



Art and the Middle-to-Upper Paleolithic transition in Europe: Comments on the archaeological arguments for an early Upper Paleolithic antiquity of the Grotte Chauvet art

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ABSTRACT

The spectacular art of the Grotte Chauvet stands out among all other examples of Aurignacian art, which are restricted to a handful of sites in other regions of western and Central Europe, which take the form of sophisticated carvings on organic materials and of simple engravings on rockshelter walls. Given its sophistication, Chauvet has understandably come to feature prominently in debates as to the nature of human symbolic origins, the behavioral capacities of *Homo sapiens*, the nature of the dispersal of modern humans across Europe, and the possibly contemporary extinction of *Homo neanderthalensis*. Significant objections to such an antiquity have, however, been made in recent years on the grounds of the style, themes, and technical practice of the art itself, and on the grounds of the AMS radiocarbon dating program that was first seen to suggest an early Upper Paleolithic age. To date, no attention has been paid to claims for an Aurignacian age on specifically archaeological grounds. Here, I undertake a critical examination of the archaeology of the cave and its wider region, as well as attempts to verify the antiquity of the art on the basis of comparison with well-dated Aurignacian art elsewhere. I conclude that none of the archaeological arguments withstand scrutiny and that many can be rejected as they are either incorrect or tautologous. By contrast, hypotheses that the art is of Gravettian–Magdalenian age have not been successfully eliminated. The age of the art of the Grotte Chauvet should be seen as a scientific problem, not an established fact. While it may prove impossible to prove an Aurignacian age for some of the Chauvet art I suggest a set of expectations that would, in combination, strengthen the robusticity of the ‘long chronology’ argument. The onus is upon Chauvet long chronologists to do this, and until they do, we must conclude that the art of the Grotte Chauvet is not dated, and very possibly much younger than claimed.

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Introduction

The spectacular art of the Grotte Chauvet—now amounting to over 420 images showing varied subject matter and considerably sophisticated techniques of production—has understandably attracted considerable excitement and attention since its discovery in 1994. Although initially thought to be of late Upper Paleolithic antiquity, AMS radiocarbon dates on charcoal from four of the cave’s images suggested that the charcoal—and thus art—was produced between ~30,000 and 32,000 BP. Consequently, the cave has become pivotal in discussions about the origins of Paleolithic art, and of the cognitive differences between Neandertals and early *Homo sapiens*, at least by the time the latter had arrived in Europe. Although it is possible (but as yet undemonstrated) that the cognitive changes assumed to be critical to the emergence of *Homo sapiens* occurred much earlier than Chauvet and on a separate

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continent, the cave, as with the Aurignacian archaeology of Europe, still occupies a prominent role in discussions of the ‘human revolution.’ For Mellars, ‘the Aurignacian period shows an apparently sudden flowering of *all the most distinctive features* of fully ‘modern’...cultural behavior. Such features include...remarkably varied and sophisticated forms of both abstract and sophisticated art—ranging from engraved outlines of animals, to representations of both male and female sexual organs, to the remarkable ivory statuettes of animal and human figures from southern Germany, and “*the elaborate cave paintings of the Chauvet Cave*” (2004: 461, my emphasis). Remove Chauvet from the equation and one is left with the simple outline paintings and engravings of France, Spain, and Italy and the (admittedly impressive) carvings in the round from southwest Germany, which, if it is fair to generalize about the Aurignacian from three restricted geographical regions of Europe, is still probably exaggerating to describe as ‘remarkably varied.’

Here, I examine some of the justifications for an early Upper Paleolithic antiquity for the Chauvet art, and contextualize these in

the wider debate. In a brief summary of Aurignacian art I shall ignore ‘personal ornamentation,’ a term usually used by Paleolithic archaeologists to define highly-organized and symbolically-organized items of exchange and personal display. While personal ornaments may, of course, be indicative of ‘symbolic’ activity, and of advanced planning in the landscape in the form of exchange networks and the biography of objects, they may also be indicative of little other than a desire to ornament the body. As Chauvet is not known to have yielded personal ornamentation, I shall restrict my discussion to figurative art.

The Middle-to-Upper Paleolithic transition: methodologies and generalizations

Typologies and dates, not fossils and biology, are the stock-in-trade of the European Middle-to-Upper Paleolithic transition debate. Artifact taxonomic units established in the first half of the twentieth century form the basic units of analysis, are taken as proxies for human populations, and hung very broadly in Pleistocene time by the imprecise dating methods currently available to us. Despite the often severe limitations in this endeavor, specialists have achieved considerable amounts in recent years, and something of a consensus has materialized over the last twenty or so. It is probably fair to assume that the following statements represent this consensus:

- Despite a poor chronological database and limitations to chronometric methods, Neandertals seem to have become extinct everywhere by ~30,000 BP;
- Despite virtually non-existent associations between Neandertal fossils and poorly-understood ‘transitional’ assemblages such as the Châtelperronian, Uluzzian, Lincombian, etc., it is most likely that Neandertals were responsible for the manufacture of most, if not all, of these assemblages;
- By the time Neandertals became extinct, given similar caveats, early modern humans appear to have established themselves over much of Europe;
- Given the caveats noted above for transitional assemblages, it is most likely that modern humans were responsible for the manufacture of most, if not all, Aurignacian assemblages;
- Thus, where ‘transitional’ and Aurignacian assemblages overlap chronometrically, despite large errors in precision which are usually ignored, it is likely that this represents a degree of contemporaneity between the two populations;
- This contemporaneity suggests that the two met and interacted, at least on occasion. Such interaction may account for the occasional presence of personal ornamentation in ‘transitional’ assemblages;
- The available evidence suggests that Neandertals did not engage in as much artistic activity as *Homo sapiens*. Despite the existence of utilized pigments on European and Levantine Mousterian sites (which are as abundant as those from African MSA sites), there are no convincing examples of Mousterian (or ‘transitional’) figurative art. Thus, it is unlikely that we will find examples of Neandertal art;
- By contrast, although figurative art is remarkably uncommon in the Aurignacian, the existence of some, in addition to examples of non-figurative art, apparent notation, and personal ornamentation all ‘add up’ to suggest that from the period of their initial expansion across Europe, *Homo sapiens* Aurignacians were fully artistic. This is in accord with their being ‘cognitively modern’;
- The discovery of the art of the Grotte Chauvet supports the latter notion spectacularly.

It should be evident that a number of assumptions are present in these axioms, although specialists are rarely happy about

questioning them. The result of building up consensus rather than seeking to eliminate testable hypotheses will inevitably create a potentially shaky mix of theory, assumption, and dogma, and in this context, it is easy to understand how certain assumptions are usually either rejected outright or accepted implicitly. The uncritical acceptance of the early age (or ‘long chronology’ as one might call it) of the Chauvet art by many specialists arose out of this situation, but this does not make it uncontroversially established that it is Aurignacian. The degree of axiomatic assumption may be seen by the fact that many specialists in the African/European MSA/MP and LSA/UP will presumably be happy enough with the following statement:

“Despite one or two critiques most specialists agree that convincing examples of Neandertal burials exist. Estimates of simple burials among the Neandertals vary between around 12 and 30 individuals spanning a period of approximately 40,000 years, (i.e., between ~75,000 and ~34,000 BP). The relative rarity of such burials probably indicates that burial was not a particularly common mortuary activity among Neandertals. Either Neandertals did not regularly practice mortuary activity, or the means by which they did so are not visible in the archaeological record. Certainly one should not generalize that ‘Neandertals buried their dead’: instead, it may be more apposite to say that some Neandertal societies, in some periods, buried some of their dead. The rest didn’t.”

Of course, the lack of any other form of visible mortuary ritual does not preclude any other forms such as exposure, but neither does it preclude the notion that most Neandertals did not engage in it. Thus, if burial is taken as one item on the ‘check list’ of modernity, one must conclude that some Neandertal groups were cognitively modern in at least this aspect of behavior, but many were apparently not.

The following statement follows a similar observational and logical process, although I suspect that many specialists would be less happy with it:

“Estimates of artistic or symbolic activity among MSA and earliest Upper Paleolithic *Homo sapiens* populations are generally in good agreement, emphasizing a handful of African sites with evidence of personal ornamentation (and engraved ochre ‘crayons’ from one site), and somewhat more evidence from Europe. The small number of sites excavated in such a large continent as Africa should make us very wary about making any generalizations at this stage, but the large amount of archaeological evidence from this period in Europe, and the rarity of evidence for art and symbolism before the mid-Upper Paleolithic probably indicate that art at least was not a particularly common activity among the earliest modern humans in Europe. Whether or not they practiced art on perishable materials is debatable, but one should not generalize that ‘Pleistocene *Homo sapiens* created art, painted caves, and sculpted figurines.’ It may be more apposite to say that some early modern human societies, in some phases, produced art. The rest didn’t.”

In this case one would have to conclude that if art is indicative of one aspect of ‘modern behavior,’ which given the ubiquity of the notion of ‘symbolism’ in the modernity debate, is highly likely, some modern humans (including Aurignacians) were modern in this light, whereas many were not. Again, one cannot distinguish between the notions that this indicates art was common but was practiced in ways that are now archaeologically invisible, or that absence of evidence really does provide evidence of absence. Problems of excavation and recovery, taphonomy, and survival aside, the two statements relate to the same set of assumptions and interpretations used by prehistorians interested in the

Middle-to-Upper Paleolithic transition. The precise similarity can be summarized simply: one piece of evidence—one object or one site—is used as a foundation for generalizations about an entire species. Only three African sites are quoted by d'Errico et al. (2003: 3) that 'challenge models that equate the symbolic revolution with the arrival of AMH (anatomically modern humans) in Europe some 37,000 years ago,' and of these only two have yielded used pigment for which, in any case, there may have been several non-symbolic uses (e.g., Wadley, 2005). Ochre fragments have been found in Lower Paleolithic sites as geographically distant from Africa as Hungsi and Zhoukoudien in China, and as chronologically distant from the MSA as the Lower Paleolithic of Bizat Ruhama, Israel at ~800–900 ka BP (Dennell, pers. comm.). The recent hypothesis of a deep-rooted and cumulative emergence of cognitive and behavioral 'modernity' in Africa by McBrearty and Brooks (2000) provides little further evidence for pigment use, and no evidence of figurative art before the Late Stone Age (i.e., the painted plaques from Apollo 11 Cave, Namibia, which are in any case not securely dated and may be much younger than the ~20 ka usually quoted). Despite this, they infer a continuous tradition of pigment processing in Africa stretching back at least to 280,000 BP (the oldest end of which is marked by the recovery of 'red stained earth' and haematite fragments at Kapthurin; McBrearty and Brooks, 2000: 528). While the recovery of engraved plaques from Blombos Cave, South Africa, may (or may not) indicate symbolic activity in South Africa by ~80,000 BP, it may be premature to infer the cognitive capacities and behavioral expression of an entire species on the basis of a handful of used lumps of ochre.

The art of Chauvet is one such example of a site that is used largely *in isolation* to make bold statements about the origins of

modern human behavior. If its art is really of late Upper Paleolithic antiquity it is not unique: rather it falls into a widespread and well-understood context of Solutrean-Magdalenian decorated caves which reveal considerable sophistication in the planning, organization, and execution of parietal art. By the same token it would be irrelevant to the Middle-to-Upper Paleolithic transition as it is as distant in time from those processes as the Magdalenian is from us. By contrast, if some of its art is genuinely Aurignacian in age, it is as yet unique, and as it is so, one cannot generalize about the entire European earliest Upper Paleolithic by using it alone. It should be apparent that there is much time and much space between Blombos and Chauvet caves, with very little in between except our own assumptions.

Aurignacian art

Despite well over one century of intensive excavation, at least in several regions of Europe, and a relatively extensive Aurignacian archaeological record, unambiguous examples of art >30 ka BP are remarkably rare. Table 1 summarizes those which are demonstrably or very probably of Aurignacian attribution. One can summarize these briefly. Deriving from a handful of sites, they fall into two broad groups: carvings on organic materials (usually mammoth ivory) mostly in the round but occasionally in bas relief; and engravings on rockshelter or cave walls usually discovered as cryoclastically shed blocks within Aurignacian archaeological horizons. Of the latter, techniques are simplistic and depictions are often ambiguous, at least in the case of the painted slabs from Fumane Cave (Italy) which may, or may not, be figurative. By contrast, the carvings of SW Germany and Austria are remarkably

Table 1
Demonstrable and probable examples of Aurignacian art

Art work	Nature	Probable age	Notes	References
'Galgenberg Venus', Krems-Rehberg (Stratzing)	Two-dimensional schist statuette	Evolved Aurignacian ~32 ka BP	Dates on charcoal from hearth near to statuette and association with diagnostic Aurignacian lithics	Neugebauer-Maresch, 1999
'Lion-Man' of Hohlenstein-Stadel	Three-dimensional carving on tip of mammoth tusk, lion-headed anthropomorph	32–31 ka BP	Dates on four samples from same spit and association with diagnostic Aurignacian lithics	Schmidt, 1989; Conard and Bolus, 2003
Vogelherd figurines	15 three-dimensional carvings on mammoth ivory and bone (one bovid, one possible horse, four mammoths, four carnivores, three felids including one from the spoilheap, one anthropomorph, one unidentified quadruped)	32–30 ka BP (although dates scatter widely to ~36 ka BP and more recent: one should exercise caution as these come from early excavations)	Aurignacian lithics and bone points	Verlaine, 1990; Conard, 2003; Conard and Bolus, 2003
Hohle Fels figurines	Small three-dimensional carvings of a lion-man, water bird, head of a horse on mammoth ivory	31–30 ka BP	11 AMS radiocarbon dates from same level	Conard, 2003
Geissenklösterle figurines	Four carvings on bone: bear, mammoth, and bovid: one bas relief carving of anthropomorph on bone	32–30 ka BP	Numerous AMS radiocarbon dates (including on charcoal from hearth), association with uppermost Aurignacian, including flutes	Hahn, 1982; Conard, 2003
Fumane Cave painted blocks	Numerous cryoclastic blocks sheared off the cave's walls, ochred, and, in six cases, bearing ambiguous (possibly figurative) art	35–30 ka BP	Dates from levels D3–D6 in which the blocks where found. Association with Aurignacian II.	Broglio and Guioli, 2004; Broglio et al., 2006; Bartolomei et al., 1994 (archaeology and dates)
SW French engraved blocks	Simple engravings of complete animals, and signs including 'vulvae' from rockshelters at Belycayre, Blanchard, Castanet, Cellier, and La Ferrassie.	No direct dates	Early excavations: association with evolved Aurignacian	Delluc and Delluc, 1978a,b
Cantabrian grooves	Series of deeply-incised grooves on the wall of El Conde Cave and La Viña Rockshelter	>24 ka BP early Gravettian or Aurignacian	Engravings covered by deposits containing Gravettian archaeology, dated at El Conde to ~24 ka BP. Probably Aurignacian but one cannot rule out an early Gravettian age	Fortea Perez, 2002

accomplished, and presumably formed part of a mobile set of material culture rather than the materials used to give symbolic meaning to a specific place.

The Chauvet art could not stand out from these examples more. With the exception of the simple engravings of France and Spain (which are *not* found in deep caves but in habitation contexts), no other example of the enculturation of space—the fixing of art on a deep cave's walls—is known from the Aurignacian. If Chauvet is genuinely of this age it is the one example we have for art removed from personal and domestic space. Some (e.g., Broglio et al., 2006) have argued that the variability observed between known Aurignacian art and that of Chauvet 'in no way contradicts the attribution of these sites to the Aurignacian' (Broglio et al., 2006: 7) and favor functional differences to account for variation in which the 'primitiveness' of the Fumane art suggests a more prosaic context, whereas the 'maturity' of the Chauvet art relates to the Chauvet Cave's use 'as an initiation and ceremonial site' (Broglio et al., 2006: 7). This may be true—we cannot possibly tell—although a parsimonious interpretation of the difference would see them as radically different in age.

The parietal art of the Grotte Chauvet

A poor radiocarbon database has been used to justify the notion that the parietal art of the Grotte Chauvet, or at least some of it, represent 'the World's oldest paintings' (Chauvet et al., 1996). The title of another popular publication by the Chauvet team suggests, that it represents the 'Birthplace of Art' (Clottes, 2003). Arguments for an early antiquity of the Chauvet art center on the following: a series of ~50 AMS radiocarbon dates on charcoal largely from the cave floor (including a small number of charcoal samples from depictions on the cave's wall); stylistic and thematic comparisons with other demonstrable or supposed Aurignacian art; archaeological arguments for the antiquity of human incursions into the cave; and archaeological arguments for the antiquity of the Upper Paleolithic in the region.

In recent years a number of critiques of the grounds upon which the Chauvet art—or much of it—is held to be Aurignacian have been made. These relate to arguments about the nature of the art itself, and to the ways that it has been dated. Of the former, numerous stylistic traits, the content (i.e., themes) of the art, and the technical aspects of the production of the art are unknown before at least the Gravettian and in many cases before the Magdalenian. Of the latter, the direct dating of microscopically small samples of charcoal scraped off of chemically-active rock environments is an endeavor that must be treated as experimental given the many pitfalls involved (see especially Rowe, 2004). For Chauvet, one is asked to accept only six dates on three art images as face-value indications of their antiquity. Table 2 summarizes a number of the problematic areas with the Aurignacian age of the Chauvet art.

Although these are serious grounds for objection—or at least for concluding that the art of Chauvet is not reliably dated—I intend here solely to concentrate on specifically archaeological arguments forwarded in support of the notion of an Aurignacian antiquity of the art. I do this for two reasons: first, because of the strong objections to the stylistic and thematic arguments and critiques of the reliability of the absolute dating of the cave and its relevance to the antiquity of the art that already exist in the literature (Züchner, 1995, 1996, 2001, 2007; Floss 2003; Pettitt and Bahn 2003; Pettitt and Pike 2007; and see Table 2); and secondly, because the archaeological support for an Aurignacian antiquity of the art has yet, to my knowledge, to receive critical attention.

One should remember that when the spectacular art of the cave was discovered in 1994, it was originally thought on both stylistic and thematic grounds to be of late Upper Paleolithic (i.e., Solutrean-Magdalenian) age and it was only with the appearance of a handful

of radiocarbon dates on charcoal used for some of the pigments, supported by an increasingly large number of dates on charcoal from the cave's floor, that the Chauvet team shifted their opinion towards an Aurignacian attribution which remains the commonly accepted view today. Pettitt and Bahn (2003) drew attention to the weaknesses of the chronological data, questioning the relevance of charcoal samples from the floor of the cave as well as the chronometry of cutting edge science, such as dating minuscule samples of carbon scraped off of chemically active surfaces. Our call for independent verification of the results—having an independent laboratory undertake a complete sampling, pretreatment, and dating project for samples of the art—has, to the present day, gone unheeded. Overall, there are many objections to the 'long chronology' for the Chauvet art, and a parsimonious interpretation of all available evidence would support the initial views of the Chauvet team (i.e., that the art is of late Upper Paleolithic age; Pettitt et al., *in press*). If this is so, then the cave has no relevance to the Middle-to-Upper Paleolithic transition, and one is left with a remarkably small amount of artistic material (and, it has to be said, no technically-impressive parietal art) to represent the Aurignacian. Suffice it to say here that:

- On many thematic and stylistic criteria, numerous specialists would regard the art as of late Upper Paleolithic age, and many such criteria contradict the notion of an age earlier than the Gravettian;
- The existing direct dating of the cave's art and archaeology is poor, unrepresentative, chronometrically problematic, and probably highly misleading;
- There are a number of tautologous arguments and contradictory statements in the reasoning of the Chauvet team.

It is probably fair to begin by assuming that the art of the cave was created at several times, by distinct individuals probably with differing cultural affiliations. 'There is virtually no doubt that all the images cannot have been produced by the same person in a single episode...One can even discern *successive phases*...people came into the cave some time after the production of the black paintings...analyses of the charcoal on the floors will give chronological indications, *but will not provide any proof*: these pieces of charcoal might have been left at the moment when some paintings were produced, but it is equally possible that they could be earlier or later by several millennia' (Clottes, 1996: 118, my emphases). Thus, prepared with the caveat that the archaeology of the cave need not correspond at all with the art on its walls, and hence that the 37 dates from the floor are irrelevant to the art, one may explore the archaeological arguments for its early Upper Paleolithic antiquity.

Art of the Grotte Chauvet: archaeological arguments for an Aurignacian antiquity

Over 420 depictions have been identified throughout several chambers of Chauvet Cave. Fourteen faunal taxa can be identified, among which carnivores represent over 50%. The complexity of techniques used to create the images includes preparation of the cave's wall surfaces by scraping, use of topographic features to bring out dynamism, complex 'stump' shading and attention to detail, group composition, and perspective. In the decade subsequent to the discovery, several popular books have appeared on the cave (e.g., Chauvet et al., 1996; Clottes, 1996, 2001, 2003), in addition to a collection of short scientific papers, with a proliferation of secondary publications that tend to stress the technical sophistication of the art and its importance for our understanding of the behavior and cognition of early members of *Homo sapiens* in Europe. Apart from the stunning sophistication of the art—which would be exceptional whatever its age—the perceived early Upper

Table 2
Non-archaeological arguments for and against an Aurignacian antiquity for the Grotte Chauvet art

Grounds of critique	Specific arguments	References
Style, content, and technique	<p>Chauvet art originally thought to be Solutrean/Magdalenian on stylistic grounds</p> <p>Art is not homogeneous: at least two broad 'traditions' exist (red and black series)</p> <p>Red series underlies black series and is stratigraphically older. Closest parallels for red series are Gravettian, suggesting that black series must be younger</p> <p>Heterogeneity of black series suggests that it spans a considerable period of time after the Gravettian</p> <p>Unambiguous Aurignacian art from other sites is not at all similar to Chauvet</p> <p>Hand prints, styles, and certain signs present at Chauvet are by general agreement type fossils of the Gravettian, Solutrean, and Magdalenian, (e.g., Y-shaped legs, red claviform, engraved tectiform)</p> <p>Depictions of reindeer unknown elsewhere before the Magdalenian: Chauvet has 12</p> <p>Unequivocal type fossils of the Aurignacian (e.g., circular 'vulvae' and animals in outline found at other Aurignacian sites) are completely absent from Chauvet</p> <p>Black series of paintings displays much interest in anatomical detail (e.g., hooves, pelage, musculature) and perspective, not evident elsewhere before the Magdalenian</p> <p>Black series of paintings displays evidence of movement; closest parallels are with Magdalenian art elsewhere</p> <p>If one accepts that the dates on the black series indicate that some of the black paintings are Aurignacian, others must be of the same age or older. The red series must on stratigraphic grounds at least be early Aurignacian. The entire evolution of Upper Paleolithic art would be present in one cave in a few millennia, long before it evolves in a similar manner everywhere over ~20,000 years</p> <p>Four-phase production process from preparatory scraping to final engraved retouching of paintings found only after Gravettian</p>	<p>Chauvet et al., 1996</p> <p>Chauvet et al., 1996</p> <p>Alcolea and Balbín, 2007</p> <p>e.g., Züchner, 1995, 1996, 1999, 2001, 2003, 2007</p> <p>Pettitt et al., in press</p> <p>e.g., Züchner, 1995, 1996, 2001, 2003, 2007</p> <p>Djindjian, 2004</p> <p>e.g., Züchner, 1995, 1996, 2001, 2003, 2007</p> <p>e.g., Züchner, 1995, 1996, 2001, 2003, 2007</p> <p>'Chauvet evolution,' Züchner, 2007; Azéma, 2004. Examples of animation are 'surtout au Magdalénien il est vrai,' Clottes and Azéma, 2005: 181</p> <p>e.g., Züchner, 1995, 1996, 2001, 2003, 2007</p> <p>Tosello and Fritz, 2005</p>
Wider artistic parallels	<p>Arguments often involve other art sites which are not demonstrably Aurignacian and could be later (e.g., Aldène, Ebbou, Grotte du Deroc)</p> <p>Comparisons are often tautologous</p> <p>Closest parallels are seen to be with SW German Aurignacian carvings but these bear few similarities. Emphasis on felines but German themes are much wider including herbivores and a water bird. None of the Chauvet felines are dated. Closer parallels could be among the Gravettian (Pavlovian) of the Czech Republic</p> <p>Tautologous attempt to date Chauvet to Aurignacian by comparison to engravings at Aldène highly problematic. The latter art is probably not Aurignacian; is highly unique and idiosyncratic; dating relies on un-provable assumption that a stalactite sealed the decorated chamber and U-series dates on the stalactite are highly problematic in the opinion of the scientists who produced them</p>	<p>Various arguments summarized in Pettitt et al., in press</p> <p>Pettitt et al., in press</p> <p>Clottes and Azéma, 2005: 181; Conard, 2003; Pettitt et al., in press; Tosello and Fritz, 2005: 168–9, acknowledge that there are few similarities between the Chauvet art and the SW German carvings</p> <p>Tosello and Fritz, 2005: 168–9; Ambert et al., 2005 'l' Aldène ne peut actuellement être rapportée valablement à une des cultures classiques du Paléolithique 'Supérieur'; Pales and Vialou, 1984: 342</p>
Chronometry (¹⁴ C)	<p>Assumption that production of charcoal (i.e., age of the samples) relates to the creation of the art</p> <p>Lack of publication of dating program details; pretreatment, sample yields, discussion of samples that are deemed to have 'failed'</p> <p>Lack of treatment of dating of charcoal from chemically active cave walls as experimental. Possible contamination has not been eliminated</p> <p>All samples dated at Gif-sur-Yvette laboratory with no complete independent verification of results on the art</p> <p>Serious discrepancies with direct dating of art at Candamo Cave (Asturias): samples from the same dots dated at Gif-sur-Yvette to >30 ka BP and Geochron to ~15,000 BP—over two half-lives different. The Chauvet team acknowledge the possibility of contamination</p> <p>Serious discrepancy between dates on humic (~29 ka) and humin (~20 ka) fractions of charcoal from one horse depiction (>1 half-life) suggest serious contamination. Results have now apparently been withdrawn</p> <p>The greater majority of dates from Chauvet come from charcoal on the cave's floor: charcoal from only 3 or 4 separate images has been dated for a cave with >400 depictions. How many separate contexts have actually been dated? Only 12% of dated contexts are >30 ka BP</p>	<p>Pettitt and Bahn, 2003; Pettitt and Pike, 2007; Pettitt et al., in press</p> <p>Pettitt and Bahn, 2003; Pettitt and Pike, 2007; Pettitt et al., in press</p> <p>Pettitt and Bahn, 2003; Pettitt and Pike, 2007; Pettitt et al., in press; Rowe, 2004</p> <p>Pettitt and Bahn, 2003; Pettitt and Pike, 2007; Pettitt et al., in press; Rowe, 2004</p> <p>Fortea Perez, 2002; Pettitt and Bahn, 2003; 'this cave may have been visited at different periods by prehistoric people...the decoration of this cave is rather complex...pollution might have affected certain samples but not others,' Valladas and Clottes, 2003: 142</p> <p>'This result needs future verification,' Valladas et al., 2005: 111</p> <p>Pettitt et al., in press</p>
Access to the cave	<p>Discrepancies with different team members' views about when the cave closed. The team rely on youngest dates only, and large Holocene fauna were able to enter the cave</p> <p>Possibly more than one entrance in the Pleistocene</p> <p>Bear activity in the cave spans millennia. No bear scratch marks on top of black series despite the fact that 'cave bears visited the cave for millennia, before, during, and after the visit(s) by humans'</p> <p>Inconsistencies between team members' views on when the collapse of the modern entrance occurred. Even assuming the modern entrance was the only one to allow access in antiquity, the cave could have been open for the entirety of the Pleistocene</p>	<p>For latest dates compare Gély, 2005: 28 (22,800 ± 400) with Fosse and Philippe, 2005: 94–95 (19,105 ± 150); Philippe and Fosse, 2003: 53</p> <p>García, 2001</p> <p>Alcolea and Balbín, 2007: 450; Fosse and Philippe, 2005: Table 3; Quotation from Philippe and Fosse, 2003, 54</p> <p>>20,000 BP, Baffier, 2005: 12; ~20,000 BP, Bocherens et al., 2005: 78; 'vers la fin du Gravettien,' Le Guillou, 2005: 134; 'à la fin du Pléistocene,' Valladas et al., 2005: 111; some time before ~11,500 BP, Genty et al., 2004, 2005: 49</p>

Paleolithic age of the art is critical to its importance in current debate.

Geneste (2003, 2005) has forwarded a specific argument for the antiquity of the Chauvet art from the archaeology on the cave's floor. This takes the form of an as yet unspecified number of hearths and wide scatter of small pieces of charcoal which are said to result from deliberate charcoal production rather than lighting and heating; a small (and as yet not exactly quantified) number of flint artifacts; and one sagaie of mammoth ivory. In addition to these, a rich paleontology dominated by bear exists, the relevance of which to the age of the art is, however, ambiguous. Although Geneste finds the indications of human presence in the cave as being 'nombreux et diversifiés' (2005: 142), he clearly favors the long chronology without making a single clear and unambiguous connection between the archaeology and the art. He points to a relatively high density of lithics and AMS radiocarbon dates in the 30–32,000 BP range clustering in the *Megaloceros* Gallery (2005: 141) which, along with a sagaie he identifies as of Aurignacian age, are seen to collectively establish an early antiquity for the art. This is, in fact, illusory. Of the 20 lithic artifacts plotted in Figure 7 (of Geneste, 2005), 12 are found outside of the *Megaloceros* Gallery, and the 8 found within it are scattered over some 30 m; the sagaie could well be of late Upper Paleolithic age as I discuss below, and the large number of AMS radiocarbon dates now available for charcoal from the *Megaloceros* Gallery need bear no relation to the art and would seriously skew the chronometric data if they pertained only to two or three hearths that had become dispersed through subsequent water action (Pettitt et al., in press).

About 20 flints in total have been recovered from the floor of the cave, and among these there are no retouched tools that bear diagnostic cultural attributes (Geneste, 2005: 141), with the exception of a fragment of a small backed blade visible in a calcite flow which may be of Gravettian (or Châtelperronian?) attribution. We must remember that this is a truly 'small number of flints' (Geneste, 2003: 47) that are the only lithics to have been identified on the cave's floor (Geneste, 2003: 141). The relevance of the existing lithics is therefore open to question, and others are unlikely to emerge. They need, of course, bear no relation at all to the artistic activity in the cave, and the recovery of products of débitage indicate that tools were produced and maintained in the cave, which could equally suggest that the occupation of the cave which resulted in hearths being lit ~30–31,000 BP was of a prosaic activity unconnected with the art. Gély (2005: 19) has described the flints as 'souvent bruts et peu caractéristiques,' a description that one could apply to lithics spanning the entirety of prehistory, and one wonders, therefore, how these could at all support the notion of an Aurignacian (as opposed to later) age for some of the art. Furthermore, the distribution of the lithics is diffuse (in the *Megaloceros* Gallery, Gallery of the Crosshatching, Skull Chamber, Hillaire Chamber, and Chamber of the Bear Hollows: see Geneste, 2005), and certainly do not cluster around any specific piece of art, and in any case one might question the relevance of stone tools to the practice of charcoal creation and its subsequent artistic use. Plisson (2005) undertook microwear study on eight of the cave's lithics of which four bore use wear, and was understandably cautious about making any statements from such a poor sample. It is interesting to note that, of these, two were used to cut skin/meat, and only one could be related to 'le raclage d'une matière minérale très légèrement abrasive' (Plisson, 2005: 147) which may, or may not, be a cave wall. As the preparation of the cave's walls prior to painting seems to have been widespread, yet the number of recovered tools so low, one can only conclude that materials used for this preparatory work were removed from the cave or remain to be identified.

While not dismissing the relevance of the lithics, Geneste (2003: 48) makes stronger use of a large biconical sagaie of mammoth

ivory discovered in 1998 embedded in the floor of the cave's *Megaloceros* Gallery close to the 'sector close to the hearths.' This is biconical in form, with an oval or circular section more than 30 cm in length, and with a maximum thickness of around 20 mm. No visible decoration or scoring is present, and the base shows signs of breakage through use. Geneste (Geneste, 2003: 141) notes that it appears to be more slender than the Mladec points of the Central European Aurignacian, although apparently thicker than those of the Solutrean or Magdalenian. The fact that it was found 'in the sector close to the hearths' is not demonstrably relevant and, in fact, it is stated to have been found 'under a thin film of sediment that had accumulated since the prehistoric occupation' (Geneste, 2003: 48), which does little to clarify any potential stratigraphic relationship. Geneste notes that objects of this type are 'known throughout the Upper Paleolithic' (my emphasis) but suggests that points of such a relatively large size 'are well-known at the start of the Aurignacian in Germany and Central Europe.' It is questionable as to why Central European (as opposed to French) sagaies should be relevant to the issue, but Geneste cites the analysis of southern German sagaies by Albrecht et al. (1972) to support an argument that the Chauvet point is of Aurignacian age. This is his only specific argument in favor of an Aurignacian presence in the cave, although his use of the Central European data is problematic. The German sagaies are of either split- or massive-based forms, not biconical, which invalidates any comparison purely on typological grounds. Neither are the few poorly-dated Aurignacian bone points from the Chauvet region noted by Gély (2005) typologically similar to the Chauvet example (they are split-based). In terms of absolute dimensions it is true that a small number of Central European forms approach 30 cm in maximum length, but Figure 17 (of Albrecht et al., 1972) reveals that these are exceptionally rare: the greater majority of German Aurignacian sagaies are 20 cm or shorter in length, and only eight artifacts used in their analysis were larger than 30 cm (79 were <30 cm of which the majority <20 cm). Thus, if the Chauvet sagaie can be compared to the German forms, it is to typologically dissimilar forms that are rare among forms, for greater majority, much smaller. This is hardly a convincing typological and morphometric comparison, and in fact, the differences in morphometrics between the split and massive based forms of Germany led Albrecht et al. (1972) to believe that they formed 'distinct local projectile point populations' (Albrecht et al., 1972: 82, my emphasis).

Thus, it should be clear that there are no grounds to believe that German Aurignacian sagaies have any currency for understanding the Chauvet sagaie, and certainly not for understanding the age of the Chauvet art. There is, however, a more convincing typological and morphometric comparison that one can make closer to home. This French parallel, also of mammoth ivory, biconical form, and of large dimensions (>30 cm), was also recovered from the floor of a painted cave. This is the 'sagaie géante à base conique' associated with the Solutro-Magdalenian occupation of Lascaux, which is seen by specialists as being of proto-Magdalenian age and in the context of an archaeological assemblage which is thought to be homogeneous and representative of no earlier or later periods than the Solutro-Magdalenian (Allain, 1979). Geneste's arguments are thus unconvincing, and can in any case be rejected on the grounds of tautology: he presumes an Aurignacian age of the Chauvet art, which in turn is taken to suggest that the most plausible age for the sagaie is also Aurignacian; this leads him to compare it to German Aurignacian sagaies, which thus, (to him) reinforce the notion that the Chauvet sagaie and art are Aurignacian. Sadly, the sagaie is devoid of collagen and thus a direct date will not solve the issue (Bocherens et al., 2006: 372). However, a more extensive dating project on the cave's faunal remains would at least provide a more reliable minimum span for incursions into the cave. So far, the Chauvet team appear to have been reticent to undertake this on the

grounds of sample destruction and on the basis of Bocherens et al.'s (2005) suggestion that collagen is missing from ~70% of the cave's faunal remains. As there are thousands of these, the ~30% remaining should preserve enough collagen to permit AMS radiocarbon analyses and an exceptionally rich number of dates for the cave's paleontology, and thus accessibility. The sample size required for AMS radiocarbon analysis is minimal, and this has not restricted previous direct dating even of Aurignacian points (e.g., Jacobi and Pettitt, 2000; Bolus and Conard, 2006; Higham et al., 2006). Given that the Chauvet point cannot be dated directly by AMS ^{14}C , it would be worth attempting to date the flowstone that overlies it with U-Series.

One must remember that even if diagnostic Aurignacian artifacts were recovered from the cave, and thus we were able to demonstrate that at least one Aurignacian (or culturally distinct human who had obtained an Aurignacian artifact) had entered the cave, this makes no stronger argument for Aurignacian art. What if a diagnostic Mousterian flint artifact were found in the *Megaloceros* Gallery? Would we conclude that at least one Neandertal created some of the art? Probably not, but as yet this is academic, and only wider, regional, archaeology is relevant to the cave's use. Gély (2003, 2005) has forwarded similarly pro-Aurignacian arguments for the age of the Chauvet art from the regional archaeological context. By his own admission (Gély, 2003: 28) there is 'little evidence' for the Aurignacian in the Ardèche, which leads him to extend his search for evidence 'further south in the Languedoc' to provide a suitable appropriate cultural context. We should remember that Geneste's cultural context is the southern German Aurignacian, now Gély expands this to Languedoc, an immense distance.

If some of the Chauvet art is of Aurignacian age, the distinct rarity of diagnostic artifacts in the region is surprising. Should we expect that infrequent visitors or miniscule populations in the region left a uniquely sophisticated art that is without parallel anywhere else across Aurignacian space? Were these cognitively modern *idiots savants* too concerned with perfecting their art to bother with the quotidian concerns of weapon and tool production and use? As Floss (2003: 277) pointed out, 'in a vast area from the Lyonnais in the north to the Gard and the Vaucluse in the south, we note only two or three localities where Aurignacian occupations can be demonstrated... In the context of such a sparse Aurignacian record it was so much more surprising that some of the Grotte Chauvet paintings were dated to >30,000 years ago. If we assume these dates to be correct, the only possible cultural assignment of the paintings would be to the Aurignacian. Nevertheless, considering that outstanding examples of Paleolithic cave art are generally located in areas with a well-documented habitation settlement of the period, we are beginning to regard the early dates from Grotte Chauvet with some skepticism.'

Why is the regional archaeological record not unambiguous in demonstrating Aurignacian settlement? The gorges of the Ardèche contain a handful of sites that contain late Mousterian and Upper Paleolithic archaeology, the transition to which has not yet been established with any degree of precision: all one can say is that it probably occurred some time after ~36,000 BP and before ~30,000 BP (taking errors on the few available dates for Mousterian and Aurignacian sites into account). Perhaps the most accepted hypothesis is that the regional Mousterian disappeared without being succeeded by the Châtelperronian, but with an early Aurignacian O appearance in Mediterranean parts of the region (Combiér, 1990). The relevance of this is that a number of radiocarbon determinations on charcoal from Chauvet fall into this broad period. Given that the greater majority of the dates come from fragments of charcoal with no cultural context, the assumption is usually made that this must pertain to Aurignacian activity, given that it is the only culturally diagnostic material from this time

period elsewhere. We should remember, however, that Neandertals persisted until ~30,000 BP in some regions, and Gravettians may have been established in others by the same period. Given, then, the lack of Aurignacian sites in the Ardèche it may be somewhat rash simply to assume that the Chauvet art was created by Aurignacians, particularly as this would make it unique for its time.

Gély's (2005:19) survey of Chauvet's regional archaeological context discusses in the context of 'early Upper Paleolithic sites' (most of which are Gravettian and thus irrelevant) only two Aurignacian sites west of the Rhône; Esquicho–Grapaou (assigned to the Aurignacian I/Archaic Aurignacian) and Abri des Pêcheurs bed 22 (assigned to the Aurignacian O/Archaic Aurignacian). By his own admission Gély employs only selected dates. As we are not told exactly what dates he has omitted or why he has done so, it is impossible to evaluate his conclusions. We need to know on what grounds he has 'selected' them. He also admits that it is difficult to 'dater précisément cette longue période' due to various 'distortions' (whatever they are: Gély, 2005: 19). What, for example, should one make of the date from a Gravettian industry at the Aven de l'Arquet, of $35,400 \pm 1900$ BP? Gravettian sites are far more common in Ardèche than Aurignacian ones, but neither can be said to be reliably dated. In view of this, one hypothesis to falsify would be that the Gravettian originated in the region—perhaps close to ~31,000 BP (the younger end of the Aven de l'Arquet date at 2σ)—and that the art therefore begins, culturally, in the Gravettian. I am obviously aware of the pitfalls of taking one apparently erroneous date at face value, but archaeologists usually do (in this case by ruling it out as a reliable indicator of the age of the Gravettian at this site), and in any case, one must proceed by falsifying hypotheses, however unlikely they may appear at first glance. The reasoning—that an apparently good radiocarbon date for a Gravettian assemblage suggests that it is as old as ~35,000 BP is logically the same as that used by Chauvet long chronologists.

Chronology for the few Aurignacian sites of the region is unconvincing at best. Gély cites as 'convincing evidence' of Aurignacian activity a split-based (not biconical—see above) bone point from the Abri des Pêcheurs some distance to the west of Chauvet. This was found in a layer with highly mixed radiocarbon dates: $26,760 \pm 1000$ BP (which Gély, inexplicably, describes as 'tres aléatoire'); $29,400 \pm 900$ (which he believes to be 'compatible avec l'ancienneté de cet objet très rare dans notre région' [Gély, 2005: 24, my emphasis]; and $23,880 \pm 750$ BP [Gély, 2005: 32]). More widely, Saint Marcel appears to date younger than 30,000 BP, and thus its archaeology is presumably not of relevance to activity at Chauvet in the 30–32,000 BP range, and the Dufour bladelet site of Mandrin is on the opposite side of the Rhône to Chauvet (Gély 2005: 18). As the river appears to have acted as a cultural barrier during the Upper Paleolithic (Gély, 2005: 24) its relevance can again be questioned. Overall, one cannot consider these few sites to be dated reliably, or to be immediately germane to the activities in Chauvet. To my knowledge, only Chauvet has dates in the earlier Gravettian (~28–25,000 BP) in the region, let alone in the 30–32,000 BP range. Why should there be an 'indigence des documents typiquement aurignaciens, et jusqu'au Gravettien moyen' but by contrast a 'relative densité en sanctuaires profonds datés ou attribués à cette période' (Gély 2005: 31)? It should be clear that this is hardly a convincingly dated context.

Most scholars appreciate that the faunal remains of Chauvet Cave represent activities unrelated to human presence and are thus irrelevant to the issue of the age of the Chauvet art. However, Bednarik (2005: 89) claimed that 'arrangements of deposited cave bear skulls have been found in numerous sites, mostly in Central Europe. All of them date from the earliest Aurignacian, and from similar industries of the interface between the Middle and Upper Paleolithic. Therefore, if the same kind of behavior were demonstrated in Chauvet, it would secure solid dating to a period close to

the Campanian Ignimbrite eruption. In view of the distortion that presumably affects all radiocarbon dates of that period from southern Europe, it is perfectly possible that the charcoal dates for the older art phase in Chauvet are too low rather than too high, as some have suggested. Nevertheless, evidence of cultural behavior involving the placement of cave bear remains would securely place any related rock art into the early part of the Aurignacian. Robert-Lamblin (2005: 201) has sensibly cast doubt on the Chauvet evidence for human interaction with bear remains; the days of associating Aurignacians (and Neandertals for that matter) with cave bears are thankfully long gone, and there is simply no evidence for Bednarik's assertions.

So what would constitute reliable evidence for the Aurignacian antiquity of at least some of the Chauvet art? One is sympathetic with Chauvet 'long chronologists' as it is difficult to see how a single line of evidence could unambiguously prove an Aurignacian age. There are, however, two broad ways in which the case could be strengthened. First, hypotheses based on the style, techniques, and themes of the art that suggest it is Gravettian and *post*-Gravettian in age could be falsified. If this cannot be done then attempts to date the art by stylistic, thematic, and technical similarities should be abandoned. Secondly, arguments based on content, chronometry, archaeology, and wider artistic and archaeological parallels could be improved, and while these may not demonstrate its antiquity, could, at least as cumulative arguments, shift the balance of probability in its favor. Some examples of how these goals might be achieved include the following:

- Specialists should adopt an attitude of open-mindedness about the age of Chauvet. Ascertaining its age/s should be an objective enterprise conducted in the spirit of scientific enquiry, involving international collaboration. Its age is a scientific *problem*, not an established fact;
- Falsification of hypotheses that the black series is Solutrean-Magdalenian in age on the grounds of parsimonious interpretation of similarities of other art of these periods; and of the stylistic dating of the red series to the Gravettian (and thus, the black series younger);
- Demonstration that the creation of charcoal >30 ka BP relates to the production of art, and falsification of the hypothesis that hearths were lit for unknown reasons and some of these became dispersed through water action;
- A far wider dating program including ambitious ^{14}C dating of bone to ascertain the minimum window/s of activity in the cave, including U-series dating of stalactites overlaying archaeology, humanly-modified bones and, critically, art images;
- The independent verification of all dating methods and results by total sampling, pre-treatment, and measurement of samples by other laboratories, particularly on charcoal samples *from the cave's walls*. Blind tests on various materials between separate laboratories, and collaborative attempts to identify sources of error in cases such as Candamo;
- Recovery of diagnostic Aurignacian archaeology from the cave, and elimination of the hypothesis that the Chauvet saga is Solutrean-Magdalenian in age using appropriate comparanda;
- Direct dating of cut-marked or otherwise humanly-modified bones from the cave's floor to the period 30–35 ka BP;
- Examination of likely ages of art overlain by cave bear scratches and comparison of this to the age ranges obtained by an ambitious dating of the bear remains (ideally the whole MNI);
- Full publication of all sampling, pre-treatment, and measurement information, including data on what samples have been deemed to have 'failed' (and why), to allow independent evaluation of methods and results;
- Experimental work on potential sources of contamination, such as measurement of carbon levels in bedrock of the cave's walls,

in micro-organisms, effects of background carbon on minuscule samples, etc; measurement and comparison of humic and humin fractions in samples from the cave's walls and floor;

- Demonstration of clear stylistic or technical similarities with art elsewhere that has been unambiguously dated to the Aurignacian;
- Archaeological strengthening of the case for serious Aurignacian presence in the region; and falsification of the (however unlikely) hypothesis that the Gravettian of the region approaches the >30 ka BP period.

Conclusion

I have discussed above the sum of archaeological argument for the antiquity of the art at Chauvet. I suggest that it is far from convincing, and that an objective assessment of the arguments forwarded by the Chauvet team must conclude that, on the grounds of the cave's and the region's archaeology, the art of the cave is undated. Critics might note that I have ignored the existence of ~32 (out of ~50) AMS radiocarbon dates on charcoal for the site which, assuming these are reliable and not contaminated (an open issue that remains to be addressed) would indicate human activity in the cave between 32,000 and 30,000 BP. The Chauvet team have on more than one occasion suggested that the weight of dates in this period is strongly suggestive of the reliability of these results (which as they were all produced by the same laboratory is tautologous as they could all be systematically incorrect), but we have no idea as yet how many discrete events these pertain to. If these are few, hypothetically two or three hearths that were subsequently dispersed by water action for which there is evidence in the cave, their relevance would be highly questionable. As it is, they are no more relevant to the art of the cave than to the presence of bears, and the numerous problems with the dating program so far have been summarized in Pettitt and Bahn (2003) and are addressed at length in Pettitt et al. (in press). If one counts charcoal 'torch wipes' on the cave's wall as archaeological (as they are not obviously artistic) they indicate only human activity in the Gravettian (i.e., after ~27,000 BP).

Thus, assessments of the artistic achievements of the Aurignacian should, *for the time being*, proceed without incorporating the Chauvet art. I am not stating that some of this art is *not* of Aurignacian attribution, but I *am* stating that all of the arguments as yet forwarded to suggest an Aurignacian age are unconvincing. This is nothing new; controversies over the age of parietal art are a significant part of the historical fabric of the study of the Upper Paleolithic. Why should things have become so apparently uncomplicated all of a sudden? The reality is of course, that they haven't, and we ignore the many potential pitfalls at our peril. It is, after all, easier to list problems to show that one has an awareness of them, then ignore them and get on with the business of interpretation. By doing so assumptions become dogma, and specialists understandably become reticent to question their own statements. For many, the spectacular art of Chauvet has become part of their understanding of the European EUP, of the spread of *Homo sapiens*, and even of the appearance of symbolic behavior. They may be correct, but they also may be wide of the mark. We owe it to the artists of Chauvet—whoever they were—to employ scientific rigor in our attempts to understand them. As Clottes (1996: 89) has noted, 'one has to approach a new cave with caution. Everything has to be carefully verified, with one's critical facilities on the alert, before coming to a decision.' Quite so. As Clottes (1996: 118) has also noted, 'the major problem posed by the discovery of wall art is that of its date (or dates).' On this point at least I am delighted to agree with him.

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