

Style: A Strait Jacket on Hunters' Rock Art Research?

Summary

Most research on the Palaeolithic cave paintings in Southern Europe has aimed at proving development of different kinds by detecting different styles. The use of style as a dating method has affected our entire view upon humans, technology and society during the Palaeolithic. Researchers have until recently emphasized their trust in style dating. With a rapidly accelerating development within radiocarbon dating of cultural layers and figure pigments, the foundation for a dating system built upon style and technological seriation is heavily contradicted.

In similar ways research on the carved panels with hunters' motifs from the end of the Stone Age in Scandinavia have been heavily influenced by the view that social development could be detected by stylistic development. Also in Scandinavia most researchers have been hesitant to discard style as the most trusted dating method. A few researchers, however, have pointed towards the need for using both shoreline and radiocarbon dating to obtain more tangible data, and see style dating as an outdated method.

Introduction

Even if it is highly doubtful that there is a cultural, geographical or periodic connection between the Neolithic and Mesolithic Scandinavian hunting art and Southern European Palaeolithic cave art, a lot of similarities between these two can be studied. A parallel development regarding dating has taken place during the last 30 years. Style along with shoreline dating has been the central dating method in Scandinavia until the early 1990s, while style seriation combined with stone artefact typology has been a widely accepted dating method for Southern European cave art. Since the late 80s a number of researchers have pointed towards the limitations of style typology and emphasized the potential for new scientific dating methods. Since 2000 radiocarbon dating have been applied on a number of rock art localities, and thereby challenged style seriation as a reliable method for dat-

ing rock art (Bahn and Lorblanchet 1992, Conard 2009, Cuzange et al 2007, Gonzales-Sainz et al 2013, Lødøen 2013, Petzinger & Nowell 2011, Ramstad 2000, Sinclair 2003, Straus et al 2003, Valladas 2003). In addition results from shoreline dating of panels with certain styles, have showed that style not necessarily offer a reliable dating method (Lødøen 2013, Ramstad 2000, Sognnes 2010, Stebergløkken pers. comm.).

Dating hunting art in Scandinavia

Since the beginning of the 20th century petroglyphs with hunting motifs in Scandinavia have been seen to have evolved from simple to complex, from naturalistic to abstract, because the people creating the art has developed cognitively. Hansen (1909) perceived the first hunting art to have resulted from the hunters' unreflected imita-

tion of nature, while Gjessing (1936) relying heavily on Herbert Kühn's thoughts on cave art saw schematizing/stylizing as a higher art form (Kühn 1923, 1929). Shetelig and Gjessing classified the hunting petroglyphs into three categories: 1) animals in natural size, 2) smaller and less naturalistic animals, some with inner décor, and 3) small and abstract animals (Gjessing 1936, Shetelig 1922, Sognnes 2010).

Style groups, shoreline levels and cross-cuttings

When basing my style groups on Gjessings three main styles and including newly discovered panels, I will attempt to group the panels roughly, and test whether shoreline dating, cross-cutting and radiocarbon dating conform Gjessings style dating.

The panels chosen for this analysis are all carved and contain cervids such as elk, reindeer and red deer. Panels only containing other motifs will not be included in the shoreline analysis. I will neither integrate the painted sites since shoreline levels for painted panels vary greatly within rather limited areas (ex Honnhammer, Møre and Romsdal). The study area is from the Bogge fjord and the Molde fjord in Møre and Romsdal in the south to Fosnes in Nord-Trøndelag in the north. Most panels were situated in the fjord systems that during Late Stone Age (6000-3800 BP) existed in Central Norway. Panels in Steinkjer, Levanger, Frosta, Stjørdal and Snåsa were all situated close to the Trondheim fjord shoreline during this period, while Bogge I, II and IV were situated close to the Bogge fjord shoreline. Some panels were also situated close to the coast such as Stykket and Strand on the Fosen peninsula in Sør-Trøndelag, Reppen in Fosnes in Nord-Trøndelag, and the Rødsand and Bjørset panels in Averøy and Molde in Møre and Romsdal.

Figures belonging to Gjessings *Style 1* are monumental, naturalistic and in general portrayed in natural size. Figures clearly belonging to group 1 are found at Bogge I, Bardal I, Hell, Stykket, Hammer V and Bøla I (Bakka & Gaustad 1975, Gjessing 1936, Sognnes 1981, 1982, 2007). Hell is a border

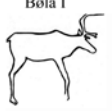




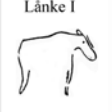



example, since the biggest cervids there are 1.7 metres long, but the smallest only 20 cm, and figures contain some inner ornamentation, and are not so naturalistic in shape as the other panels of group 1.

Cervids of Gjessings *Style 2* contains some or none body decoration and are neither quite naturalistic nor fully abstract, and can be found at Reppen, Evenhus, Hammer, Skjevik, Bøla, Holtås, Lånke, Strand, Bogge, Rødsand (Røsand) and Bjørset (Gjessing 1936, Bakka 1988, Bakka og Gaustad 1975, Sognnes 1981b, 1983).

Style 3 are found on Bogge I, IV, Bardal III and Holtås I (Gjessing 1936, Grønnesby 1998, Møllenus 1968). The cervids on these panels have been compared to cervids on Glösa east of the Swedish border (Lindgaard 1999, Sognnes 2010).

At the beginning of the 20th century researchers started using shoreline dating as a means to date hunting art panels in Scandinavia, along with style dating. Land uplift curves after the ice age varied from region to region, and height above sea level could give a maximum age for the panels or an earliest possible time period for the panels to submerge from the water. Shoreline curves for Trøndelag and inner parts of Romsdalen are not affected by transgression, which makes this region more suited for shoreline dating, while curves for outer parts of Nordmøre, Romsdalen and Sogn and Fjordane are affected by transgression,

Figure 1. An attempt to group the cervids belonging to style 1, 2 and 3.

STYLE 1	Bøla I 	Stykket 	Hell 
STYLE 2	Lånke II 	Hammer XIV 	Lånke I 
STYLE 3	Holtås I 	Bardal III 	Bogge I 

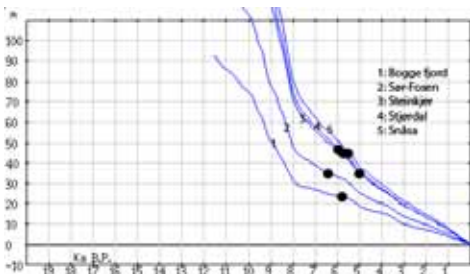
which gives more than one possible maximum age for the carvings, and additional data for dating should be considered.

It has been questioned whether the panels necessarily were related to the shoreline at all during Stone Age. Sognnes' investigation of different petroglyph sites situated in the middle and inner parts of the Trondheim fjord showed that most panels with hunting motifs were situated at heights between 20 and 50 masl, and could be shoreline dated to 7000-4500 BP (Sognnes 2002, 2003). Reasons for placing figures and panels close to the water could be that panels lying on or close to the beach were washed clean of moss, lichens and soil, or that the border between land and sea were perceived as sacred because of its liminality (Helskog 1999: 73). In some areas people may have continued to use the same panels or closely situated panels for hundreds or thousands of years (Ex Bardal and Hammer, Steinkjer).

Most panels in Central-Norway have available height above sea level data, and I have applied these to Møllers uplift curves for Norway (Sognnes 1991). It should be noted that Møllers curves are based upon only one or a few shoreline dates for each region, which can give anomalies in certain areas. Even though, I want to focus on obvious tendencies or groupings of panels.

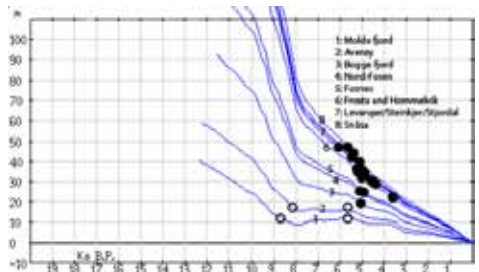
STYLE 1

Figure 2. Shoreline levels for Bogge fjord, Sør-Fosen, Steinkjer, Stjørdal and Snåsa with localities Stykket, Hell, Bardal I, Bogge I, Bøla I and Hammer V. Localities of style 1 can be shoreline dated to the time period between approx. 6500 and 5000 years BP



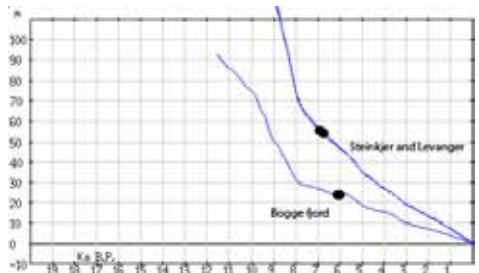
STYLE 2

Figure 3. Shoreline levels for Molde fjord, Averøy, Bogge fjord, Osen, Fosnes, Frosta, Hommelvik, Levanger, Steinkjer, Stjørdal and Snåsa with localities Holtås II, Lånke I, II, III, Bøla II, III, IV, Strand, Bogge II, Reppen, Rødsand I, Bjørset II, Hammer I, IV, V, VI, VIII, X, XIV, Skjevik IV, Evenhus I, II, III. Localities of style 2 can be shoreline dated to a time period stretching over 3000 years; between approx. 6000 and 3500 years BP. The panels Bjørset II in the Molde fjord, and Rødsand (Røsand) I in Averøy are marked by two circles, since shoreline curves for these areas give alternative dates. Most plausible period for the pecking of Rødsand I and Bjørset II are however between 5000 and 6000 BP, since most other panels also belong to this period. The Evenhus panels that are shoreline dated to about 3500 BP clearly stands out from the crowd of localities that concentrates to 6000-4500 BP



STYLE 3

Figure 4. Shoreline levels for Steinkjer, Levanger and Bogge fjord, with localities Bardal III, Holtås I and Bogge I and IV. All localities of style 3 can be shoreline dated to the time period between 7000 and 6000 years BP



When interpreting all three shoreline charts, we observe that all three styles overlap the other style periods. The only two periods with no overlap between different styles is a rather short period of 500 years between 7000-6500 BP, with only style 3-figures, and the longer period between 5000-3500 BP, with only style 2-figures (Steberggløkken pers. comm.) During the period between 6500-5000 BP three different styles

existed. Overall this points towards style as insufficient as a dating device.

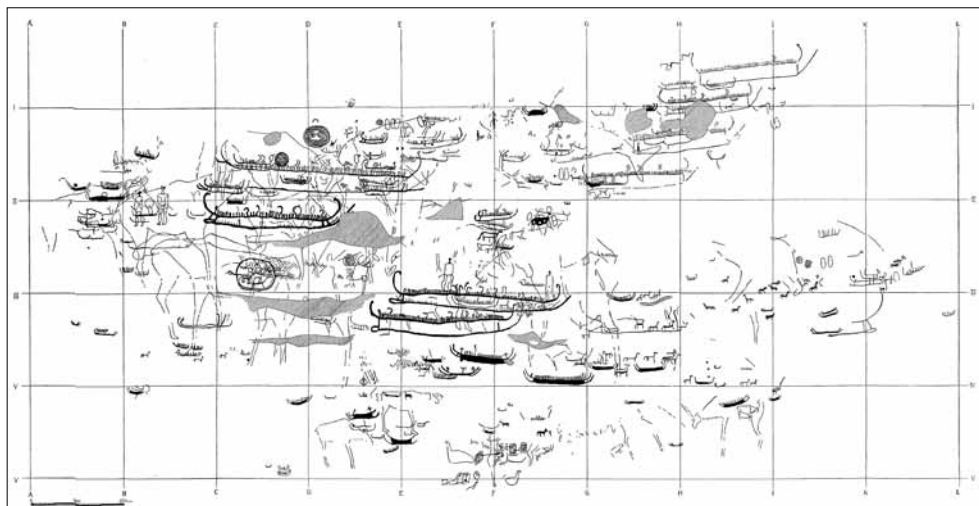
The reason for holding on to the style dating method may partly be explained by the fewer known panels of the different styles during the 1930s. Nevertheless, some important facts on shorelines and cross-cuttings concerning Bogge and Bardal were never really taken into account by Gjessing about 70 years ago.

Firstly the style 3 panel at Bardal can be shoreline dated to about 1000 years earlier than the style 1 panel at Bardal. In addition; boats, horses, foot soles and rings and spiral figures of the Bronze Age cross-cutting the monumental figures of the Stone Age, indicates that it was the monumental panel at Bardal (I) and not the abstract one (III), that people in the Bronze Age was aware of, and used for ritual purposes. Perhaps the knowledge of the Bardal III panel was lost or the panel "went out of use" sometime in the Stone Age. Bardal I on the other hand, may have been "in use" for most of the younger Stone Age. When people with other ideologies looked for a locality to place their sacred symbols, they already had a perception that the Bardal I panel was sacred. Most lightly the people of the Bronze Age had seen the figures on this panel

earlier too, or even had a long tradition for pecking figures into the rock there. Gjessing during the 1920s and 1930s chose to focus on Bardal I and Bardal III being 130-140 metres *apart* (and not on the land uplift curves for these two panels), and claimed that it was obvious that Bardal III was younger than Bardal I's hunting figures (Gjessing 1936:171).

Bogge I and IV were known when Gjessing and Hallstöm underwent their investigations, and already then it was known that the latest shoreline dated panels with figures of group 3 also had figures of group 1. Gjessing investigated the super-imposition stratigraphy of figures of group 3 and 1 at Bogge I in the 1930s and concluded that the cervid of group 1 (Gjessing's fig. 7) was the oldest. Gjessing interpreted the deeper lines of a group 3 animal (fig. 11) intersecting the thinner lines of the large animal at Bogge I, to be the result of subsequent deepening (cross-cutting). A closer look at these figures shows, that the other two small and abstract animals (fig. 9 and 10) intersecting the large cervid have thinner pecking lines than the group 1 animal. Interestingly, only the feet and abdomen line is left on fig 9, where the whisker of the large cervid forms its back line. Not only is

Figure 5. Bardal I, with hunting art cross-cut by farmers art. Tracing by G. Gjessing 1936.



the smaller animal made with thinner lines than the larger one, i.e. cannot be seen as cross-cutting the large elk figure, it is also one of the few animals on the panel missing a head. If this animal was cut cross the larger one, why didn't the makers make it deeper and with a distinct body and head? Figure 10 has a distinct head and misses no limbs, but has thinner and shallower lines than the large cervid (fig. 7). Figure 11, however, seems to have a mixture of deeper and shallower lines, which makes it hard to establish which figure cross-cuts which one, 7 or 11. It was probably easier for Gjessing to focus on fig. 11, since it was the only style 3 animal that had deeper lines than the group 1 animal, and supported the general view on dating of petroglyph styles in the 1930's. At the same time he had to ignore fig.s 9 and 10.

A lower panel with Stone Age carvings at Bogge, Bogge II, is shoreline dated to about 5000 BP, and contains cervids of style 1. If figures of group 3 generally should be younger than those of group 1 at Bogge, it is strange that the super-imposition of group 3 figures over group 2 figures do not take place on the Bogge II panel, which is shoreline dated 3-400 years later than the Bogge I panel.

Radiocarbon dating

During the last 50-60 years another method, radiocarbon dating has come into use for dating archaeological structures and layers. At excavations of petroglyph panels or ar-

reas close by in the last decade, charcoal has been derived for radiocarbon dating on several sites as Ausevik, Flatruet, Håltbergsudden, Indre Sandvik/Ruksesbåkti, Landverk, Nämforsen, Sandhalsen, Vingen, (hunting art), Benan (Laboratory reference DF- 4049, Radiological Dating Laboratory, NTNU, Trondheim), Berge, Madsebakke, RÅ 1371, 446, 897 and 336 and Svarteborg, (farming art) (Bengtsson 2004, Bertilsson 2006, Hansson 2006, Helberg 2003, Kaul 2005, Lødøen 2008, 2010, 2013, Lødøen pers. comm., Munkenberg 2004, Sørensen 2006). Radiocarbon dating demands that one assess the quality of the dating material and the relation between the structures being dated and the panel. However, several charcoal tests that have been derived from herds, cooking pits, cultural layers and stone structures related to the panels, have been radiocarbon dated to relatively specific time periods (Bengtsson 2004, Lindgaard in press, Munkenberg 2004). In some cases where several radiocarbon dates of a site have been scattered throughout the millennia, one can detect a definite start and end of the activity of such sites.

The Vingen panels in Sogn and Fjordane on the Norwegian West Coast are located between 8 and 10 masl and transgressions in the shoreline curve gives alternative periods with pecking activity; one around 6000 BP, another around 10000 BP. Stilistically figures in Vingen have a lot in common with Gjessings style 3. Bakka's investigations in Vingen during the early 1970s were based on style and shorelines. He claimed that investigations of the panels in Vingen supported Gjessings dating of the style 3 figures in Trøndelag, Hordaland and Sogn and Fjordane, and that this style was the youngest, and belonging to the Middle Neolithic, about 5000 BP (Bakka 1973). In 1976 Bakka participated in archaeological excavations into a settlement close to the rock art locality Teigen in Vingen. Even though charcoal from this settlement was radiocarbon dated 6690-6540 BP, Bakka was cautious to claim that the carvings in Vingen were Mesolithic (Bakka 1979). Lødøen has later discussed whether this was due to resistance from fellow researchers holding on to style dat-

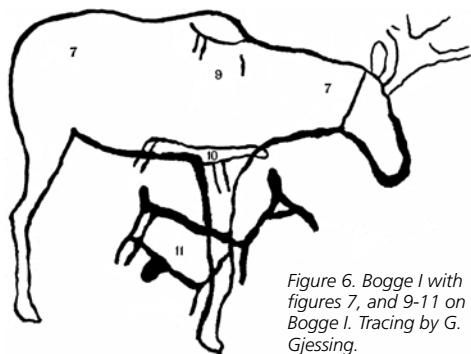


Figure 6. Bogge I with figures 7, and 9-11 on Bogge I. Tracing by G. Gjessing.

ing as the most reliable method (Hagen 1969, Johansen 1969, Lødøen 2013). Due to several excavations from 2000 and onwards settlement activity in Vingen can be radiocarbon dated roughly to 7400-6200 BP and to the late Mesolithic period (Lødøen 2013). Lødøen points towards shoreline dating as an insufficient method for dating the Vingen panels (Lødøen 2008, 2010, 2013). Results from Vingen indicate that radiocarbon dating of settlements and human activity in general offer more secure results than shoreline dating, but I would also emphasize that radiocarbon dating can refine results from shoreline dating.

Similar results regarding style dating, shoreline dating and radiocarbon dating have been obtained in Ausevik in Sogn and Fjordane. Panels were style dated Middle Neolithic period by Bakka, but the lowest panels were shoreline dated Late Mesolithic period by Ramstad, and radiocarbon analysis of charcoal in the Ausevik settlements Ausevik has given Late Mesolithic dates (Bakka 1973, Lødøen in press, Ramstad 2000). The shoreline curves for Ausevik and Vingen are quite similar, with a sea level rise interrupting the land rise between 8000 and 4000 BP, which gives alternative dates for same sites. However, the lowest panels found at Ausevik are 11 masl while the lowest at Vingen are 8 masl, which should give better shoreline data for Ausevik than Vingen. Even though Bakka used shorelines and style to date the Vingen panels, he exclusively dated Ausevik through style comparison with the Vingen panels (Bakka 1973, Lødøen 2013, Ramstad 2000). Some researchers have since 2000 critiqued Bakka for selecting dating methods that supported the existing views about the development from "primitive" to "sophisticated" and a connection to farmer groups in the Neolithic (Lødøen 2013, Ramstad 2000), while other researchers have not challenged dating methods and results for Vingen and Ausevik (Prescott and Walderhaug 1995).

Apart from Vingen and Ausevik few hunting art panels in Scandinavia have been excavated, provided sufficient test material for analysis (Forselv, Bjørset, Indre Sandvik/Ruksesbåkti) or provided radiocarbon

dates that makes it possible to pinpoint a limited period of activity (Ausevik, Flatruet and Sandhalsen) (Hansson 2006, Helberg 2003, Helberg pers. comm 2008, Lødøen 2008, 2010, 2013, Lødøen pers. comm. 2008, Sognnes 1993-1994).

Dating cave art in Southern Europe

Just like in Scandinavia, hunting art found in the caves of Southern Europe has been seen to have evolved from simple to complex because the people creating the art developed cognitively. Henri Breuil and Hugo Obermayer that published principal works on cave art and parietal art during the first half of the 20th century, put much emphasis on Herbert Kühn's theories regarding cognitive development, just like Gjessing and other researchers in Scandinavia, and Leroi-Gourhan focused during the 1940s and 1960s on cognitive and lingual development and structuralist methods (Breuil 1952, Kühn 1923, 1929, Leroi-Gourhan 1964, 1965). Cognitive development and an aesthetic perspective on art were therefore important elements in Breuils and Leroi-Gourhans typological systems for Palaeolithic cave art and technological complexes, and the prehistoric periods: the Aurignacian (40000-34000 BP), the Gravettian (33000-23000 BP), the Solutrean (26000-17000 BP) and the Magdalenian (18000-10000BP).

Style

In 1879 the first Palaeolithic cave paintings in Southern Europe were discovered in Altamira, Northern Spain, and over a century later over 140 caves containing painted art has been discovered only in the Franco-Cantabrian region. At the beginning of the 20th century Breuil started producing a period seriation based on style, that later was refined by Leroi-Gourhan during the 1960s. Breuils two and Leroi-Gourhans four style groups were constructed on Palaeolithic typology for technological complexes that spread over 30000 years and an area of over 5000000 square kilometres, stretching from Spain in the southwest to England in the north and the Ural Mountains in the

east. The stone technology was seen to have developed into a technological and aesthetic peak during the late Palaeolithic. Like wisely, the cave art seriation was based on style and the development from primitive to sophisticated technique, from monochrome to polychrome figures and from flatness and crudeness to depth, movement and realism. This development was based on the notion that this early art represented modern humans and their cognitive development (Breuil 1952, Straus 2003, Leroi-Gourhan 1964, 1965).

The basis for interpreting technological and artistic development as reaching higher perfection within these cultures, need to be discussed. Some defining techno complexes have been abundant in some areas and lacking in others, just like some cave paintings unusual for their period have been claimed to be classic examples for their period (Straus 2003). Some researchers have pointed towards the extreme variations within the cultural area and rather suggested parallel development within several cultural complexes. With new archaeological finds and the development within radiocarbon dating Leroi-Gourhans four styles: Style I Primitive 32000-27000 BP, Style II Primitive: 27000-20000 BP, Style III Archaeic 20000-15000 BP and Style IV Classic 15-11000 BP, have been contradicted, (Gonzales-Sainz et al 2013, Straus 2003, Lawson 2012, Zilhao 2007).

Radiocarbon dating

In 1994 the cave paintings of Chauvet in Southern France were discovered, and with their figurative complexity, they should presumably be attributed to later art phases such as Leroi-Gourhans style IV dated roughly to 15000-11000 years before present and consisting of polychrome figures and expel depth and movement. Radiocarbon dating of pigments from most figures in the cave rather gave dates ranging from 39000 to 34000 cal. years BP, which place these paintings in Leroi-Gourhans style I and II, consisting of "primitive" and incomplete animal figures (Cuzange et al 2007, Gonzales-Sainz et al 2013, Lawson

2012, Leroi-Gourhan 1968). Direct dating of organic pigments such as charcoal, has since the early 1990s been applied to a number of painted figures. It is still a relatively new method and circumstances regarding sample collection, contamination, pre-treatment and measurements have been critiqued (Pettit & Pike 2007, Rowe 2001, Watchman 1999, Züchner 1996, 2001), even though, researchers have seen the need for discarding the style dating system based on development from simple to complex (Valldas 2003).

Several researchers have been critical towards dismissing style dating and still perceive style dating as one of several ways to date the cave paintings rather than using exclusively scientific methods, even though some figures of "later styles" have been radiocarbon dated to much earlier periods (Züchner 1996, 2001). Other scholars have pointed towards the circular reasoning within style dating, and how few panels that have been directly dated and rather suggests constructing a new framework for dating through radiocarbon dates (Petzinger & Nowell 2011, Straus et al 2003). Similar to the Scandinavian hunting art the earliest panels in Southern European cave art were perceived as depicting nature and having no deeper, symbolic meaning. The creators of the late cave paintings were seen as being at a high cognitive level and the artistic "peak" was seen as a deflection of the fact that modern humans had reached the highest level of artistic performance and meaning. With the new radiocarbon dates in Chauvet, the cave of l'Aldène and many more, several of the most sophisticated panels regarding depth, movement and realism can be attributed to 40000-32000 BP (Straus 2003). In addition the radiocarbon dating of a mammoth-ivory figurine found at the Hohle Fels cave in Germany in 2008, places the figurine in the Aurignacian period, but according to Leroi-Gourhans typology it should belong to later style periods (Conard 2009, Sinclair 2003).

Theories regarding cognitive, linguistic and aesthetic development and the assumption that the first modern humans made the cave art in Southern Europe has during later

years also been contradicted (Straus 2003). Neanderthals have historically been perceived as cognitively incapable of making complex art forms, even though relatively complex burial rituals and burial gifts have been found in graves clearly belonging to Neanderthals. In the cave of la Ferassie in France, three tumuli containing eight Neanderthal skeletons were found, one of these was covered with a slab decorated with cup marks, while in the Shanidar cave in Iraq, the skeletons of four Neanderthal graves were found, one of these contained large clumps of pollen with medicinal properties (Pettitt 2013). In addition to this, Neanderthal jewelry made from pierced shells and traces of orange pigments, and lumps of red and yellow pigments were observed in connection to this find already 50000 years ago (in the Aviones cave, Spain) (Zilhao et al 2010).

Radiocarbon dates of bone finds from cultural layers in the Altxerri cave in France, containing simple animal figures, places some dates prior to and some dates after the Chauvet dates (Gonzales-Sainz et al 2013). This suggests that Breuil or Leroi-Gourhans style groups cannot be used for dating even if they are inverted, so that f ex style III or IV can replace style I periodically. Similar to how the shoreline dates of the

styles in Scandinavian hunting art showed how insufficient style was as a dating method, radiocarbon dates from both pigments and cultural layers in Paleolithic cave art suggests that the dating system built upon technological complexes and art style is not applicable.

Discussion and conclusion

Style dating within research on hunting art is heavily influenced by several underlying assumptions about the development within modern humans and from hunters' to farmers. Early researchers on Palaeolithic art believed that the earliest art works were made by humans with primitive brains and living in primitive social organizations. Further researchers like Kühn, Obermayer, Breuil and Leroi-Gourhan, were particularly preoccupied by human developmental psychology, philosophy and religion, and assumed that artistic development equalled cognitive, technological and artistic development in humans and in human societies.

Style used as a tool to date prehistoric art, also had its basis in art history and an aesthetic and universal perspective on art, claiming prehistoric art, like art in small-scale societies, was primitive. Hunter-gatherers in small-scale societies were seen to hold "primitive" cognitive and artistic skills, as opposed to farmer groups living in larger family groups. This has since been heavily contradicted by anthropological art studies within small-scale societies that have showed that art must be studied within its context and its society, and not judged by universal ideas about the meaning of art (Flores 1985, Kuper 1988, Layton 1981). If we keep aside the term "primitive", many of the underlying assumptions about the development of prehistoric art has to be rejected, and the notion about a development from "primitive" to "sophisticated" art left behind.

Since brain development and social organization has been seen as largely universal, technological complexes, cave art and parietal art found over vast areas and dispersed over 30000 years has been put into a very a complex system aiming to embrace

Figure 7. A composition displaying depth and sophistication from the Chauvet cave. According to Leroi-Gourhans typology compositions like this should belong to style period IV, dated 18000-10000 BP, but radiocarbon dates from pigment scrapings in the Chauvet cave concentrate to 32000-30500 BP. Photo: Wikipedia



all new finds. Cultural diffusion within a larger techno complex has been emphasised since the human cognition and organization also developed universally, while the possibility for identifying several, parallel techno complexes and cultures has been overlooked (Straus 2003).

Even with the entry of and the increasing quality of radiocarbon dating, researchers are still very hesitant to dismiss Breuils and Leroi-Gourhans typological systems. One should of course use new methods with caution, and be aware of possible contamination, retract sufficient test material, and analyse material from same figure/panel in different radiocarbon laboratories. The number of tests being analysed so far, show that radiocarbon dating must be seen as a valid method for dating (Cuzange 2007, Valladas 2003, Valladas & Clottes 2003). The build-up of a new dating system within the Southern European cave art seems inevitable.

Shoreline dating of hunters' carvings in Central Norway shows an overlap between all three defined styles. This suggests that different styles do not equal different times, but rather different means or meanings (Sognnes 2010). Therefore style should not be discarded as a tool within research overall, but style development should not necessarily be viewed as equal to cultural development within research on hunting art.

The belief that social, cognitive and technological development is reflected in artistic development in hunting art in Scandinavia is largely derived from research on style in Palaeolithic cave art. Just like researchers have claimed that the Leroi-Gourhan's technological and stylistic groups were based on circular arguments (Straus 2013), researchers in Scandinavia have refused to question the old paradigms (Bakka 1973, Hagen 1969, Johansen 1969, Prescott and Walderhaug 1995, Sognnes 2003). Shoreline dating has merely been used to underline Shetelig's and Gjessing's style groups. When tendencies regarding shoreline dates and cross-cuttings could have offered new insight and alternative datings, researchers chose to focus on shoreline dating as an insufficient

method and pointed towards the need for more minimum dates, i.e. panels covered with marine deposits or transgression submerged panels (Bakka 1973, Gjessing 1936, Sognnes 1998, 2003). Panels covered by marine or other deposits so far have been few and uncertain, even though some, such as the Hammer VI panel, has emphasized that some panels were shore bound.

As mentioned earlier, the relation between the structures being radiocarbon dated and the panels must always be discussed, however, at rock art localities that has undergone several archaeological excavations and been dated through radiocarbon dating, quite accurate dates for activity phases have been obtained, which gives more tangible results about human activity than style dating do. Unlike within Palaeolithic cave art research where the pigments (and figures) can be radiocarbon dated directly; no available methods are sufficiently verified that can date carved panels directly at present (Dorn 2001, Lødøen 2013, Watchman 2001). Since shoreline dating only offer maximum dates, it is important to build a dating framework consisting of radiocarbon dating and shoreline dating. This suggests that archaeological excavations at rock art panels should become a primary documentation method, alongside with documentation of the figures themselves. Such a development will demand more resources for documenting rock art panels and localities, but will bring rock art research closer to the current development within archeological research.

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