) concluded that it is unwarranted to view Upper Palaeolithic societies as having such highly elaborate astronomical systems on the basis of current evidence. However, the orientation of the entrances into decorated caves as well as the ethnographies of complex hunter/gatherers, indicate that some degree of celestial observations most likely existed. Nevertheless, the extent to which astronomical systems beyond lunar phase monitoring or the tracking of sunrise/sunset positions existed in the Upper Palaeolithic requires further investigation.

The prevalence of winter solstice observations among ethnographic complex hunter/gatherer groups and the orientation of the painted caves in Southwestern France provide some insights into this system, while a few relatively convincing claims have also been made for apparent lunar observations recorded on scraps of bone like the Blanchard plaque (Jeguès-Wolkiewicz 2000, 2014; Marshack 1991). However, comparatively little attention has been paid to constellations and the possible roles that they may have played in Upper Palaeolithic astronomical systems. To date, the only generally accepted representations of star clusters, or constellations, in the Upper Palaeolithic have come from Lascaux Cave in the form of a cluster of six black dots situated just above a depiction of an aurochs. The spatial relationship of the dots to the bull closely resembles the relative position of the constellations known today as the Pleiades and Taurus. Rappengluck (2001) has suggested that similar images of a bull and dots in the Tête-du-Lion Cave, dating

to the Solutrean period (c. 20,000 – 15,000 BC), also represent Taurus and the Pleiades. However, even these suggestions may need reassessment in light of recent research suggesting that such combinations of dots and animal conveyed seasonal behavioural information about specific prey species – in this case aurochs (Bacon et al. 2022).

Interpretive claims of constellations in rock art predominantly rely on similarities between the shape and/or position of the artistic depiction compared to the constellation in the sky. We want to use this as the starting point of our argument. To move beyond this departure point, we firstly explore, via ethnographic parallels, the potential social role that both the artistic motif of tectiforms and the constellation of Auriga may be related to. Secondly, we explore the seasonal motions of Auriga and whether they may have synchronised with the phenological (seasonal meteorological) yearly cycles important in the worlds of the Middle Magdalenian people.

Evidence for skylscapes in the upper paleolithic

Hayden and Villeneuve (2011) previously presented an in-depth review of ethnographic data on solar observations among ethnographic hunting and gathering groups. In brief, they found that most complex (transegalitarian) hunter/gatherers made detailed observations of the sun's movements to determine the exact days of the solstices. Records of lunar phases were probably also kept, something that Marshack (1991) and Jeguès-Wolkiewicz (2000, 2014) have also argued was present in Upper Palaeolithic groups, and has been documented in many early historical calendars (e.g. Stern 2012). Among ethnographic complex hunter/gatherers, specialists were often given the task of monitoring solar and other celestial movements. These specialists employed fixed posts, trees, mountain peaks, or other reference points to monitor solar rising and setting points throughout the year. Special rituals, ceremonies, feasts, or other events were generally determined according to these solar 'calendars' and

the solstices were often key times for holding these events (Fauvelle and Perry 2023, Hayden and Villeneuve 2011). Simple, more mobile and egalitarian hunter/gatherers generally did not exhibit this kind of sophisticated solar monitoring.

Hayden and Villeneuve (*ibid.*, Hayden 2018) also argued that there were complex hunter/gatherers in the European Upper Palaeolithic, at least in some resource-rich areas such as the Franco-Cantabrian region, and that, like ethnographic complex hunter/gatherers elsewhere in the world, the complex Upper Palaeolithic groups appear to have engaged in solar monitoring linked with rituals (including rituals in caves) and feasts. These may also have involved mythologies and ideologies about the stars, constellations, the Sky World, and the beings that inhabited it.

In order to support the idea of sophisticated solar monitoring in the Upper Palaeolithic, Jegues-Wolkiewicz (2000) roughly measured the orientation of the entrances of painted and unpainted caves in Southwest France. For the painted caves, she found a bimodal distribution of cave entrance orientations with azimuth peaks at the solstice rising or setting position of the sun. Thus, the sun would shine into the entrances of most decorated caves at the solstices, including, among others, Lascaux, El Juyo, and Bernifal (see also Hayden and Villeneuve 2011). This tradition continued, or was re-invented, in the European Neolithic where artificial caves (mounds with passageways) were constructed so as to have the sun shine into their inner chambers or along other alignments at the winter solstice sunrise, e.g., at New Grange and Knockree (Ireland), Maes Howe (Scotland) and Dombate (Spain) (e.g. González-García et al. 2018; MacKie 1997; Prendergast 2018). Other European monuments from the Neolithic and Bronze Age, such as Stonehenge (England) and Mnajdra (Malta), also exhibit alignments with key solar events (e.g., Lomsdalen 2014; Parker Pearson 2012). The finding that many Upper Palaeolithic caves exhibited solstice orientations is of such fundamental importance that Jegues-Wolkiewicz' data should be verified for accuracy, but it

would be surprising if future results would be completely inconsistent with her initial conclusions.

At this point, it is relevant to remember that Aujoulat (2004:264-5) – probably the most authoritative source on the art of Lascaux – thought that cave paintings corresponded in a very general way to configurations in the night sky. He suggested that the cave depictions of animals represented stars associated with types of animals and their seasonal behaviors on earth, such as the rutting seasons of aurochs (summer), stags (autumn), or horses (spring)—an interpretation recently supported by the research of Bacon et al. (2022). For instance, the Buryat, in Siberia, imagine some star configurations as herds of horses (Eliade 1987:18). While some star clusters might have represented a figurative image of an animal like an aurochs, other star clusters might simply have represented herds of animals, with each star representing an animal. Viewing individual stars as individual animals or individual humans is a fairly common astronomical conception in hunting and gathering and even more complex traditional societies as exemplified by the Pleiades viewed as seven sisters (Hayden and Villeneuve 2011:11-12; MacDonald 1998).

Tectiforms

In France, the cave art motif known as the 'tectiform' only occurs during the Middle Magdalenian (c. 17,000 – 14,000 BCE) and only in four painted caves in Southwest France, all within a few kilometers of each other: Bernifal, Combarelles I, Font-de-Gaume, and Rouffignac (Capdeville 1986:61; Plassard 2000, 2005:263; Vialou 1987:316). Tectiforms have always been the focus of special attention by French prehistorians. The French use the very descriptive term, 'tectiform', to refer to these images, although none of the authors provides a clear definition. Capitan et al. (1910:227) simply state that tectiforms have a geometric shape (in contrast to the natural themes of most cave art) and that they resemble the roof of a hut. Plassard (2000:19) and

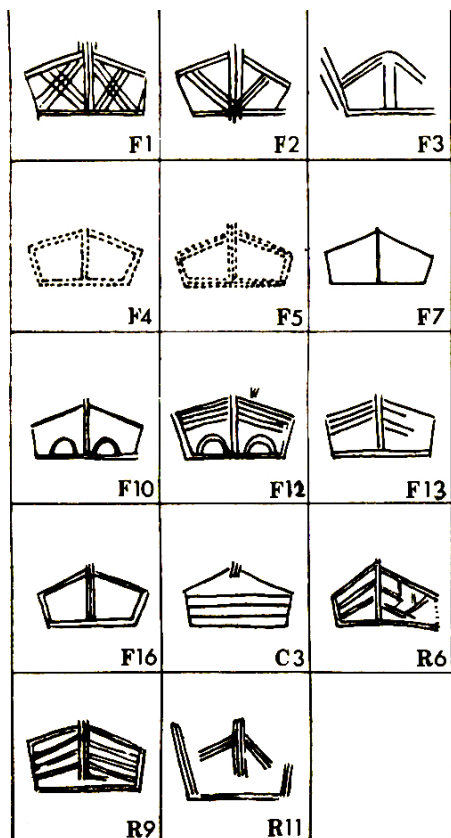


Figure 1. Tectiforms from Capdeville (1987:75)

Capdeville (1986:73) add that in the most complete examples, the shape is pentagonal with a horizontal base and walls, usually with a central post. This is the sense in which we use the term.

The general interpretation is that tectiforms represent structures or huts. In fact, the term itself refers to the roofed shape of the images (*tectum* is Latin for 'roof'). In all, there are 56 recorded images in France interpreted as tectiforms, many of which are incomplete or abstracted (Plassard 2005). There are only 15 images identified as relatively complete tectiforms by Plassard and Capdeville; others lack side elements or are very schematic. Capdeville (1987:75) has published illustrations of almost all of these more complete tectiforms (Figure 1) but

omitted the complete tectiform in Bernifal Cave (Figure 2).

The first to recognize them as a special motif in Upper Palaeolithic cave art was Breuil (Capitan and Breuil 1902:228) who thought that "they seem to represent a house", while later they compared tectiforms to ethnographic huts or tents. The view that they represent a tent structure has dominated the interpretations of this motif ever since.

As Plassard (2000:54) has noted, the similarities of tectiforms at all the sites where they occur indicates that the artists adhered to a graphic convention to an unusual degree. Following the suggestions by Capitan et al. (1910:228) that tectiform placements seemed to have some kind of ritual significance, Vialou (1987:315-6) provided further arguments that tectiforms had strong symbolic associations, a view which Plassard (2005:274) also endorsed. Vialou suggested that their usual location away from the main art panels in caves – sometimes in very isolated locations within caves – indicated this. In his global synthesis, Capdeville (1986:78), too concluded that tectiforms were primarily placed in narrow areas or alcoves (see also Plassard 2005:270-1). There are some examples of tectiforms in close association with images of the dominant animal types represented in each cave such as bison in Font-de-Gaume and mammoths in Rouffignac (Plassard 2000:55; 2005:272), or, as Vialou (1987:3) points out, they could be associated with rare animals or animals not frequently depicted such as rhinoceros, reindeer, felines, and wolves. Both Plassard and Vialou (*ibid.*) conclude that there is a special relationship between tectiforms and certain animals. On this basis, Vialou (*ibid.*) argued that a special symbolic importance is implied. It might be added that even when associated with animals like the bison in the Salle des Petits Bisons in Font-de-Gaume Cave, the chambers where tectiforms occurred were often so small that "five people would be uncomfortable there" (Capitan et al. 1910:83). Yet, in the case of Font-de-Gaume, this small chamber was filled with high quality polychrome images of bison including four of the tecti-



Figure 2. The tectiform in Bernifal cave (Photo: B. Hayden)

forms that occur in Font-de-Gaume which would seem to imply the use of this space by a small exclusive group of important ritual specialists. Tectiform shapes were also sometimes rendered in duplicate or triplicate which both Capitan et al. (1910) and Vialou (1987) thought was indicative of their powerful symbolic significance.

These observations taken together seem to indicate that there was something special about tectiforms. If this premise is accurate, it seems unlikely that tectiforms were meant to depict ordinary kinds of structures. Later in life, Breuil suggested that tectiforms could have represented spirit houses or houses for ancestors (Díaz de Espada 1949; Breuil 1952:24). This seems plausible, although Zervos (1959:83) thought that tectiforms might be symbols of the magical power attributed to normal habitation structures which he suggested

could involve symbolical connections to supreme powers.

We know of no ethnographic examples of hunter/gatherer structures that have walls that slant inwards in the fashion consistently depicted in tectiforms (i.e., walls that are wider at the top than at the bottom) – most mobile hunter/gatherers erect circular, teepee, or domed types of shelters rather than ones with peaked roofs and separate side walls. It is true that pithouses, such as those widely used by the Jomon and on the North American Plateau exhibit similar wall angles, but there are no indications of walls dug below ground level in any of the tectiform portrayals besides which pit houses are very rare and shallow structures in the Upper Paleolithic. Thus, if tectiforms did represent structures, or some concept of an archetypal structure, the inward slanting sides make it seem like a special type of structure for the period, rather

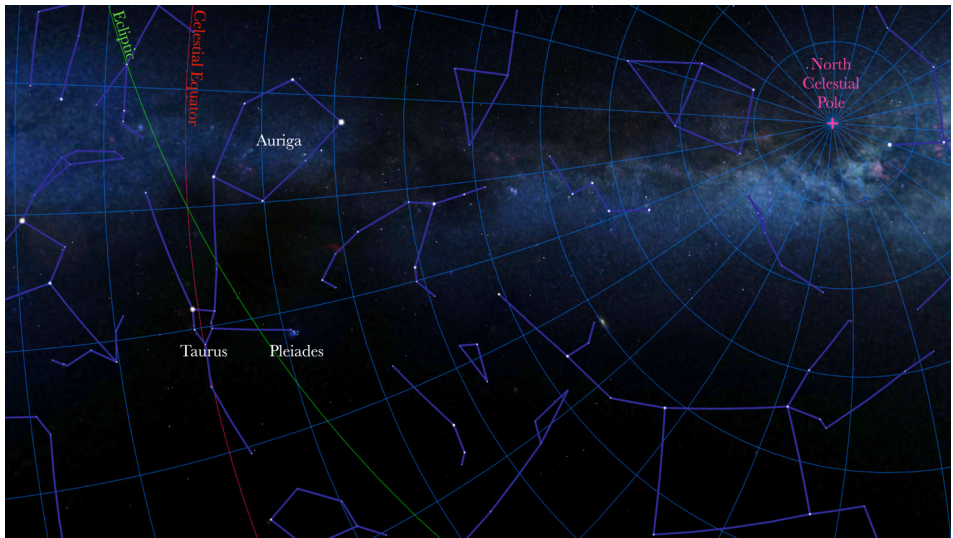


Figure 3. The night sky around 17,000 BCE showing Auriga, Taurus and the Pleiades in relation to the North Celestial Pole, the Celestial Equator and the Ecliptic (all marked) as well as the Milky Way (the light “cloud” that stretches horizontally). Adapted from Stellarium (Zotti et al 2020).

than a normal tent, lean-to, or camp setup. Indeed, such an inward slant is unlikely to occur in any tents where skins would hang vertically besides which any inward-slanting sides would reduce the amount of covered interior floor space and thus be an inefficient architectural design. Nor is this slant likely to be due to misperceptions of structural details since it is so consistent.

Furthermore, the uniformity of style of the tectiforms implies that there was a physical model in the Upper Paleolithic environment that had a pentagonal form with inward sloping sides. It would seem that all artists at the different sites could observe this model independently. While huts or tents could be expected to vary in a number of ways (size, proportions, seasonally, individual construction abilities), a configuration of stars in the sky would always remain the same and we suggest could have been a good model for depicting tectiforms.

A celestial tectiform

While the identification of the constellations of Taurus and the Pleiades in Palaeolithic

cave art has achieved recognized plausibility, the proposal of tectiforms as representations of Auriga is a relatively new suggestion (Hayden and Villeneuve 2011; Hayden 2018) and supporting details have not been published. It therefore seems important to elaborate the arguments concerning this proposed correspondence in more detail.

Auriga is a constellation of the northern celestial hemisphere that was included in the catalogue of Ptolemy in the 2nd century AD (Allen 2015). It is a large constellation which can be readily seen, at present, primarily during winter evenings. Its key asterism is an irregular pentagon formed by its five brightest stars: Capella (α Aur, magnitude 0.08, the sixth brightest star in the night sky), Menkalinan (β Aur, magnitude 1.89), Mahasim (θ Aur, magnitude 2.62), Hassaleh (ι Aur, magnitude 2.69), and Elnath (β Tau, magnitude 1.65, a star shared with the constellation of Taurus).

To compare this asterism to the tectiforms we have used *Stellarium*, an open-source software package that depicts a realistic sky in 3D from any location on the globe and from a broad chronological range that includes the Middle Magdalenian (Zotti

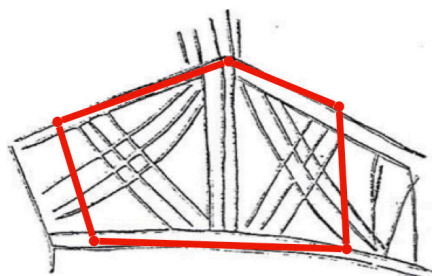
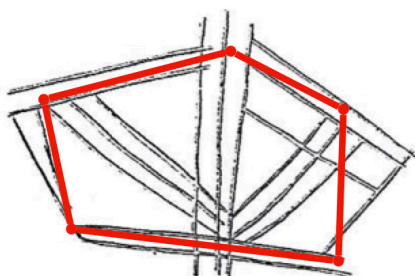
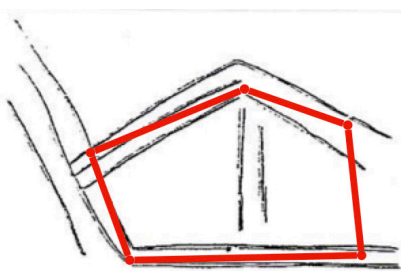
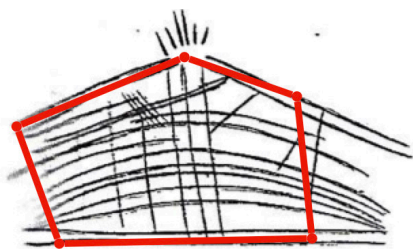


Figure 4. Auriga in 17,000 BC (red lines) superimposed on tectiforms from Font-de-Gaume from Capitan et al. (1910:228-9, 231).

et al. 2020). To ensure the star positioning in the Upper Palaeolithic was accurate we compared the celestial coordinates of the five bright stars of Auriga provided by *Stellarium* against those calculated by two other astronomical software packages, *Cartes du Ciel* (2019) and *swephR* (Reijs and Stubner 2020), which calculate this using different algorithms, and found excellent agreement between all three. We have looked at the shape of Auriga, and its seasonal dynamics, for the entire span of the Middle Magdalenian (c. 17,000-14,000 BCE--Barshay-Szmidt et al. 2016). As the differences are minute and insignificant, for simplicity, we show only the results for 17,000 BCE.

Virtually all the complete tectiform examples exhibit a remarkable and unusual degree of standardization (Plassard 2000:54; Vialou 1987:316), with similarities to Auriga in five specific ways. Firstly, the basic shape of both the tectiforms and the

constellation is that of an irregular pentagon (Figure 4). Secondly, the angle of the peak of the 'roof' (as determined from Capdeville's representations in Figure 1) ranges between 34° and 51° in almost all tectiforms; whereas the angle of the 'roof' of Auriga was 40° , close to the middle of this range. Thirdly, in most of the best cave art examples, the sides of the pentagon slant inward toward the base at an angle that varies between 98° and 112° --none of left walls are at right angles to the horizontal bases. The left side of Auriga's pentagon also slants inward at an angle of 109° , well within the range of the tectiforms. Fourthly, the two sides of the roof are asymmetrical in several of the best representations (e.g., R6, R9, F3, and perhaps C3, F2, and F16 in Figure 1, and in Figure 2 from Bernifal Cave), as are the corresponding sides of the top of Auriga. And, finally, the proportions of the tectiform tops, bottoms, and sides are roughly the same proportions as found

in Auriga, although the tectiforms tend to be more symmetrical than the constellation was in the Upper Palaeolithic (Figure 4).

While not every depiction in cave art might be expected to realistically portray the exact details of Auriga rather than portraying it in a more schematic way, the fact that most of the complete 'pentagonal' depictions do reflect similar angles and the approximately correct proportions of Auriga seems to be more than would be expected by chance. These similarities, with slight variations, plausibly result from drawing tectiforms by memory based on the model that the constellation Auriga provided and which all artists could refer to outside of caves for their depictions. Some variations from the model might also be expected due to individual differences in artistic aptitude. Nevertheless, the overall uniformity of the complete examples is striking, as repeatedly noted by the French rock art specialists who have studied tectiforms most intensively.

The identification of Auriga with a roofed structure might be questioned on the grounds that it rarely can be viewed oriented with the roof 'up' in relation to the horizon. Around 17,000 BCE it was generally viewed upside-down (when rising) or with its side towards the horizon (when setting). However, observing a constellation like Auriga when it is high in the sky tends to minimize horizon orientations which can be easily ignored with a tilt of the head or turn of the body, as affirmed in our own viewing of Auriga. Cognitively, it is also a small task to mentally consider off-kilter sky images as correctly oriented, or at least as *bona fide* representations. This is amply illustrated by the up-side-down occurrence of the horse constellation, Pegasus, which few people have difficulty in conceiving as a horse. Therefore, it seems unlikely that the orientation of Auriga in relation to the horizon would have had any adverse effect on it being viewed as a roofed structure by Middle Magdalenian people--specifically as a structure which was also represented in the rock art of the period.

Reflexively, one needs to wonder whether the joining of these five stars to

form a single unit is not merely an ethnocentric and anachronistic projection. Different cultures, both in the present and the past, have linked stars differently, constructing different constellations in the night sky. This is true also for the stars that comprise Auriga. However, there is a not insignificant number of societies, many of which were unrelated in space and time, that have joined these same stars to form the pentagonal shape we have been discussing. These include Arabic (where the constellation is known as *Al-Ayyuq*, the Posts), Chinese (known as the Five Chariots), Hawaiian, Indian Vedic, Korean (known as *Garage for Chariot*), Norse (the *Asar* battlefield), and Sardinian (the *Fence for Sheep*) among others (e.g. Allen 2015; Ridpath 2018). Moreover, there are several examples of star configurations in the Western tradition believed to have persisted from Palaeolithic times to the present, such as the previously mentioned cases of Taurus and the Pleiades, and probably Ursa Major as well (D'Huy 2012, Frank 2015). It is therefore plausible that, in the Upper Palaeolithic, the same five stars of Auriga, which are some of the brightest stars in the northern region of the sky (Figure 3), were seen to represent a single, pentagonal constellation.

Special structures

In a somewhat more speculative vein, if we entertain the hypothesis that the tectiforms are modelled after the Auriga asterism, and that the tectiforms depicted some kind of special structure (as discussed previously in *Tectiforms*--also by Diaz de Espada 1949; and Breuil 1952:24), then the consequent question is: what kind of special structure could be represented? As already noted in our review of tectiforms in the literature, most French prehistorians have argued for some kind of special or symbolic representation of these images. There are few ethnographic examples of special structures among hunting and gathering societies, however, these include: women's seclusion huts, shamanistic ritual huts, sweat baths (e.g., in California, Hayden 2018), burial

structures (e.g., on the Northwest Coast, such as whaler's shrines, Jonaitis 1999), and secret society structures (e.g., in California, Hayden 2018).

It is also possible that another kind of special structure existed but, only in the skyscape world or in the mythology of the Middle Magdalenians. One ethnographic example of such imaginary structures is the sky house of *Alquntām*, the supreme deity of the Nuxalk (Bella Coola) Indians in British Columbia who were complex hunter/gatherers. As related by Stott (1975:5):

Alquntām assumed an important role in terms of *kusiut* society rituals. In the land above, when he wasn't travelling with the sun, he lived in a house called *Nusmat'a*. "It resembles those constructed on earth, but it is boundless in size. Every autumn the supernatural beings gather there to wait the coming of *Alquntām* at the winter solstice; while waiting they pass the time by performing the equivalent of the earthly *kusiut* dances." (McIlwraith, 1948, Vol. I, p. 34)

With the arrival of *Alquntām* at *Nusmat'a*, the heat became so intense that all the supernatural beings but three advisors rushed out of the house. The remaining quartet ".....arrange the fate of human beings during the coming year; who shall be made a *kusiut*, who shall be born, who shall die. In each case the decision rests with *Alquntām*, though he is influenced by his counsellors." (McIlwraith, 1948, Vol. I, p. 38)

Alquntām was regarded as the leader of the supernatural *kusiut* (McIlwraith, 1948, Vol. I, p.34).

The *kusiut* was one of the secret societies of the Nuxalk and advanced members claimed to be able to travel to the Sky World and observe rituals there which they then brought back to earth.

Without more graphic or material associations with tectiforms, it is difficult to choose between the various types of special structures documented for hunter/gatherers, although we suspect that women's seclusion huts were not involved and

historical photos of such structures bear little resemblance to tectiforms (e.g., Teit 1900). The other possible uses of special structures are all viable interpretations of the types of functions that tectiforms may have represented. However, we would like to explore here some of the possible links to shamanistic types of ritual structures due to several intriguing similarities, although we are fully cognizant of the debates that have taken place about shamanism in the Upper Paleolithic (see Clottes and Lewis-Williams 2001:156-166 for a summary of the debates). We use the term, "shamanistic," advisedly to indicate something generally like animistic ontologies and rituals, and we simply would like to point out a number of interesting ethnographic aspects that many researchers will probably be unfamiliar with. Minimally we hope that these observations will at least provide food for thought. We do not pretend to attempt any "proof" of any model, if that is even possible given the lack of associated data.

Hayden and Villeneuve (2011) proposed that a possible candidate for a special structure with strong symbolic meaning would have been a ritual "shaking" tent similar to the ones used by shamans in Siberia and among Algonkian groups in North America (Conway 1992; Hallowell 1942; Oakes and Riewe 1998; Stépanoff 2021; Tanner 1979). There were a number of variations in the form of shaking tents (Figures 5 through 7). Most ethnographic shaking tents were definitely not like the standard round or conical hunter/gatherer shelters that generally occur in mobile hunter/gatherer societies. The most common ethnographic shaking tents had straight, vertical walls with slightly inclined tops and an opening at the top (Figure 5). They were built for use by shamans who entered them and went into altered states in which they could travel to the Sky World via a portal located at key locations like Polaris or the Pleiades (Conway 1992; MacDonald 1998:33,40). For the people of Nunivak, "stars were not spirits but big holes in the sky world [through which the shaman went] whenever he journeyed to the sky" (Lantis 1946:197). And "among the Chukchi and the Koryak



Figure 5: Ojibway shaking tent (Halowell 1942:36). Note the asymmetrical slanting roof with an opening at the peak, and the relatively straight walls. A somewhat shorter version would be a reasonable approximation of the structures represented by tectiforms. (Reprinted with permission of the University of Pennsylvania Press).

peoples of northeastern Siberia, the Polaris star was called 'hole in the sky'" (MacDonald 1998:33 citing Therrien 1987:39). One of the chants used by shamans on entering the tent was: "Open the sky from the center" (Grim 1983:150). A number of other hunting and gathering societies in the Northern Hemisphere identify Polaris as the main portal to the Sky World where Sky beings could be contacted that live there (Eliade 1964:254,260-263; 1987:18-20). Among the Chukchee and Altaians, "the road to the sky runs through the Pole Star. The *udesi-burkhan* [star portals] of the Buryat open the road to the shaman as one opens doors" (Eliade 1964:263). It is also relatively common for the dead to reside in

the Sky World, often as stars, so that burial structures might also have been thought of as places to contact the Sky World and its spirits. The altered state of consciousness that all of these experiences could correspond to Lewis-Williams' (2002:111-127) middle trance level of shamanistic entoptic mental states in which many geometric and abstract images are imbued with familiar cultural meanings, often related to traditional ritual themes.

Hultkrantz (1981:73,79) describes the Spirit Lodge ritual (also known as, the Dark Tent ceremony, in which shaking tents were sometimes used) as being widespread in North America in the Algonkian area, the northern Plains, and the eastern Plateau



Figure 6: An Ojibway shaking tent recorded by Schoolcraft (1855:428, Fig. 33A). Note the animals, birds, woman, horned man, moon, and solar depictions emerging from, or entering into, the top of the structure; also the images on the front wall of the structure.

as well as being present in some South American groups. Lowie (1934:188) argued for Eurasiatic connections of this complex. Hultkrantz (1981) endorsed Lowie's view but indicated that more research needed to be done on the subject. More recently, Stépanoff (2021:242) has documented that this ritual complex occurred "among all peoples of the Paleo-Asian [linguistic] family" which is actually composed of a number of unrelated, older linguistic families in Siberia. Stépanoff (2021) further noted that the DNA from Upper Palaeolithic site at Mal'ta (Siberia) is most closely linked to the DNA of three Paleo-Asian linguistic groups, the Ket, Chukchi, and Koryak. This link and

the pervasiveness of the Dark Tent ritual performances among Paleo-Asian groups may indicate that something resembling the Dark Tent complex could have been used in the Upper Palaeolithic. Certainly, many of these practices and beliefs are prevalent in northern hunter/gatherer cultures where shamanistic performances were important.

The shaman's spirit was thought to exit through the top of the shaking tent, and this may be represented by lines emanating from the tops of some of the tectiforms. Eighteen of the tectiforms at Font-de-Gaume and ten of the tectiforms in Rouffignac have lines or 'plumes' (Plasard 2000:23) extending up from the peak

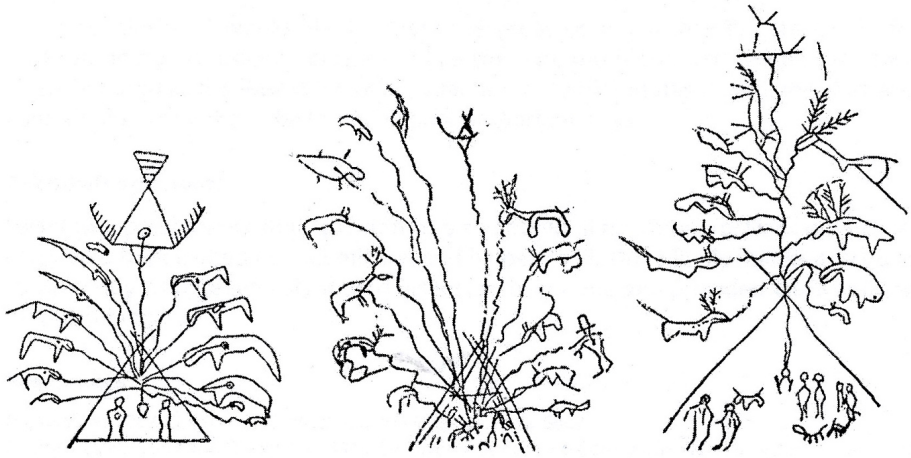


Figure 7: Ojibway tents holding shamanic rituals with animal spirit emanations from or toward the peaks. (Hoffman 1891:252).

of the images so that they seem to play a key role in the depictions and symbolism of the tectiforms (Figure 4). While it might be suggested that these lines could have represented decorative bundles attached to the main support post, the lines do not look like bundles or decorative elements. They do seem symbolic of something emanating from the top of the image. One suggestion stemming from ethnographic depictions is that they could represent spirits or spirit connections such as the lines emanating from the tops of Ojibway tents used by ritualists (compare Figures 4, 6, and 7 – Hoffman 1891:252), although alternatively, the “plumes” might have represented spirits of the dead emanating from burial structures, or steam from sweat baths.

If we want to explore possible reasons for selecting Auriga as an important connection to a Sky World cosmology, the symbolic importance of Auriga could have been enhanced due to its relation to the Milky Way which traverses the constellation from its ‘floor’ to its ‘roof’. In fact, the Milky Way visually and directly connected Auriga to the North Celestial Pole (NCP) region ca. 17,000 years BCE (Figure 3). At that time, given the wobble of the earth’s axis resulting in the precession of the equinoxes, there was no star occupying the polar po-

sition. The NCP was a black patch within the Milky Way, lying between the modern constellations of Cygnus and Cepheus. This black patch may itself have been of significance, just as other so-called ‘dark cloud constellations’ of the Milky Way are important for different peoples across the world (e.g. Aveni 2019; Gullberg et al. 2020). Even in conditions of poor Milky Way visibility (which would never have been as extreme as those of present-day light-polluted cityscapes) this relationship between Auriga and the NCP could have been recovered by following the direction roughly provided by the peak roof star and Capella (the brightest star) to the general vicinity of the NCP void – similar to what has been suggested was done in Bronze Age China using two stars of Pegasus (Pankenier 2013), or in the Egyptian Old Kingdom using two stars of Ursa Major (Belmonte et al 2009). There were thus two possible links for finding the NCP using Auriga as a ‘fulcrum’ for orientation (the peak and Capella star alignment, and following the Milky Way through Auriga to the NCP). On the other hand, if Auriga was conceived as a ritual structure in the Sky World, Auriga itself, rather than the NCP, could have been the point where shamans – or other ritualists – could enter and exit the Sky World.

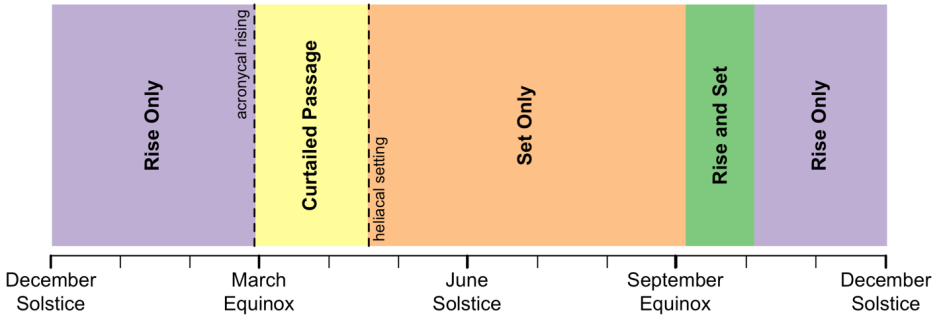


Figure 8. Visibility of Auriga (represented by its brightest star, Capella) throughout the year 17,000 years BC. Curtailed Passage refers to the permanent visibility, i.e. the lack of rising or setting, throughout the night. Calculated using skyscapeR (Silva 2021).

We hazard to suggest that the decorative variation within the pentagonal shape of tectiforms might result from different transcendent experiences or artistic preferences of different ritualists who travelled, in spirit, to the Sky World and actually saw Auriga in their visions as the celestial form of a shaking tent or as a special type of celestial abode of the deities up in the Sky World. Each individual ritualist would probably have seen or portrayed different details (like those on the shaking tent in Fig. 6), but all visions would have had to conform to the general shape of Auriga. Such individual variation within a basic cultural tradition is characteristic of traditional ritualists like shamans and members of secret societies.

Auriga's seasonality

Auriga's seasonal visibility may have equally imbued it with significance or added to it (Figure 8). Auriga's stars are of the curtailed passage phase-type (Brady 2015), meaning that for a period of time in the year, this constellation is seen every night, slowly making its journey around the NCP, without ever touching the horizon (i.e., without rising or setting at night). This behaviour is special, as stars of this phase-type are somewhere between circumpolar stars – that can be seen every night in the year rotating around the pole – and the other stars that rise and set – and consequently can only be seen at certain seasons in the

year. For the ancient Egyptians of the Old Kingdom, stars of the curtailed passage phase-type carried the soul of the dead Pharaoh into the northern celestial region where it would become one of the circumpolar stars (Brady 2012). Although we don't have any direct ethnographic parallels for this psychopomp function of curtailed passage stars their unique ability to link up the world of the living to the celestial polar region – perhaps the Sky World more generally – could also have been recognised by hunter/gatherers in the Upper Palaeolithic. For Auriga ca. 17,000 years BCE, the curtailed passage phase would have occurred for a month and a half (Figure 8), starting around the vernal equinox. This could have been an ideal timing for shamanic rituals to be performed – thereby synchronising the ritual activity to the cosmological ascent of Auriga as a celestial ritual structure.

This curtailed passage phase would end in late April/early May, a time that, in the Upper Palaeolithic, indicated the *bonne saison* – the “time at the end of winter when rivers unfreeze, the snow melts, and the landscape begins to green” (Bacon et al. 2022: 7). This is arguably a critical time for a northern hunter/gatherer community and one which Bacon and colleagues suggest was the beginning of their calendrical time-reckoning as depicted in non-figurative signs. Therefore, this return of Auriga to earth, coinciding with the revival of nature, could have been imbued with important

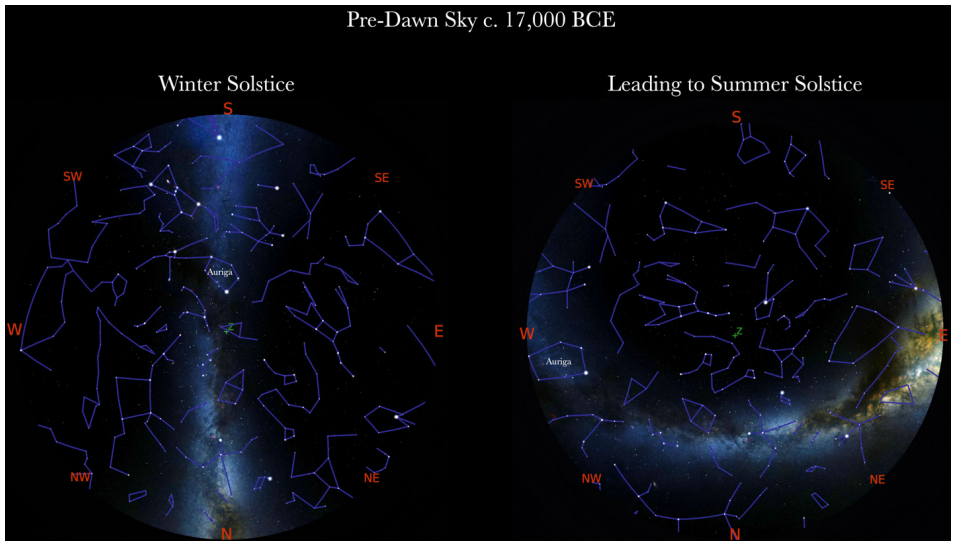


Figure 9. Pre-dawn sky at 17,000 BC at winter solstice (left) and one month before summer solstice (right). Adapted from Stellarium (Zotti et al 2020).

symbolism. In fact, the seasonal, ecological and ethological character of the constellations is not without global precedent, both in the historical and ethnographic records, where the seasonal appearance of certain constellations in synchrony with key cycles of the natural and social world are seen as intrinsically related (e.g. Campion 2012; Fabian 1992; Hugh-Jones 1979; MacDonald 1998; Nimuendajú 1946; Urton 1981; Wagley 1983;). It seems possible that, in the Upper Palaeolithic, constellations that were seen at important moments in the cycles of nature could have been conceptually or symbolically related to those cycles.

In effect, observing the stars of Auriga close to the eastern horizon as they rise, and tracking them throughout the year, one would be able to use them to roughly identify the turning of the seasons, i.e., the moments when day and night are roughly equal. This is because Auriga could only be observed rising between, roughly the weeks of the September and March equinoxes (Figure 8). Its first rise, around dawn, in September would indicate that the colder half of the year had started, whereas its last rise in March, at dusk, would indicate the

beginning of the warmer half of the year. This would have been a stellar way to identify the transitional periods we identify with the, solar-defined, equinoxes – a much simpler and intuitive solution than the highly sophisticated requirements for the observation of a solar equinox (cf. Ruggles 2017).

Furthermore, just before sunrise on the days around the winter solstice, the Milky Way would have been straight-up, going from the North cardinal point, straight up to the zenith and back down to the South cardinal point. Auriga was right at the top, close to the zenith (Figure 9, left). Similarly, leading up to summer solstice, Auriga would have been the last constellation to set before the sun rose; and, as it did so, the Milky Way would be at its lowest in the sky, with its arms touching the cardinal points East and West (Figure 9, right). While pre-dawn celestial observations may appear unusual, it is pertinent to point out that many hunter/gatherer and horticultural rituals last throughout the night and only end near dawn (e.g., Katz 1982:40-1,170,282; Valero and Biocca 1970; Hayden, field data from Australia).

Due to the imprecise time range when the cave art images could have been created (c.17,000-14,000 BCE for the tectiforms; Barshay-Szmidt et al. 2016), and the uncertainty about the nature of observations that would have been important for these constellations in the past (e.g., whether their risings, settings, or highest positions were important, or even positions at other specific periods of the night such as pre-dawn hours), it is challenging to identify which of the above observations of Auriga might have been more meaningful for Magdalenians. However, given all of the above relationships, there are several reasons for thinking that 17,000 years BC, Auriga could have been conceptually and symbolically associated with the polar region in the sky, as well as with key moments in the annual cycles of nature.

Concluding remarks

We have provided a number of reasons to think that the tectiform shapes in the Middle Magdalenian around Les Eyzies (France) were based on the pentagonal form of Auriga. Practically all cave art specialists who have dealt with tectiforms have interpreted them as strongly symbolic representations of some kind of special structure often thought to be ritually significant. Ethnographically-based possibilities are that tectiforms could represent shamanistic tents, burial structures, sweat bath structures, mythological houses of deities in the sky, or women's seclusion constructions. We explore some similarities between ethnographic shaking tents of northern hunter/gatherers as a possible candidate for such a special ritual structure. That the tectiforms were meant to represent Auriga seems probable on the basis of the peculiar similarities between tectiforms and Auriga including the same basic pentagonal shape adhering to the same proportions and involving similar roof and wall angles. The inwardly sloping wall angles of both tectiforms and Auriga are not reflected in any of the ethnographic parallels used by the early authors like Breuil to support their interpretations of ordinary tents. These unusual wall angles seem to be unique features of both

tectiforms and Auriga that support their common identity.

Aside from the more abstracted versions, the full pentagonal versions of tectiforms are remarkably standardized in terms of their outlines and proportions, although the stylistic infilling of the basic shapes is more variable (Figure 2; Plassard 2000:54). Vialou (1987:316) has drawn attention to this interesting aspect of tectiforms. Such standardization of forms is unusual for cave art. It is as though all the different image makers over a millennia or two were using the exact same visual template. This could be explained if, in fact, they were using Auriga as the template.

A number of rock art specialists are convinced that Upper Palaeolithic caves were used for shamanistic rituals and that the art was created by shamans (Clottes 2001, 2004; Clottes and Lewis-Williams 1998; Lewis-Williams 1994, 2002; Whitley 2000). In addition to shamanistic rituals on the ground and under the ground (in caves), we think it is possible that something like shamanistic rituals--especially a variety of shaking tent performances involving middle level entoptic interpretations--could have existed during Magdalenian times involving journeys, in spirit, to the upper world and could have been represented in the cave art of the more complex Upper Palaeolithic cultures. The emanations depicted as coming out of the tops of the tectiforms provide additional support for such views.

Decorative variation within the pentagonal shape of tectiforms could have resulted from different transcendent experiences of different ritualists who travelled, in spirit, to the Sky World and actually saw Auriga in their visions as a shaking tent or spirit home up in the Sky World. Individuals would have seen different details, but all visions would have had to conform to the general shape of Auriga. The Milky Way, often viewed as a path to the Sky World, passed through Auriga in 17,000 BCE and led directly to the North Celestial Pole, also frequently viewed as a portal to the Sky World. Such practices and beliefs are particularly prevalent in northern hunter/gatherer cultures where shamanistic performances were important.

But irrespective of whether Auriga or tectiforms did, in fact, represent shamanistic 'shaking tents', or burial huts, or deity houses, or sweat baths, we think that the similarities between the Auriga constellation and the tectiform cave motif are strong enough to demonstrate a conceptual link between the two. It also seems plausible that Auriga could have been used as a directional indicator for the polar centre of the sky; and that its prominence near the zenith of the evening sky at the time of the winter solstice, and its return to the horizon--after a curtailed passage phase, during the important *bonne saison* in early May-- could have constituted another level of symbolic importance linked to important seasonal changes. These are all plausible reasons why painters of caves could have wanted to portray the general form of Auriga as tectiforms.

As a final note concerning the problems of identifying constellations in cave art – or indeed in any form of rock art – we recognise that the above has largely been an exercise in informed investigation rather than any establishment of proof. However, with respect to previous attempts to identify celestial features in rock art, we have tried to move past mere visual or positional similitudes by engaging with Auriga's peculiar celestial context. We have tried to at least ask why this particular constellation might have been important enough to represent it in cave art and to suggest some answers based on ethnographic practices and beliefs. Thus, we have examined its location with respect to the North Celestial Pole and the Milky Way, its unique seasonal movements and their correlation to the seasonal and phenological cycles. Its importance may also have been entangled with the adjacent asterisms of Taurus and the Pleiades. These aspects may stimulate other inferences and provide other possible relationships linking Auriga to the lifeworlds of Middle Magdalenian people. Although we may never know with total certainty whether the tectiforms were definitely based on the celestial template provided by Auriga, we have, at least, provided new, alternative ways of thinking

about this peculiar motif and the people who drew it.

Data Availability: Information about the generation of star maps and constellation seasonality is available from F. Silva.

Author Contributions: B. Hayden generated the conceptual framework for this research. He compiled the background information on tectiforms and undertook most of the ethnographic research. F. Silva contributed the astronomical modeling and generated the star maps used in this article as well as providing the historical aspects of astronomy cross-culturally. Both wrote their relevant sections for this article.

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