Looking at caves from the bottom-up: a visual and contextual analysis of four Paleolithic painted caves in Southwest France (Dordogne)

by

Suzanne Natascha Villeneuve
B.A. (Hons.) Simon Fraser University, 2003

A Thesis Submitted in Partial Fulfillment of the
Requirements for the Degree of

MASTER OF ARTS

in the Department of Anthropology

Looking at caves from the bottom-up: a visual and contextual analysis of four Paleolithic painted caves in Southwest France (Dordogne)

by

Suzanne Natascha Villeneuve
B.A. (Hons.) Simon Fraser University, 2003

Supervisory Committee:

_____

Dr. April Nowell, Supervisor
(Department of Anthropology)

_____

Dr. Quentin Mackie, Committee Member
(Department of Anthropology)

_____

Dr. Nicholas Rolland, Committee Member
(Department of Anthropology)

Supervisory Committee:

Dr. April Nowell, Supervisor (Department of Anthropology)

Dr. Quentin Mackie, Committee Member (Department of Anthropology)

Dr. Nicholas Rolland, Committee Member (Department of Anthropology)

Abstract

A century of hypotheses concerning Paleotlithic cave use has focused either on individual activities (such as vision quests or shamanistic visits) or group activities such as initiations. This thesis proposes and tests systematic criteria for assessing whether painted caves were locations of group or individual ritual activity in four caves in the Dordogne Region of Southwest France (Bernifal, Font-de-Gaume, Combarelles, and Villars). Resolving this issue provides an important foundation for examining more complex questions such as the exclusivity/inclusivity of groups using caves and their possible roles in the development and maintenance of inequalities in the Upper Paleolithic. Models for the emergence of socioeconomic complexity among hunters and gatherers have increasingly stressed the importance of ritual and ideology in understanding how inequality emerged. Addressing the issue of group dynamics and rituals associated with cave use may provide critical insight in our quest to understand Upper Paleolithic culture.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

assistance with mapping and photographing in the caves as well as his encouragement and support during one stage of this research. To Jay Herbert and Jessica Tilley for their statistical assistance, and Jennifer Lewis for her hours of work to assist with compiling image summaries. To Ron Adams and Brian Hayden, who helped to provide an opportunity for ethnoarchaeological research into cave use in Indonesia. Thanks also to Robert Muckle, for mentorship since the beginning.

Finally, but certainly not least, is thanks to my family for helping support and encourage my dreams. Special thanks are extended to my mother for her never ending encouragement and belief, and to my cousin and Aunt, Jane and Anne Rayvals, whose support continues to provide strength.

The initial component of this research (at the honours level) was funded through Dr. Brian Hayden's SFU Small SSHRC Grant, otherwise funding was obtained through University of Victoria and generously provided by Remi Farvacque for one phase of the research. I am grateful for all of this funding, and for all of the hours and effort spent by others in various ways which has assisted with this research. Thank you.

CHAPTER 1 ~ INTRODUCTION

1.1. GOALS

Over the last century the discovery of Paleolithic cave paintings in Western Europe has given rise to many theories that attempt to explain why the images were created, why individuals began to paint in deep caverns as early as 32,000 years ago, and what kinds of rituals they may have represented. Interpretations of the art have ranged over the decades, from hunting magic (i.e. Breuil 1952) and cosmic dualities (i.e. Lamping-Emperaire 1962; Leroi-Gourhan 1968) to ecological explanations (i.e. Jochim 1983, 1987), information storage (i.e. Mithen 1988), mating network facilitators (i.e. Conkey 1980; Gamble 1982) and shamanic expressions (i.e. Clottes and Lewis-Williams 1998; Lewis-Williams 2002). These past approaches have largely focused on the symbolic content of the images. Recent trends in rock art studies have emphasized the importance of physical contexts in understanding the social significance of the images (i.e. Clottes 1997; Baffier and Girard 1998; Lorblanchet 2001; Lewis-Williams 2002; Bahn 2003). However, relatively little attempt has been made to systematically examine cave images from this perspective.

This thesis departs from the usual symbol oriented approaches to cave art studies. In analyzing the spatial distribution of cave images an activity area approach is adopted which focuses on trying to understand what the immediate contexts of images may reflect in terms of associated activities or group sizes, and how different portions of caves may have been used. In asking questions about the associated social contexts or activities it becomes important to document the physical and visibility conditions surrounding images, and to then perhaps understand image patterns according to these contexts. Variation within caves (and between caves) in the physical contexts of images and the way space was used are central concerns of this thesis. Although symbolic aspects of the images are undoubtedly a

critical factor influencing their placement and spatial arrangement, a more detailed analysis of their physical and visibility contexts may help to refine the scope of potential associated activities (or group sizes) and motivations behind the placement of various images.

By situating these questions in a broader framework that attempts to understand what role ritual may have served in transegalitarian societies, such as those of the Upper Paleolithic, additional insights may be gained. In Western Europe, the Upper Paleolithic represents a dramatic increase in symbolic behaviour, which is arguably due to a fundamental shift in social networks toward greater inequalities. The elaboration in symbolic communication in the context of ritual activity perhaps helped to facilitate and maintain such increasing hierarchical frameworks. Some researchers suggest that the placement of the images in dark caverns especially, reflects a hierarchical structure to the societies (i.e. Lewis-Williams 1997a:149), and that an increase in hierarchical social frameworks may also be reflected as greater depths of the caves were explored more frequently (e.g., Bender 1989; Lewis-Williams and Dowson 1993). The creation of large-scale complex art, such as that seen in Lascaux, Altamira, Font-de-Gaume and other caves most likely reflect this process. However, although cave art has been thought to reflect hierarchical frameworks in ritual activity, our understanding of the kinds of activities they represent is limited. Furthermore, although cave ritual has been implicated in the creation and transformations of socioeconomic inequalities and political power in these transegalitarian societies, theoretical models of the motivations for creating such rituals are also poorly developed.

What kinds of rituals occur in transegalitarians societies? What rituals and activities involve the use of hidden places or restricted spaces such as caves? What are the motivations for creating such rituals and what social groups are involved? Is it possible (through a refined understanding of the use of cave space, and an understanding of the role of and variations in

ritual forms in transegalitarian societies) to better understand the types of ritual activity associated with cave use, how it varied and the role that caves played in the development of Upper Paloelithic societies in Western Europe?

1.2. GEOGRAPHIC CONTEXT

Over 350 sites of European Ice Age rock art (parietal art) occur from the southern tip of the Iberian Peninsula to the Urals. Approximately 160 of these sites occur in France (**Fig. 1.1**) and include some of the most remarkable of the painted caves sites, such as Lascaux, Niaux, Les-Trois-Freres, Font-de-Gaume, Les Combarelles (Breuil 1952), Chauvet, Cosquer, Cussac and Rouffignac (Clottes 2005). Over 60 decorated caves and rockshelters, over 20,000 years of image making, and some of the most spectacular of these caves occur in the Perigord region of Southwest France, one of the most important areas of Paleolithic parietal art. This thesis will examine four of the decorated caves in this Perigord region: Bernifal, Villars, Font-de-Gaume, Les Combarelles. These caves were chosen because of their accessibility and the range of variation they show in one region (in terms of image techniques, sizes and styles as well as chamber dimensions and cave layouts), in addition to their relatively large number of images (providing suitable sample sizes for statistical analysis).
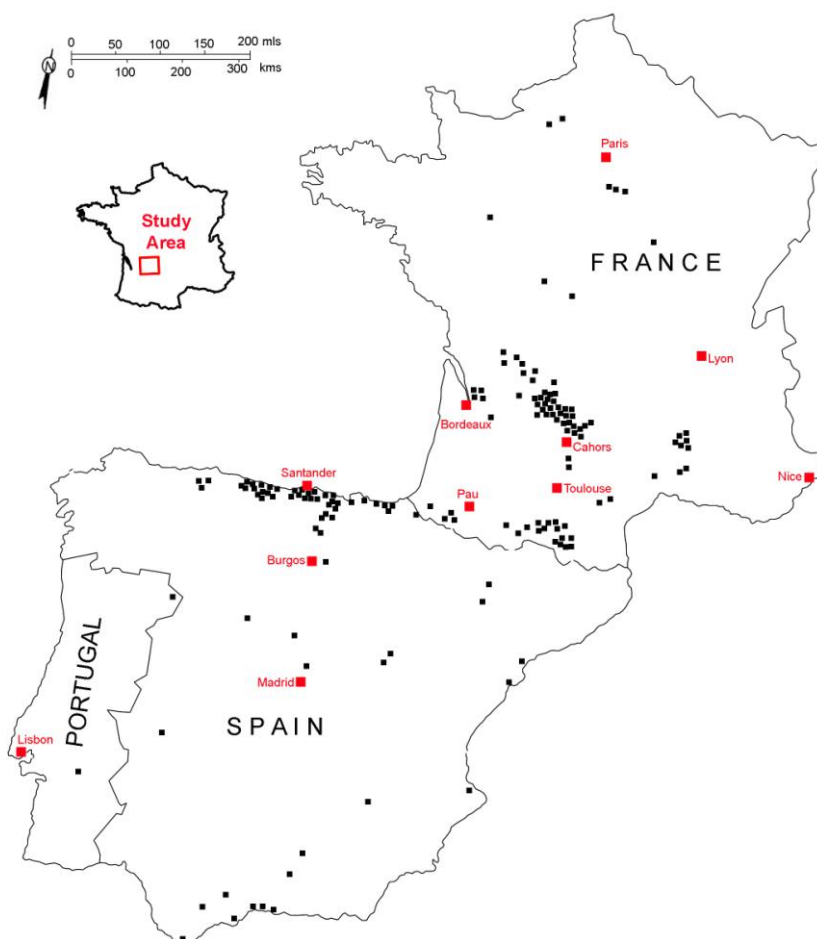
Figure 1.1 Map of France, Spain and Portugal showing the approximate location of the primary regional clusters of parietal art sites in southwest France (the Perigord region), along the France-Spain border (the Pyrenees) and in Northern Spain around Santander and Burgos where Altamira is located. The insert highlights the Perigord region, the study area of this thesis (modified from Bahn and Vertut 1988:36-37)

1.3. TEMPORAL CONTEXT

Cave images date to as early as the 32,000 years ago in the case of Chauvet-Pont-d'Arc, for example, in the Ardèche region of Southern France (i.e. Valladas 2003:1489). This early period of image making, the Aurignacian (40,000-28,000BP), marks the beginning of the Upper Paleolithic in Western Europe (see **Fig. 1.2.** below for a summary of Upper Paleolithic culture chronologies and Leroi-Gourhan's art styles). This period also coincides with a significant biological shift in European populations, with Anatomically Modern Humans (AMH) gradually replacing Neanderthal groups. Major transformations in symbolic

behavior associated with the appearance of AMH are also seen in other aspects of the

archaeological record with an elaboration of bone and ivory artifacts for example, and

developments in body adornments of ivory, shell and other materials (i.e. White 2007).

However, the majority of cave images date to a later period, between 20,000 to 10,000BP

during the Solutrean and Magdalenian Periods (Styles III and IV), when some of the most

elaborate caves, such as Lascaux, Altamira and Font-de-Gaume, were painted (i.e. Valladas et

al. 1992). Prior to this peak period of cave painting and throughout it, considerable evidence

of increasing social complexity occurs.
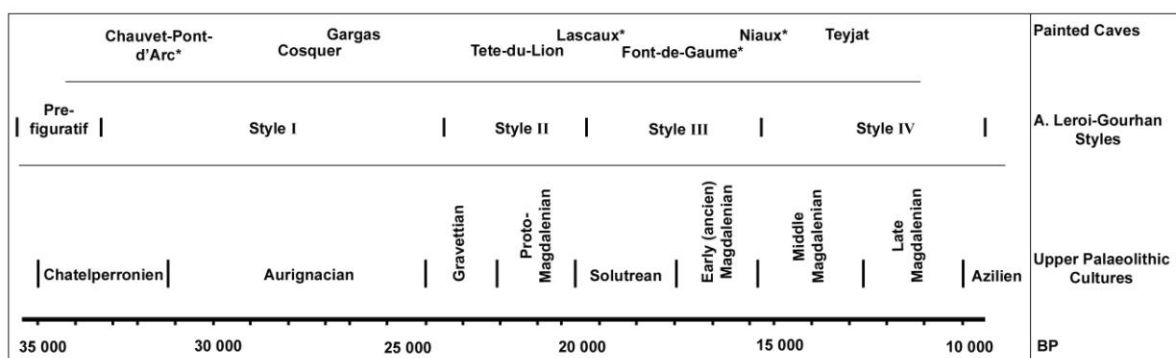
Figure 1.2: Chronology of Upper Paleolithic cultures and styles for cave art established by Leroi-Gourhan (table modified from Aujoulat 2004:57). The chronological position of some of the caves in France are shown, those with * indicate caves mentioned in this thesis. The Upper Palaeolithic is normally subdivided into a number of different cultural traditions. In Western Europe these usually include the Aurignacian (40,000-28,000 BP), Gravettian (28,000-21,000 BP), Solutrean (22,000-18,000 BP) and Magdalenian (18,000-11,000 BP).

Gamble (1982) divides the Upper Paleolithic into two periods: an "early art period"

of 33,000 to 20,000BP (the Aurignacian, Gravettian and early Solutrean), and a "late art

period" of 17,000 to 10,000BP (the late Solutrean and Magdalenian). The early period is

associated with portable art, figurines and a general increase in animal representation around

29,000BP. Although some painted caves occur during this early period (i.e. Chauvet,

Valladas 2003), the majority occur in the late period, following environmental deterioration

throughout much of Europe (until the glacial maximum at 18,000BP), when conditions provided greater availability and reliability of animal resources.

In terms of the four caves examined in this thesis, the majority of their imagery is considered to associate primarily with the late period, the late Solutrean and Magdalenian periods (Styles III and IV). In the case of Font-de-Gaume and Combarelles, two caves examined in this thesis, their archaeological deposits provide evidence of visits to the caves as early as 40,000-30,000BP until recently (1800's). However, the large polychrome images in Font-de-Gaume, are primarily associated with Leroi-Gourhan's Style III (late Solutrean / Early Magdalenian, 18,000-15,000BP). The chronological and stylistic information for each cave will be discussed in detail in *Chapter 3*.

1.4. CONTEXTS IN THE CURRENT LITERATURE

Researchers such as Jean Clottes (1997), David Lewis-Williams (2002), Michel Lorblanchet (2001), Sophie de Beaune (1995), Dominique Baffier and Michel Girard (1998), Paul Bahn (2003), among others, have begun to discuss the idea of "public" (group) versus "private" (individual) domains in the Paleolithic caves and cave images. Most of these researchers suggest that many caves have both domains of activity, such as Lascaux for example. The group-oriented domain is thought to consist of larger spaces and more "elaborately" and densely painted images and image panels, such as the Salle des Taureaux, where some type of group or communal ritual is suggested to have occurred and where viewing of the images may have been important. In contrast, the more private or individual domain is described as usually existing in the places beyond the more elaborate chambers, especially the far reaches of the cave, where space is more limited. The images occurring in these spaces are often referred to as being "crude" or expedient, involving little time and effort to produce, and described as being randomly dispersed over the available wall space. It

is suggested that viewing in some of these more private contexts was not a major consideration; instead, the *process* involved in making the image was more important.

The spatial and other assumptions some researchers have used for interpreting the images as occurring in "public" versus "private" contexts leads one to expect caves like Les Combarelles II (one of the caves discussed in this thesis) to be entirely devoted to private or individual uses and image-making. However, although a number of these researchers have suggested that there exist multiple domains of social context behind cave art, and similar discussions have developed in other geographic areas of rock art studies (e.g., Bradley 2002; Loubser 2002), no one has yet attempted to systematically determine what constitutes such domains for the caves or the cave images.

Two key issues emerge from this literature: 1) that of the space surrounding images and the distribution of images throughout space, and; 2) the intended audiences for the images. This thesis attempts to operationalize concepts of group and private domains of activities by developing a methodology to systematically analyze cave and image data from this perspective. I attempt to extend the approach advocated by Lewis-Williams, which involves looking for "activity areas." This approach contrasts markedly with past structuralist mapping of image distributions in caves focused on the symbolic content of the art (i.e. Laming-Emperaire 1962; Leroi-Gourhan 1968). The ultimate goal of this approach is to gain insight into the types of activities and group sizes that may have been associated with the use of caves, or various components of the caves.

The question of whether images in caves were meant to be viewed by groups, or whether the art was created by individual artisans acting on their own, is pivotal to current theoretical models not only of cave art but of Upper Paleolithic society. If groups were involved were they responsible for all art in the caves, or were some caves used by groups

and other caves by individuals? If so, which caves or parts of caves were used by groups, and how frequently were specific caves used by groups in relation to their use by individuals? If groups were involved, were they large communal groups or more selective smaller groups? What was the nature of such groups and how often did they enter caves? What was the nature of their activities, and why did they choose certain parts of caves rather than others? What genders and statuses did they represent in their communities? Cave art may provide a unique opportunity in archaeology to address these and other interesting questions. While it may not be possible to deal with all such questions in this thesis, the results presented here will hopefully contribute to a foundation from which some of these questions can be dealt with in the future.

1.5 OVERVIEW OF CHAPTERS

This thesis begins with a review of past explanations proposed for the 'origins' of symbolic behaviour and Paleolithic cave art, as well as current trends and debates surrounding the caves (*Chapter 2*). *Chapter 3* discusses the geological and archaeological history of the caves analyzed in this thesis, and provides an overview of their images and physical layout. A methodology is presented in *Chapter 4*, which is focused on the analysis of various aspects of the physical and visibility contexts surrounding the images. This methodology is designed to help evaluate the potential group sizes and activities (social contexts) associated with various portions of the caves. Analysis and results of the four caves will be presented in *Chapter 5*.

Finally, *Chapter 6* summarizes the results and discusses their potential for understanding variation in the use of caves and *Chapter 7* provides an overview conclusion. *Appendix A* provides a summary table of the expectations of various researchers regarding differences in cave images and physical contexts associated with private versus public spaces.

Appendix B provides a visual summary of some aspects of the methodological approach to recording in the caves.

CHAPTER 2 ~ THEORY

2.1. INTRODUCTION

In order to situate the present analysis in a broader context, this chapter will briefly examine how art is defined and will discuss current ideas concerning the widespread occurrence of symbolic behavior in the Upper Paleoloithic of Europe. A review of theories dealing with cave art follows, in which the theoretical position adopted in this thesis will be made explicit and some ethnographic grounding for critical assumptions will be provided.

2.2. THE 'ORIGINS' OF SYMBOLIC BEHAVIOR

The definition of 'art' is problematic and has been a widely debated topic. Some researchers argue that "art" is a Western construct that has no corresponding meaning in traditional societies (Dissanayake 1992), and that we should inquire about the "origin of the image-makers ('artists') rather than the "genesis of some impossible-to-define philosophical concept (Lewis-Williams 2002:45). Symbols, by definition, are social constructs that work in reference to other symbols (Barham 2002:511), and it may therefore be more appropriate to refer to this behavior as "symbol making" (Conkey 1997) especially in the case of the painted caves.

The antiquity of "symbolic behavior" has also been controversial. On one hand, the cognitive capacity for symbolic behavior or artistic expression is thought to extend far back, linked with the development of language (e.g., Deacon 1987). According to this view, changes in the brain structure, "stone tools, reduction in dentition, and changes in hand morphology mark a socio-ecological environment that required symbolic solutions" (Deacon 1998:348). In contrast, Davidson and Noble (2003) and Davis (1986) present a very 'happenstance' view, which suggests that image making may have begun simply through the

gradual recognition of mark-making abilities that, over time, would have evolved into something that would be recognized as an object. However, this prompts a number of questions, such as why hominids would practice such behavior in the first place. Moreover, if Neanderthals were mentally capable of representation, "why did material representation not become fixed when it has such obvious selective advantage" (White 1992:546)? One might then question whether there is any such obvious selective advantage. If there is such an advantage to image making, then why do we not see the same or similar levels of involvement in this behavior in the Upper Paleolithic of the Levant, for example? Given such geographic differences, the question then becomes "how" is symbolic behavior adaptive and under what circumstances?

Dissanayake has suggested that the motivation for 'art' can be found in the context of rituals which helped to ally anxiety and reinforce group cohesiveness. Ritual, she argues, provideS a "fundamental psychobiological propensity in humans that provide pleasurable feelings of mastery, security, and relief from anxiety" (Dissanayake 1992:84). The reason why we are able to see and study symbolic behavior in the Paleolithic is because of the repetitious structure of rituals and how this is embedded in the routines of daily life (Gosden 1994). Some researchers argue that this "redundancy" or repetition is *essential* for being able to recognize symbolic behavior in the past (e.g., Chase and Dibble 1987). The dispersed and occasional occurrence of isolated materials with symbolic content, such as what happens in the Middle Paleolithic, is argued to not be sufficient enough to claim symbolic cognitive capacities (e.g., Hovers *et al.* 2003). However, ritual activity (or certain forms of ritual activity which involved greater symbolic investment) may have not been an adaptive or social strategy of Neanderthals or AMH groups in other geographic locations.

Such a focus on rituals then prompts other questions such as *why* ritual activity (which may have provided motivation for greater investment in symbolic expression) should develop under certain circumstances. This does not suggest that ritual activity did not exist earlier, but that instead that at some point, greater emphasis or investment in ritual activity may have occurred with greater elaboration. If the capacity for symbolic expression then existed prior to the appearance of AMH (and in some regions occupied by AMH which lacked elaborate symbolic systems), and if ritual activity provided motivation for greater symbolic behavior, then why is there greater investment or elaboration of ritual during the Upper Paleolithic of Western Europe?

Developments in ritual activity require and reflect transformations in practices that surround belief and values – ideological systems. Perhaps we should ask *why* belief systems and practices were transformed, so as to provide motivations for ritual developments and elaboration and to provide conceptual frameworks that justified investments of time and materials in symbolic behaviors. Under what conditions did ideological transformations occur, ritual systems develop or transform, and increases in the materials remnants of symbolic behavior result?

Some researchers, such as Hayden (e.g., 1995, 1998, 2003), argue that aggrandizers (politically ambitious individuals) underlie the creation and transformations of belief systems (ideologies) as well as the development of prestige objects and elaborate parietal and portable art. Aggrandizers take advantage of and create or transform belief systems to maneuver themselves into key controlling positions which could be used to control the flow of surplus resources and labor. Resource rich areas such as the Vézère Valley (the focus of this thesis) and other valleys where cave art (and associated ritual activity) occurred, may have been ideal contexts for such aspiring elites to emerge more forcefully. Ritual would served as an arena

to that helped to create and maintain beliefs and ideological systems that aggrandizers could manipulate in their attempts to control surplus resources. The elaboration of ritual, and cave ritual, may reflect an increase in hierarchical structures as some cave art researchers have suggested (e.g., Lewis-Williams 1997a:149). Exclusive group rituals and greater investment in these types of rituals may be reflected in caves like Lascaux. From this perspective, populations aggregating in resource rich areas have a greater capacity for such aspiring elites to operate, and it is they who are behind the push to greater investment in symbolic activity. These more agency oriented explanations contrast with earlier functionalist suggestions that the rituals associated with the painted caves served solidarity purposes in the Paleolithic societies (e.g., Conkey 1987:76) and were motivated by external pressures such as demography or resource stresses as opposed to abundance.

Similar differences in views occur in explanations surrounding the level of symbolic activity between Europe and the Levant (Hovers *et al.* 2003:510). From a more functionalist perspective, Hovers *et al.* (2003:510) have suggested that the driving force behind art or color symbolism in the Epi-Paleolithic of the Levant involved a change to more settled life-ways. According to their view, less symbolic activity occurred in the Levant because the relatively stable environment and resource base necessitated smaller territories with smaller and shorter social gatherings than those in Europe. The differences in social life, demographics and settlement patterns therefore "reduced the need for elaborate symbolic expressions" (Bar-Yosef 1997 and references therein; Hovers 1990). However, this explanation does necessarily concern *why* an increase in symbolic activity occurs in the Upper Paleolithic and especially the late Upper Paleolithic.

In our attempt to understand motivations of the "origins" of art, we have often overlooked social, technological and ideational contexts (White 1992:542). The image makers

were likely acting "rationally" within their specific social context (Lewis-Williams 2002:45).

White (ibid:560) argues that two and three-dimensional representation is an "investment"

and had to prove useful in a social context for it to be adopted. If Neanderthals did have the

cognitive capacity for symbolic behavior, what may have been missing was the "social

context in which [such] material was advantageous." Materials such as personal ornaments,

for example, normally serve to provide social and political distinction. In a similar vein

Gamble has proposed that

> The difference … between Neanderthals and Cro-Magnon (AMH) populations and
> their distinctive material culture was not derived from differences in biology or
> intelligence. Rather it stemmed from differences in their societies, the structure of
> their alliances that resulted in the potential information content of material culture
> being used in alternative ways. (Gamble 1982:101).

What other researchers argue is that the control of subsistence resources through various

sociopolitical strategies played a significant role in motivating groups to adopt symbolic

frameworks to help facilitate social relationships that promoted and maintained certain

practical advantages (e.g., Hayden 1995, 2003). Rituals are highly effective strategies for

mobilizing such efforts and could have had survival advantages in competition over the

control of resources.

Many cave art researchers also feel depictions and their associated meaning(s) are

socially created and maintained and they cannot be understood outside of its social context.

Lewis-Williams, for example, suggests that

> The individual [shamans] who made the images were … manipulating a resource
> (altered states of consciousness) to advance their own religious, social and political
> positions … and is therefore an example of how material culture [symbolic
> expressions] can, n the hands of human agents, play an active, formative role.
> (1997b:828)

Depictions and their associated meaning are socially created and maintained. The

lack of variation in the subject matter of Upper Paleolithic images suggests that social norms

and customs were in some way controlling their creation (Lewis-Williams 2002:44-45). However, these views concerning how art may function in society and the implications this has for understanding why members of Paleolithic communities began to paint in dark caves are only part of a more recent theoretical trend. With a few exceptions (e.g., Conkey 1980, White 1992,1993), ideas concerning Paleolithic cave art have not always considered the physical or spatial contexts of images, much less their social contexts. A systematic approach dealing with the spatial contexts in which the images appear and how they are related to the social groups creating and using the art (painted caves) may be able to greatly enhance our understanding of social contexts during the Upper Paleolithic.

In general, the study of prehistoric art and the evolution of symboling behavior is plagued with conflicting opinions. One view favors an abrupt transition from the level of symboling behavior in the Middle Paleolithic to the Upper Paleolithic, whereas another view favors a gradual transition (d'Errico and Nowell 2000). Some 'gradualists' believe that a significant transition occurred 15,000 years after the period referred to as the Middle to Upper Paleolithic transition. D'Errico at al., (2003:18) argue that "on the basis of present evidence, the hypothesis of separate but converging cultural trajectories for archaic hominids in Europe and anatomically modern *Homo sapiens* before the Middle/Upper Paleolithic transition is not proven, but cannot be rejected."

Occasional and dispersed examples of material-based symbolic behavior throughout the Middle Paleolithic exist with more examples being discovered as time progresses (e.g. d'Errico *et al.*, 2003). Gradualists tend to rely on this evidence to argue that the symbolic ability seen in AMH's is a product of a gradual evolution in cognitive abilities, which Neanderthals possessed to some degree but did not develop in any complex form (although opinions on this topic vary). The perspective from which this thesis is written favors the

suggestion that the reason why more complex symbolic behavior is not seen in Neanderthals is because they lacked the social impetus and social contexts which provide motivation for such behavior, and perhaps as well simply a practical reason that might provide some usefulness for it. The view that the transition to more complex symbolic behavior is rooted in social forces provides the theoretical framework within which cave art will be examined.

2.3. PAST EXPLANATIONS FOR UPPER PALEOLITHIC CAVE ART

2.3.1. Art for art's sake

When the painted caves were initially discovered in the late 1800's, the images were viewed as serving only aesthetic purposes and the caves were seen as underground museums. During this period, Edouard Lartet and Henry Christy proposed that cave art was the result of an increase in leisure time which depended on a rich environment, and that the images were made for "simple enjoyment, fun and decoration, once people had achieved a measure of control over their environment" (Lewis-Williams 2002:42). Researchers at the time did not view Upper Paleolithic societies as being capable of religion, thus art was thought to lack any symbolic content and to have been produced by individuals rather than groups.

Problems with the 'art for art's sake' explanation began to emerge as more cave art was discovered. Research documenting that Australian Aborigines (Spencer and Gillen 1899) created art while living in harsh environmental conditions undermined ideas that the art resulted from an increase in 'leisure time'. In addition, in his book *The Golden Bough*, Sir James Frazer successfully argued that 'primitive' people did have religion. 'Art for art's sake' soon faded, although it was later revived for a short period in the 1980's (i.e. Halverson 1987).

2.3.2. Hunting Magic

Hunting magic explanations, which relied on ethnographic insights from Australia and elsewhere that had gained greater attention during the early 1900's, soon replaced previous views of art for art's sake. Hunting magic essentially suggested that cave artists created the images in acts which endeavored to sympathetically ensure success in their hunts. Breuil (1952) is often considered the first to have proposed the idea that the animals portrayed in cave art, and possible spears, were related to hunting magic. However, as Lewis-Williams (2002) points out, it was actually Reinach (1903) that laid the foundation for this theory. Reinach influenced popular conceptions of cave art in a number of ways. He turned attention to the ethnographic approach and argued that the only way we can begin to really understand Upper Palaeolithic art is through the understanding of hunter-gatherer lifeways. He suggested that Upper Palaeolithic people painted animals because they believed that this behavior would create greater success in the reproduction of those animals.

Breuil (1952) modified these views in his theory of sympathetic hunting magic by arguing that the images provided power over the animals, and that the dangerous animals provided the artists with strength. This explanation seemed to satisfy people's curiosity of why many of the images appeared in deep, dark chambers. Breuil also explained the tectiform (pentagonal) images within this framework, referring to them either as traps, dwellings, or hides. Hunting magic also incorporated environmental factors, arguing that art (magic) would be produced during times when the environment was harsh in order to help ensure food availability.

Subsequent criticisms pushed the theory of hunting magic into disfavor. Critiques argued that hunting magic would include art that focused on major species that were hunted for food or the species that posed threats to bands in the Upper Paleolithic (Bahn and

Vertut 1988, Clottes and Lewis-Williams 1998), which is not the case. However, from this new emphasis on analogy also emerged ideas of totemism and began a new tradition of theoretical explanations.

2.3.2. Structuralism

Structuralist interpretations emerged during the second half of the 1900's. Although Leroi-Gourhan and Laming-Emperaire are normally considered the first to have brought Structuralism into cave art studies, their ideas were built on the work of Max Raphael (1945). Raphael was a Marxist who argued that we belittled the Upper Palaeolithic people to maintain the progress doctrine of the time. He also questioned the concept of 'egalitarianism'. Directly challenging the hunting hypothesis, he argued that Upper Palaeolithic art did not reflect information about hunting and habitations, but rather he argued that the art tells us more about social struggle. While still maintaining the concept of totemism, he suggested that what the animals represent are conflicting clans. Raphael proposed a number of other ideas that persist to this day, including the idea that some images are organized compositions as opposed to scattered individual images as Breuil thought. He was also the first to propose that sexual dualities structured the compositions, which Leroi-Gourhan later developed. This predates Levi-Strauss; however, many do not acknowledge Raphael's work (Lewis-Williams 2002).

Later Annette Laming-Emperaire (1962) suggested that the images were totemic representations. Laming-Emperaire's (1959) work was strongly built on Raphael's in a number of ways. She continued to push the focus from hunting to social meaning, however, she felt that the sexual duality explanation was useless. Laming-Emperaire argued that the art represents social conflict between clans, and added that creation myths underlie the art. The

methodology that Laming-Emperaire employed influenced rock art researchers for decades. Her approach involved the compiling of inventories, which included the position of the works in the cave, associations with archaeological remains, any evidence of use, and the content or form of representation (Lewis-Williams 2002:57).

Following Laming-Emperaire's methodological approach, Leroi-Gourhan (1968) emphasized an interesting dichotomous patterning, which Laming-Emperaire first discovered. This provided the basis for his argument that the caves were sanctuaries where prehistoric animals and the cosmos were divided into a complementary duality along sexual lines. Although Leroi-Gourhan was influenced by Raphael and Laming-Emperaire, his strongest influence came from Levi-Strauss, with whom he worked during the early part of his career. Leroi-Gourhan believed that the images were carefully placed, thus they had to be understood in relation to one another. Leroi-Gourhan felt that the earlier divisions which the hunting magic explanation made--that the animals represented either food or dangerous species--was inappropriate. He also argued that the use of ethnographic analogies was not appropriate.

Leroi-Gourhan managed to compile data from 66 caves, producing a very complex data set to test his hypothesis. His strong belief in the idea that the existing patterns represented sexual dualities sometimes biased his data collecting. He occasionally 'fudged' the information in difficult to view areas based on what he felt should exist (Lewis Williams 2002). In the end he devised an elaborate "mythogram" that divided the caves into areas (entrance, central, and deep areas) and panels of images into zones based on the clustering of certain groups of images, groups which he created based on what he believed were 'feminine' versus 'masculine' animals and signs.

Although Leroi-Gourhan may have gotten carried away with a very elaborate and complex hypothesis that could easily be tested (and refuted), he did produce a vast amount of empirical data that researchers still heavily rely on. Unfortunately, as critics pointed out, the topography of the caves are so diverse that it is almost impossible to make comparisons. Bahn and Vertut (1988) bring up a number of other problems with his structuralist interpretations and methods. Nonetheless, Leroi-Gourhan successfully pushed interpretations far away from the old 'art for art's sake' explanation. He promoted a very different trend of thought and theorizing about the painted caves. Furthermore, although Laming-Emperiare and Leroi-Gourhan may not have been correct in their interpretations, they were probably justified in their recognition of some types of patterned distributions related to the use of large chambers versus more remote areas of caves. Results from this thesis support such a distinction, but this conclusion is based on technical grounds rather than symbolic criteria.

Leroi-Gourhan's explanation was abandoned along with the whole structuralist position when 'New Archaeology' emerged, which rejected approaches that attempted to deal with meaning and symbolism. With the abandonment of structuralism came functionalist interpretations and a stronger emphasis on ecological and social pressures.

2.3.4. Functionalism (1980's)

Conkey's work (1980) introduced a perspective that was completely different from preceding ones. She combined past insights with new stylistic information into an ecological framework that connected with what was known of the social context of the Palaeolithic. Conkey focused on stylistic information found on portable, rather than parietal art, from the cave of Altamira, in Northern Spain. She drew on regional patterns and new insights into

hunter-gatherer lifeways to develop an hypothesis suggesting that the caves served as aggregation centers. These centers would have facilitated group rituals, a social strategy employed to maintain group cohesion, to build alliances, and to negotiate social relationships. In some ways this explanation developed from ideas of totemism, yet Conkey was able to avoid any simplistic notion that the images were a type of clan identity. Instead, she delved into the realm of sociopolitical influences while still adhering to the prevailing ecological or adaptational paradigm of the archaeology during that period.

Gamble (1982), following in a similar vein, developed an explanation that very much centered on social forces, while also adhering to an ecological paradigm. Gamble developed a complex hypothesis for the early period of art (33,000 to 20,000BP) based on the creation and maintenance of alliances (especially marriage partners) to reduce risks due to the unpredictable environment. The stylistic qualities of portable art during this period, such as the figurines were supposed to have encoded much information that could have facilitated alliance formation. Gamble felt that during the later period of art (17,000 to 10,000BP), social conditions would have been much different, however, the painted caves would have served a similar purpose of exchanging information to facilitate social relationships and alliance formation. Jochim (1983, 1987) provides a theoretically similar explanation for the cave art, although he relies more heavily on data from the actual painted caves as well as the surrounding environment.

Around the same time, Mithen (1988) argued that it is not possible to connect Upper Palaeolithic art to the social context because we lack the archaeological data necessary to do this properly. Mithen adopted a strongly ecological perspective arguing that ecology is one data set that we can rely on. Although Mithen did not agree with sociopolitical approaches, he did not veer too far off from prevailing ideas of the time. His explanation that the painted

caves served as locations of "information storage" which hunters, and those being trained, could continuously access (Mithen 1988, 1989, 1991) was similar to the earlier information explanations of Gamble and Jochim.

2.3.5. More Recently (1990's)

In contrast to the information explanations, Gombrich (1982) argued that pictures have very little information because people read them differently. He contended that the "best that can be said is that pictures trigger memories of information that has been absorbed in different ways" (Lewis-Willliams 2002:67). As Lewis-Williams would say, images "are not like hard-drives of computers" (2002:67). More recently, Dowson (2000) cleverly commented on the absurdity of the "information storage" explanation, arguing that many of these images are found far deep in chambers that lack any source of light, and which sometimes involve extreme measures to get to. Why Palaeolithic people would insist on recording information that was supposedly so vital to survival in such locations is beyond Dowson's comprehension. Criticisms of functional interpretations opened the door to more creativity in the 1990's. During this transition of theory Halverson (1987) attempted to revive the idea of art for art's sake, changing the label to 'representation for representation's sake.' This attempt was short lived and not favored by the majority of researchers.

Today, one of the most well known and widely cited explanations for Palaeolithic art is Clottes and Lewis-Williams' (1998) shamanism model. Clottes and Lewis-Williams argue that the painted animals are related to shamanistic power images, reflecting shamanic initiations and rituals. Linking theories of human neurological predisposition to trance states and hallucinations with social cueing, Clottes and Lewis-Williams (1998) suggest that some, though not all, Upper Palaeolithic cave activities can be seen as an outgrowth of shamanistic

ritual. If caves are seen as interstices of material and spiritual realms then images, symbols, punctures, and handprints may be seen as attempts to connect with power beyond the "membranous" walls. Some images might reflect the shamanic visions of ecstatic states, with more complex paintings acting as culturally specific visual stimulants for future rituals. In a similar vein, but with a different twist, Lorblanchet (1995, 1999) suggested that caves like Pergouset served as sanctuaries for individual spirit quests involving altered states of consciousness similar to those posited by Lewis-Williams for shamans. Although some researchers have problems accepting the shamanistic explanation, one of the reasons why it may have persisted is because of the careful use of empirical data to build a strong argument. Bahn's (1997) comments in this respect, is that in order to 'debunk' this explanation, one would have to go through a great deal of effort.

Concerns for social complexity are more strongly seen in Owens and Hayden's (1997) focus on transegalitarian rites of passage. Their approach incorporates shamanism and rituals into increasing social complexity. Assuming that Upper Paleolithic resources supported increasing social complexity, and noting consistent evidence for the presence of children in the caves, they propose that some of the cultural remains derive from rituals involving young people. An examination of rituals involving children in a number of transegalitarian societies led them to the suggestion that some Upper Paleolithic art might result from secret society combined with, perhaps superimposed on earlier shamanic rituals, designed to enhance the value of high status children.

More recent models continue to attempt to explain ritual in terms of wider social traditions (Dickson 1990), ultimately seeking to understand the role of caves in religious ritual. Few models actually attempt to demonstrate that patterns of images may bear on formal meanings of religious activity – that is, how society could be affected by cave rituals –

and how this might be modeled using ethnographic data (with the exception of Owens and

Hayden 1997, Hayden 1995, 2003, and Lewis-Williams 2002). Overall, it appears that both

theories dealing with cave art and theories dealing with the adaptive significance of art have

taken a theoretical shift towards issues of social dynamics, agency, and the human-human

relationships behind such behaviors.

2.3.6. Summary

For over a century the function of the Paleolithic painted caves in Western Europe,

and the meaning of their images, have been extensively debated. Theoretical approaches

have waxed and waned and have been influenced by changing historical and academic

perspectives. According to Lewis-Williams:

> The various ways in which researchers have explained Upper Palaeolithic art
> constitutes a long historical trajectory that has moved from simple to more complex
> hypotheses and then on to the collapse of the whole interpretative enterprise, and
> thus to present-day agnosticism. Today many researchers believe that it is
> impossible to know what Upper Palaeolithic art was all about. (2002:41-42)

Some argue that the reason for this is due to a rift between general archaeologists

and rock art specialists. Previous explanations that focused on hunting magic and totemism

are now routinely dismissed (Dickson 1990; Daly 1993; Clottes and Lewis-Williams 1998;

Schmidt 1998; Fagan 2001). The Structuralist approach advocated by Leroi-Gourhan has

now been challenged on a number of points (Bahn and Vertut 1988; Dickson 1990; Daly

1993; Clottes and Lewis-Williams 1998; Hayden 2003). Current models assume that

European caves were decorated during a period of increasing social complexity grounded in

the seasonal recurrence of Late Pleistocene herd animals. Concerns for social complexity are

strongly seen in Conkey's (1980) aggregation model, and Owens and Hayden's (1997) focus

on transegalitarian rites of passage. Lewis-Williams (2002:66) argues that the fact that

paintings are found deep in caves indicates that the motivation "must have been enduring social pressures to keep pushing people under ground" and restricting access to supernatural powers to select members of past communities.

Thus, many theoretical models have emerged from this on-going and complex debate that is rooted in a constantly evolving database. To the present, however, Paleolithic cave art has largely been studied from top-down ecological (or functionalist) perspectives, symbolic frameworks that seek to find meaning in the art, or strongly descriptive approaches. These approaches have largely ignored the variability in the physical context of the art, resulting in a simplified and rather unsophisticated understanding of the social world behind this art. As Dowson has pointed out "the physical space within which these images were placed and subsequently consumed…is something we rarely see in publications" (1998:70).

2.4. THESIS FOCUS AND JUSTIFICATION

This section will attempt to clarify the conceptual orientation of this thesis and will discuss some ethnographic and theoretical material that supports and justifies some of the assumptions made.

2.4.1. Focus

One of the goals of this chapter was to review theories that have attempted to explain the adaptive role of art and why cave art emerged. The Upper Palaeolithic represents a dramatic increase in symbolic behavior, of which cave art is part. Many researchers claim that this behavior signifies a fundamental change in social networks. Material culture, and the

symbolic behavior involved in the production process, would have facilitated the changes in social relations and helped to maintain certain sociopolitical agendas.

A bottom-up perspective can help to model a methodology aimed at understanding how the caves may have been experienced and influenced by different groups within the community. The archaeology of power relations becomes an important methodology when linking 'top-down' approaches to 'bottom-up' group dynamics. When looking from the 'top-down',

> we need to recognize that there is a range of variation in power relations between the polities interacting in an interregional exchange network. At the same time, when looking from the bottom-up perspective, we must allow for a range of variation in the power relations among the different groups that make up the participating polities. (Stein 2002:908).

A bottom-up will help to shift focus to the relationships that may have been experienced within the cave. These relationships, how they were experienced in the physical setting of the cave, and how they may have been negotiated or resisted by various members of the community may have influenced the art that existed in the caves. Thus, a "bottom-up" perspective can help in viewing the painted caves as places of processes, group dynamics, and individual motivations and intentions. Places that may have been experienced differently by members in the community who may have left their mark.

By focusing on the issue of whether individuals or groups were intended to view the images made in the caves, it becomes possible to begin to address some of these issues, especially if it is possible to determine something of the nature of the individuals or groups. Were the individuals highly skilled in art or did they represent the entire range of skills in the population? Did the individuals create and view images as single events, or did they return to the same images repeatedly? Did individuals seek out special types of features within the caves to visit and make images, or did they make images at random throughout the caves?

Were individual images created as personal signatures (handprints, dots, scribbles, graffiti-style images) or were they more thoughtfully planned out?

Ultimately, the concern of my research is to take an approach that considers the social dynamics of the Upper Palaeolithic, the physical space within which the art exists and is viewed, as well as the artistic characteristics of the images. The painted caves most probably played an integral role not only in the symbolic and ideological world of Western European Upper Paleolithic societies, but also potentially in the economic and political world that appears to have developed during the Upper Paleolithic as represented in the archaeological record and by the observation that these domains are virtually always interwoven. Material culture, and the symbolic behavior that is part of the production process, could have facilitated the changes in social relations and helped to maintain certain political agendas. Many researchers claim that the dramatic increase in symbolic behavior with the Upper Paleolithic, which cave art is part of, signifies a fundamental change in social networks.

The research presented here will hopefully help to understand how complex the creation of cave art may have been in comparison to the way traditional ecological approaches have modeled it. This requires taking a step away from the more favored adaptationist position of asking why the art emerged to begin with, to a perspective that considers the different ways in which the art may have been experienced. It is felt that a systematic approach to analyzing image characteristics and their spatial contexts can help to reveal information about the social forces acting upon the creation and use of images. As Conkey has argued, "researchers need to elucidate to what extent and in what ways the rock art motifs, as well as the contexts in which they were made and used were open to manipulation by social agents" (Conkey 1993, cf Lewis-Williams 1995).

2.5. ETHNOGRAPHIC THEORETICAL SUPPORT

Much of the foregoing theory development and supporting assumptions has been based on the work of previous rock art researchers. As in the case of the hunting magic hypothesis and art for arts' sake model, these researchers have often simply employed the values and assumptions prevalent at the time in their own cultures to formulate models and ideas about the past, or they have employed what seemed like "common sense" models and assumptions. However, modern Western society often differs in striking ways from traditional pre-industrial societies. It is therefore generally useful for archaeologists to broaden their scope of explanations, postulated prehistoric motivations and meanings related to archaeological remains by consulting ethnographies of traditional societies or even by engaging in field work on archaeologically relevant topics among ethnographic groups (ethnoarchaeology). This approach has been used productively by some rock art researchers such as Lewis-Williams and Whitley. However their concerns have dealt with the meaning of the artistic representations, the role of individual shamans, and the role of altered states in creating images. They were not particularly interested in the precise spatial contexts or the social contexts from an ethnographic perspective. Few rock art researchers or ethnographers have been interested in such approaches. Thus, information on these topics is scarce, as is also the case concerning how images may differ depending on whether they were meant for single event viewing by ordinary individuals, special viewing by shamans, or display viewing by groups. There are a few notable exceptions as documented by Loubser (2002, 2006), Hudson and Underhay (1978), and Alexander (n.d.). However, even in these cases, it is difficult to identify individual versus group (or trained versus untrained) distinctive art characteristics.

What can be gleaned from the ethnographies are fairly well documented instances of both specialists, like shamans, and non-specialists making rock art images. Hudson and Underhay (1978), Whitley (2000), Lewis-Williams (1997a,b), Loubser (2002, 2006) amply document the fact that shamans are generally involved in making rock art among many cultures of the world and seem to do so more often that others and to be somewhat specialized as artists (although 'artist' is not a meaningful concept in many traditional cultures). However, Loubser (2006) also documents the fact that on the North American Plateau, and among the African Irangi, adolescents made rock art as part of their initiations or as part of spirit quests:

> The majority of rock art was painted by Indian adolescents to record their experiences while in a secluded location on a vision quest…children were required to make rock art as physical evidence that they indeed visited the requisite location to obtain their visions. These powerful places were often difficult to reach and sometimes required the assistance of an adult proctor. As a rule, both shamans and non-shamans acquired visions in lonely, secluded locations…believed to contain an abnormal concentration of supernatural power. (Loubser 2006:243, 245)

A similar situation occurs in Africa where boys paint "rough" images in remote locations to record their visions as a result of hardships during puberty ceremonies (Loubser 2002:8). Such powerful sites can be either obscure or high visibility in nature, whereas shamanic art is often placed in high visibility locations (ibid:11). Loubser proposes that private forms of rock art are generally not carefully or "realistically" executed since images need not be sufficiently diagnostic for others to identify.

The important point in these observations is that much of the art was made by a broad spectrum of adolescents from these communities most of whom did not regularly engage in image making activities and who presumably had little artistic training, resulting in a wide range of quality in artistic representations, most of it probably at the low end. In contrast, shamans regularly engaged in image making, and hence should have been more

practiced and skilled in making images. As Loubser (2002:11) states it:

"Typically…shamans have more training, time, and community support for their ritualistic

activities than non-shamans do." For these reasons then, "shamanic rock art can be

expected to be more elaborate and carefully executed" in contrast to other individuals' trance

related image making. Shamans "distinguished themselves from other adults by having

sequential vision quests, often over many years" (Loubser 2006:244). Shamans also often

painted on conspicuous rock surfaces with an apparent intent to display their powers. This

was also true of Caribbean shamans who depicted their spirit helpers for all to see, and of

African shamans who used rock art images to teach adolescents about the spirit world

(Loubser 2002,2008).

Using broad ethnographic analogies, Loubser (2002) developed seven criteria that

ethnographic examples indicate should distinguish public/instructional/shamanic art from

private/mnemonic/trance art. These criteria are:

    1/ Visibility of rock art from a distance,
    2/ Ease of detection of the art (in terms of bodily effort required to view it),
    3/ Care of execution (application technique and finish),
    4/ Craftsmanship (uniformity and consistency of execution),
    5/ Recognizability of images,
    6/ Integration of art and rock surface (e.g., the incorporation of natural features),
    7/ Degree of effort involved in the creation of the art, especially group efforts.

Another aspect of relevance from the ethnographies is that in contrast to their

display oriented art in relatively open areas, shamans in Africa and the Caribbean also

created images of anti-social animals in hidden areas like caves (Loubser 2008).

It may also be useful to examine cave art images from the perspective of prestige

versus profane items. There are a number of criteria that are common among ethnographic

groups in many parts of the world which are used to distinguish prestige from profane items.

These include the cost of the materials, the amount of labor that went into manufacture, the

rarity of materials or the distance from which they were imported, object fragility, the display

potential of objects, and the aesthetic attractiveness of the objects (Hayden 1998:12-14).

Admittedly, "aesthetic attractiveness" is usually culturally influenced, although some

researchers have argued that there are some more or less universal "attractive" characteristics

such as sparkling objects, highly colored objects, timbre, elaborate shapes, symmetrical

shapes, and certain bodily and facial proportions (ibid). Evolutionary psychologists have

established the cross-cultural prevalence of a number of these aesthetic proportions. At the

extremes, it might be argued that some cave art images have the hallmarks of relatively

profane art while others exhibit many of the characteristics of prestige art.

　　　While it may not be possible to ethnographically warrant all the assumptions that one

must make about human behavior in creating explicit models for paleoanthropological

studies, it is always reassuring when some ethnographic support can be shown to exist for

the more critical assumptions. The industrial world is very different from the traditional

tribal world, and researchers must be careful not to simply apply what appear to be

"common sense" assumptions to past situations. In this respect, it is reassuring to find

ethnographic support for several of the key assumptions that will be employed in the

following chapters.

CHAPTER 3 ~ BACKGROUND

3.1. Introduction to the Dordogne

This chapter summarizes the archaeological contexts and artistic styles of Font-de-Gaume, Combarelles II, Bernifal and le Villars to examine how they compare in terms of their occupation history. These caves are located in the department of the Dordogne in the Perigord region of Southwest France. This region lies between the highlands of the Massif Central and the lowlands of the Bordeaux area, encompassing approximately 900 km^2. The topography of the Perigord is composed of massive slabs of limestone that are deeply etched by rivers creating elevated plateaus, under which are vast karstic systems of caves. In geological terms the region's deposits are relatively young and date to the Cretaceous era, but it was during the Pleistocene that the vast majority of the deposits forming the Perigord's river floodplains were laid down (Laville *et al.* 1980).

Geologically, the Perigord is divided into three sectors (i.e., see Laville *et al.* 1980). In the Northwest lies the White Perigord, composed of light colored limestone and gently sloping valleys extending along the Drone River. In the Central Perigord, south of the Isle River, is a transitional zone of both gentle and abrupt valley slopes. In the Southeast (the Black Perigord which follows the Vézère and Dordogne Rivers) there is an abundance of rockshelters and caves in the cliff-walled abrupt valley slopes. The four painted caves discussed in this thesis lie in the heartland of the Black Perigord, where the highest density of Paleolithic painted caves occur. Lascaux, one of the most famous painted caves, lies upstream from the study area along the Vézère River. **Fig. 3.1** shows the location of the study caves in the Perigord, along with the density of painted caves and rockshelters with archaeological deposits.

The archaeological deposits of the region begin with the Acheulian industries of the Lower Paleolithic, however, very little is known of this period in the Perigord. During the Middle Paleolithic deposits become very rich. The wealth and content of deposits continues to increase with the Upper Paleolithic, beginning at roughly 37,000BP and continuing to 10,000BP, and is considered to reflect population sizes and "degrees of cultural complexity and elaboration that may be without parallel in the history of hunting and gathering societies" (Laville *et al.* 1980:6). However, the richness of the archaeological record in this region may also be due to the fact that the Perigord has been one of the most intensively excavated regions for over a century, with more than 200 rockshelters and other sites now at least partially excavated. The painted caves in the Perigord however, have received very little attention in terms of modern excavations and dating. Most of the deposits were excavated during the turn of the century with crude techniques and minimal control over provenience to make room for tourists to comfortably walk through. Although there have been numerous publications on some of these caves, the focus has mainly been on stylistic or technical aspects and on inventorying the images. In this context, caves such as Font-de-Gaume and Les Combarelles have received the greatest amount of attention, while caves such as Bernifal, and especially Villars, have received very little. The following sections document the information that currently exists for Bernifal, Font-de-Gaume, Les Combarelles and Villars.
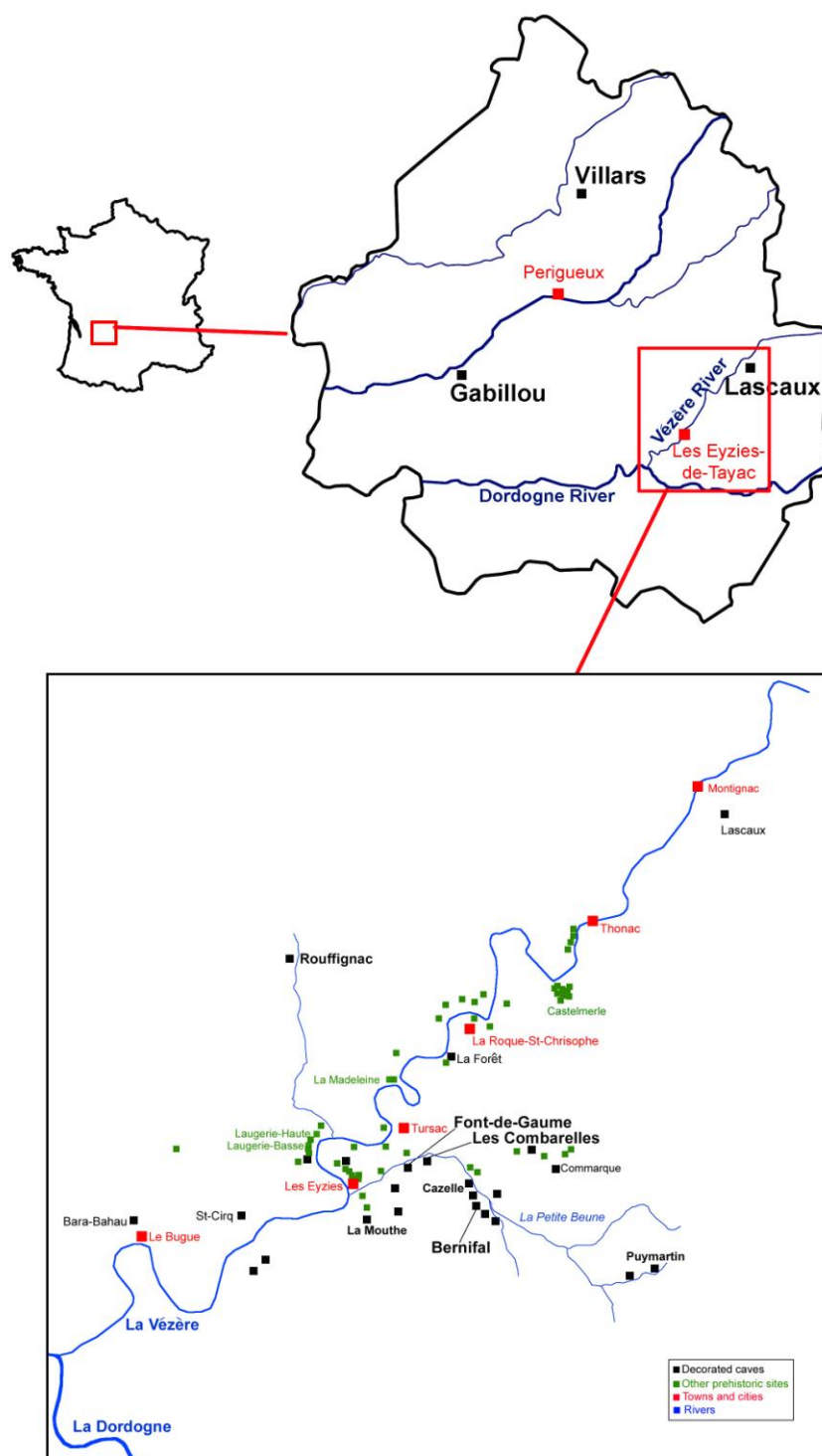
Figure 3.1: Map of the Perigord with the location of the location of the caves discussed in this thesis (insert shows the location of the Perigord in relation to the rest of France) (modified from Aujoulat 2004:12,23).

3.2. GROTTE DE BERNIFAL

3.2.1. Geographic location and discovery

Bernifal is located in the commune of Meyrals, 6 kilometers upstream of Les Eyzies, on the northern side of a small tributary of the Beune River. Its cavity extends in a general north-west direction (**see Fig. 3.2**). Bernifal was one of the earliest caves to be discovered by Peyrony in 1902, around the same time as the discovery of Font-de-Gaume and Les Combarelles. Although a number of small studies have been undertaken on the cave and its art over the past century, a comprehensive monograph has never been published making it difficult to evaluate the archaeological contents and chronological position of this cave.

When the cave was initially discovered, only 26 images were documented (Capitan, Breuil and Peyrony 1903). This number increased to 41 images after three decades (Breuil 1952), and more recently a total of 130 images have been recorded (Roussot 1984) although most them are indecipherable traces. The most recent and precise documentation on Bernifal has been provided by Delluc and Vialou (1995). The physical layout of Bernifal and the location of the images are shown in **Fig. 3.2** below.
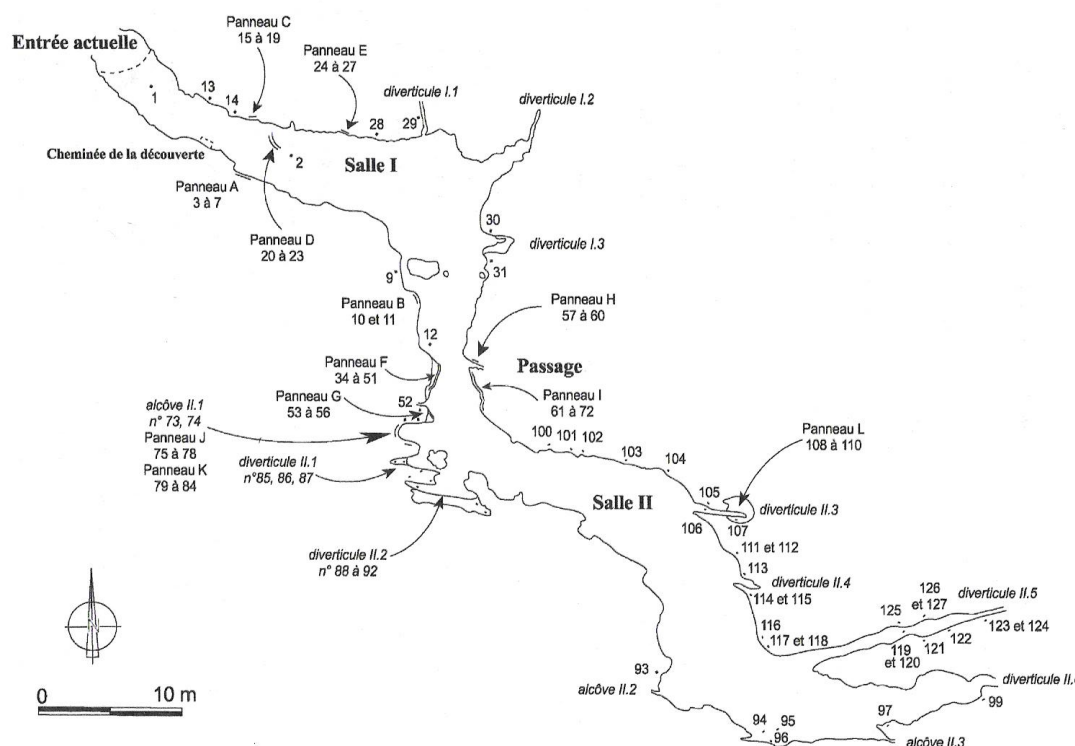
Figure 3.2: Map of Bernifal showing the location of images according to the most recent inventory of images (after Aujoulat 1975, taken from Plassard 2004: 94).

3.2.2. Archaeological context and chronology

In general, there is very little archaeological material in Bernifal, and the context of early collecting and excavating has been very poorly recorded so we are left with limited understanding of the cave's occupation history. In 1935, Peyrony undertook excavations in Bernifal, with the goal of locating the original (Paleolithic) entrance. The results of his excavations were published in a short three page document (Peyrony 1948). Based on the lack of ceramics in the assemblage around the entrance Peyrony concluded that the cave was not visited after the Paleolithic period, which the lack of Holocene deposits inside the cave further supports. He also noted that the Paleolithic entrance was blocked by a wall which he speculated may have been constructed by the last artists.

Plassard (2004) has recently provided an up-dated synthesis of the archaeological materials recovered within the cave. In his assessment of Peyrony's collection, he notes that there are no cores in the lithic assemblage from the entrance and thereore suggests that the stone tools found in the cave were not made on the spot, instead transported to the site in a finished state. However, information on the debitage does not exist. Plassard also notes that very few faunal remains occur overall, with only reindeer, ox and wild boar are represented.

In addition to the material from Peyrony's excavation, Roussot (1984b) documented cranial fragments and associated charcoal in the first chamber (which have not been dated). Clay pellets were also recovered from the chimney (Roussot 1978), which Delluc (1994) proposes were used to create the mammoth that is drawn in this area. Two flint blades were also found inside the cave, one at the entry and one at the far back of the main chamber, which Roussot (1978) believes were used to make many of the engraved images in the cave.

Overall there has been very little archaeological material recovered from Bernifal and very little information published on it. The occupation record of the cave is not well understood aside from the likelihood that it was not visited after the Paleolithic. The small archaeological assemblage from the entrance of the cave is probably Magdalenian, but it cannot be directly connected to the art. The blades inside the cave are not diagnostic and do not provide any chronological information, and the cranial fragment (and associated charcoal) has not been dated. Furthermore, the art has not undergone any chemical analysis or dating. However, based on the available archaeological information, the cave appears to be associated primarily with the Late Magdalenian (Plassard 2004; Peyrony 1948; Soneville-Bordes 1960). In order to further discuss the chronological position of the images one must turn to stylistic information.

Breuil (1952) has argued that the art in the first chamber (Area 1) is Aurignacian, and that the passage (Area 3) is Late Magdalenian with some resemblance to Combarelles. Leroi-Gourhan (1968), on the other hand, argues that all of the images (with the exception of one bison) correlate to style IV (Middle to Late Magdalenian) with resemblances to Font-de-Gaume, Combarelles, and Rouffignac. Therefore, between the limited archaeological material and art styles the majority of images appear to have been created during the Middle to Late Magdalenian.

3.3. GROTTE DE FONT-DE-GAUME

3.3.1. Geographic location and discovery

Font-de-Gaume is located on the left bank of the Beune Valley, approximately one kilometer from the confluence with the Vézère. Its entrance is located approximately 30 meters above the valley bottom, and opens to the west. This karstic network, carved out of a solid mass of sandy limestone, extends for approximately 120 meters in a general northwest-southeast direction (Roussot 1984a) with a number of small chambers and corridors extending in various directions (**see Fig 3.3**).

Font-de-Gaume and Lascaux are the only two polychrome painted caves discovered thus far in the Perigord. It was not until 1901, with Peyrony's visit to the cave, that the art located deep in the cave was noticed and special interest was taken. In 1910, a monograph was published on Font-de-Gaume (Capitan, Breuil and Peyrony 1910), documenting the majority of the images, providing an interpretation of the chronology based on stylistic aspects of the art, and describing the archaeological material collected.

During this early period of work at Font-de-Gaume, it was considered to have art only past the Rubicon, with no painting or engraving present in the entrance corridor. In the 1980's, however, a new examination of the entrance corridor (the "Gallery of Access") revealed traces of paint (Roussot *et al.* 1983), which has led to a re-evaluation of the archaeological potential of this area. Since that time, a number of smaller studies have been undertaken that add to our understanding of the cave's images (i.e., Penvern 1997; Igarashi 2003; Plassard 2000). However, the 1910 monograph remains the only comprehensive text for this cave.

3.3.2. Archaeological context and chronology

Unlike some of the other painted caves, Font-de-Gaume was apparently not closed off after its use in the Upper Paleolithic. The archaeological material found within the cave, the Paleolithic images, and the graffiti dating to the past few hundred years found on the walls of the cave, indicate that the cave has been continuously visited since the beginning of the beginning of the Upper Paleolithic. The continuous use of the cave poses a challenge when attempting to understand and interpret the images and their relationship to the cave's archaeological record.

In 1967 and 1968 Prat undertook excavations in the main gallery, between the "Crossroads" and the "Chapel of Bisons" (Prat and de Sonneville-Bordes, 1969). In 1962, he also undertook excavations in the small side gallery located just before the Rubicon (now referred to as the "Gallery Prat") that was never published. Barrier (1969) later published a report on the material discovered while cleaning the second part of the main gallery, which contributed to the existing inventory of images. Plassard (2004) has recently provided a synthesis and evaluation of two sets of archaeological material from Font-de-Gaume: 1) the Capitan-Breuil collection consisting of material sporadically collected at and around the time of discovery for which there is no stratigraphic information, and; 2) the material from Prat's excavations in the 1960's. The following discusses the information that Plassard and others have provided on the Capitan-Breuil collection, starting with material found near the entryway. The location of the various cave areas referred to, as well as the location of images, are provided in **Fig. 3.3** below.
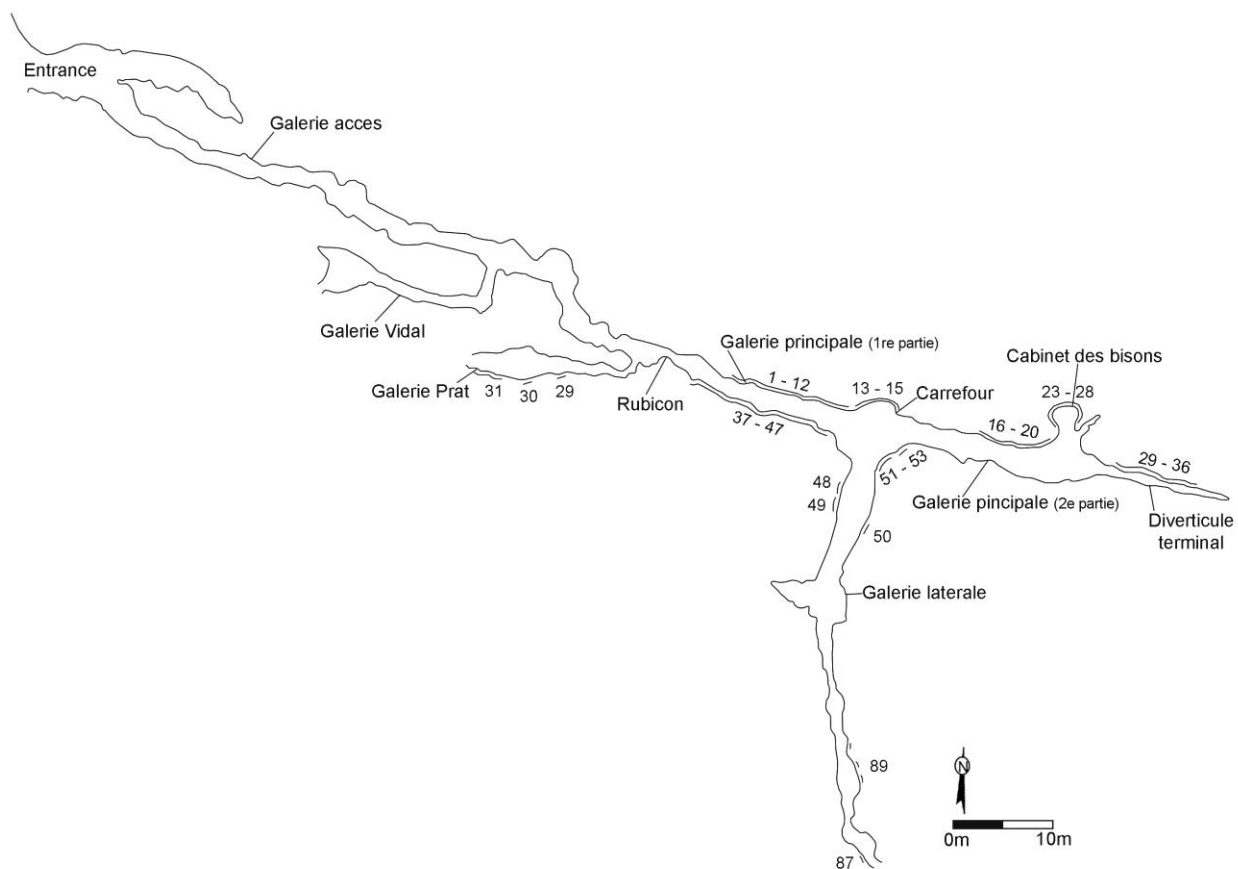
Figure 3.3: Map of Font-de-Gaume showing the location of images and cave areas (taken from Rousseau 1984a).

In the gallery to the left of the entrance, a high density of bear remains were found with few lithics, including a Mousterian scraper. Further in, along the entrance corridor and before the Gallery Prat, a high density of faunal remains also occur (up to 1.5 meters deep) as well as a small Magdalenain-like granite "crusher." At the back of Gallery Prat, which extends off the entrance corridor, was a small hearth with remains of reindeer and ox and lightly retouched blades. A few meters further into the cave, in the Gallery Vidal, which also extends off the entrance corridor, an assemblage of 200 paleontological remains occurred, dominated by bear, and also included a number of other taxa in lesser amounts. The lithic material in this area is more abundant and heterogeneous, including Mousterian components

and Aurignacien blade fragments. Past the Gallery Vidal, and just after the Rubicon, a Solutrean point was also recovered. However, in a small room just before the Rubicon, which is at the far end of the access corridor, was a hearth with medieval pottery shards. Other Holocene vestiges are found throughout the caves. For the main galleries, located after the Rubicon, the 1910 monograph discusses five possible archaeological levels (with ceramics occurring on the surface). The assemblage of this area is described as abnormal in regards to the types represented, consisting of Aurignacian and Magdalenien components, and Aurignacien blades exhibiting retouch similar to that found on Chatelperronian points.

In the main galleries fragments of pigments were also recovered. In an alcove at the crossroads (opposite the side gallery) a natural basin in the rock was reddened by pigment where a red ochre pencil remained, which the authors of the 1910 monograph proposed was an area where pigment was prepared. In terms of portable art, a fragment of bone with a head of a horse engraved on it, measuring approximately 85 x 55mm, was recovered from the entry of the main gallery.

In summary, the archaeological materials found in the entrance corridor (before the Rubicon) include Mousterian, Aurignacien, Solutrean, Magdalenian and Holocene remains. In the main galleries (the far chambers located past the Rubicon) where the vast majority of the art is located, Chatelperronian, Aurgnacien, Magdalenian and Holocene (ceramics) remains were recovered. Therefore, in terms of the materials from the Capitan-Breuil collection (material collected around the time of the cave's discovery), the occupation sequence in the entrance and far chambers are similar. The main difference includes Mousterian material in the entrance area and not in the far chambers (as well as a questionable Chatelperronian component in the main chambers).

In general, the chronological position of the images is not well understood. Unfortunately, no direct dates exist for the art or archaeological deposits of this cave, and information from the limited reporting of archaeological excavations are difficult to associate with the art. Based on style and superpositioning of the images, the authors of the 1910 monograph place the art in a succession of phases beginning with the Aurignacien through to the Magdalenian. Leroi-Gourhan (1968), on the other hand, places the majority of the art in style IV (Middle to Late Magdalenian), with only some figures in style III (Early to Middle Magdalenian). Even though the archaeological deposits of the cave span the Mousterian though to the Holocene, Leroi-Gourhan's assessments place the period of image making in Font-de-Gaume during the Middle to Late Magdalenian, similar to Bernifal. In summary then, Font-de-Gaume has a long history of use, which may have greatly influenced the variation of images in this cave. However, based on regional stylistic information, the majority of images in the cave (especially those sampled which include the large polychrome painted bison) appear to associate with the later period of the Upper Paleolithic.

3.4. GROTTE DE COMBARELLES

3.4.1. Geographic location and discovery

Les Combarelles, located upstream from Font-de-Gaume is composed of two long, very narrow crawl space caverns. Combarelles I (extending downstream), Combarelles II (extending upstream), and Grotte de Rey (adjacent to Les Combarelles) are part of the same karstic system (see **Fig. 3.4**). Data were collected from Combarelles II for this thesis.

Combarelles I was discovered in 1901, soon after the discovery of Font-de-Gaume. However, the first synthesis on this cave did not appear until in 1924 (Capitan, Breuil and Peyrony 1924). Combarelles II, on the other hand, was not discovered until 1934 when Pomarel removed some of the rock collapse that previously blocked it. Over the past century, a number of publications have also added to our understanding of the images in these caves (i.e. Peyrony 1936; Breuil 1952; Aujoulat 1979, 1984; Archambeau 1989; Delluc and Vialou 1994), however, Barrier (1997) has published the most comprehensive inventory of the images and their location (see **Fig. 5.18** for a map illustrating the spatial dimensions and image locations for Combarelles II).
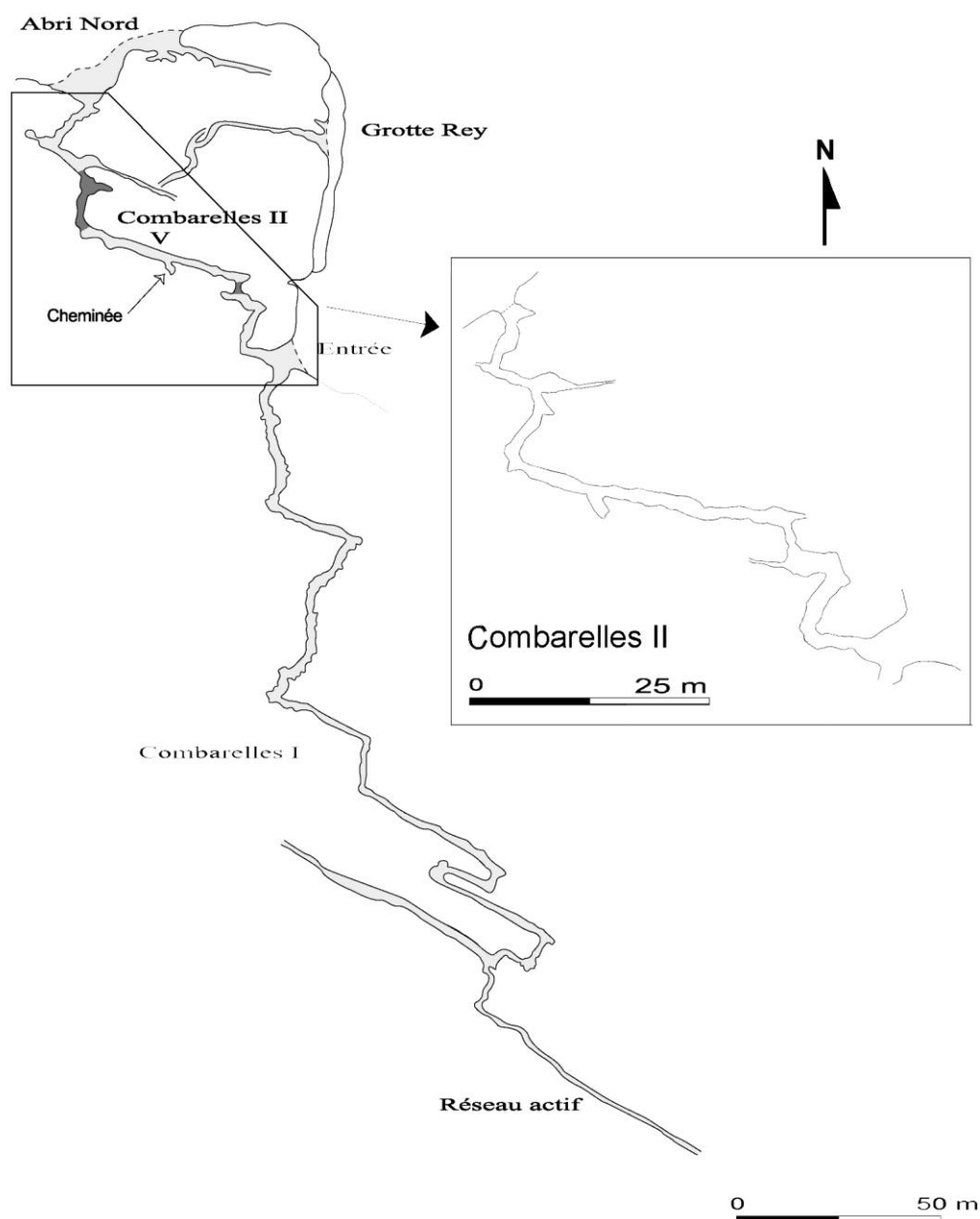
Fig 3.4: Plan map of the Vallon des Combarelles caves showing the location of Combarelles II in relation to Combarelles I and Grotte Rey(taken from Plassard 2004:45, originally produced by Aujoulat, Fardet, Nielsen and Guichard after Barrière 1984), with a slightly enlarged version of Combarelles II (modified from Barrier 1997).

3.4.2. Archaeological context and chronology

There are two collections of archaeological material from these caves. The first was collected during Rivere's excavations around the turn of the century at the entrance of Combarelles I and in Grotte de Rey. The second collection resulted from Rigaud's excavations in the 1970's at the entrance of Combarelles I and II. Unfortunately, both of these collections are poorly published, and although details on Rivere's excavations appeared in 1894 and 1906 reports, they were never fully published. The archaeological material reported on from Rivere's excavations in Combarelles I include fragments of bear, hyena, rhinoceros, horse, reindeer, stag, ibex, and ox, several thousands of lithics, as well as two harpoons (one with two rows of barbs), sagaies points, punches, needles, one reindeer scapula with engraved figures of reindeer, and a pierced reindeer canine (with a hole for suspension), although the specific provenience of these items is not known.

Based on the material recovered from Rivere's excavations, Les Combarelles does not appear to have had human occupations before the Magdalenian.

Two archaeological levels were recorded during Rigaud's excavations in 1973. Bone from the lower layer of Les Combarelles dates to 13,680 + 210 BP, while bone from the upper layer dates to 11,380 + 210 BP (Archambeau 1987a), situating Combarelles between the end of Magdalenian IV and VI. However, these dates apply to material collected from the entrance zone and may not necessarily apply to the deeper cavern areas where art occurs. Stylistically, Breuil also argues that the majority of the images are from the Magdalenian with some Early Magdalenian images deep in the cave, and nothing dating past Late Magdalenian (Capitan, Breuil and Peyrony 1924).

3.5. GROTTE DE VILLARS

3.5.1. Geographic location, discovery and chronology

Grotte de Villars is located over 80km north of the river valleys where Font-de-Gaume and Combarelles are located (see **Fig. 3.1** above). It is one of the largest cave networks in the region with over 13km of galleries. The portion currently accessible is only 500m, which is also the only locaiton that images occur. The cave was first discovered in 1953 by speleologists, although it was not until 1957 that the images inside were identified and later verified. Following its discovery a number of small studies were undertaken on the images and its archaeological material by Bordes and Breuil (1958) and Leroi-Gourhan (1959, 1965). Stylistically, the art work is attributed to the Solutrean and early Magdalenian, roughly 17,000BP (Leroi-Gourhan 1965; Delluc and Delluc 1974).
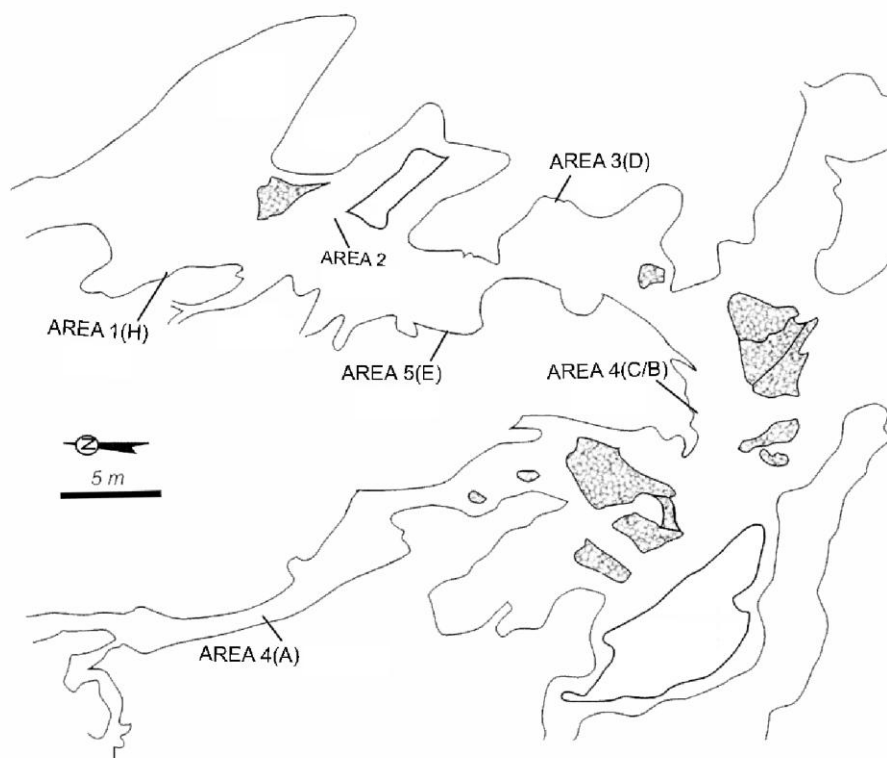
Figure 3.3: Map of Villars showing the location of images and cave areas (modified from Delluc and Delluc 1974).

The archaeological remains recovered have included broken concretions, utilized cups formed from calcite, fragments of ochre and manganese, flakes, heat treated lithic material and some fauna. To date, the most comprehensive studies have been provided by Delluc and Delluc (1974, 1984, 1986), however, no comprehensive monograph or analysis of the cave exists and is therefore difficult to evaluate.

3.6. SUMMARY

In summary, based on stylistic information the majority of the images in these caves were probably produced during the Early and Late Magdalenian. However, based on the archaeological deposits of the caves, major differences occur. Most important perhaps, is that based on their archaeological deposits, both Font-de-Gaume and Combarelles appear to have substantial episodes of use spanning possibly as early as the Late Mousterian to the 1800's. This continuous use of the caves potentially contributes to an increase in variation and/or density of images in these caves. The entrance of Bernifal, on the other hand, appears to have collapsed during the late (Magdalenian) Upper Paleolithic period restricting further use of its caverns. If cave use (in terms of cave rituals or activities associated with and resulting in image making) was more frequent in the later periods of the Paleolithic (as some caves such as Lascaux attest to), this may then suggest that less development, complexity or density of images in Bernifal results from the cave not being available for use during these periods. However, this does not explain similar image patterns seen in other caves of the region which were available for use. Thus, it is perhaps more likely that caves like Font-de-Gaume (and possibly Lascaux), in which images are more dense and complex, may result from their geographic positioning or proximity to aggregated communities that may have been utilizing them more frequently, which is similar to ideas expressed by Conkey (1980) and others.

CHAPTER 4 ~ METHODOLOGY

4.1. INTRODUCTION

This research project begins with a few basic questions: can it be determined whether individuals or groups were the intended viewers of the cave images, and could anything about their nature or the nature of their activity (or the organization of it within caves) be inferred from the physical context of the images? The expectations of various cave art researchers suggest that images (their technique, color, quality, symbolic content, and other characteristics) may be best understood from within their surrounding physical and visibility contexts when asking questions about associated activity and group size. Past approaches which have attempted to understand the social significance of the cave images have largely overlooked information that can be attained from the immediate physical surroundings of the images. In the past, cave art analyses tended to focused on the distribution of subject matter (the symbolic content of imagery) throughout the caves. In contrast, the approach taken in this thesis attempts to examine image attributes according to space and visibility subcategories that may reflect differences in the use of the cave. Thus, the spatial distribution of images is examined from what is referred to as an "activity area" type approach, with consideration of potential group size, movement through space, and activity associated with the placement or viewing (consumption) of the images. In order to address these aspect of cave art, previous research was consulted to see what kinds of information had been recorded about images that might be relevant to the issues of concern, and the kinds of variables suggested by others as relevant to these issues that are discussed below.

4.2. EXPECTATIONS

In terms of possible group-oriented uses of the caves, large chambers where impressive images cluster, are suggested to have served as "communal" areas (Lewis-Williams 1997:335-336, 2002:232), areas involving "public" and "display" intentions (Bahn 2003:17), "domestic zones" (de Beaune 1995:201-202) or possibly "sanctuaries" (Clottes 1997:212-213). These are places of sometimes "monumental cave architecture" (Baffier and Girard 1998:109-110) where "groups of the faithfull [may have] gathered and undertaken rituals or various actions in front of the paintings" such as in Peche Merle or Cougnac (Lorblanchet 2001:149), where "preparatory rituals" may have occurred such as in the case of chambers close to the entrance in Le Gabillou where there was enough room for a number of people (Lewis-Williams 2002:232). In the more narrow spaces of Grotte de Cheval (Baffier and Girard 1998:109-110), small groups, not exceeding 4-5 individuals ("a few initiates") may have entered. In these locations "carefully painted images with some simpler engravings" would occur (Lewis-Williams 1997:335-336), as well as images that are "only fragmentarily preserved" with remains of "simpler" engravings "showing that the area was not exclusively reserved for one kind of activity" (Lewis-Williams 2002:232).

The Hall of Bulls in Lascaux is also often described as a "public" or "display" area (Bahn 2003:17), a "chamber that would permit large numbers of people," and where "communal rituals" (Lewis-Williams 1997:335-336) occurred or where "rites were performed involving "dancing, music, chanting" (Lewis-Williams 2002:250), used for group "meetings with chants, dancing and ceremonies" possibly similar to the Salon Noir in Niaux or the Salles des Vagues (Baffier and Girard 1998:109-110). The images in these locations are almost always described as "elaborately painted" (Lewis-Williams 1997:335-336) or

"spectacular and very visible" (de Beaune 1995:201-202), in which "time was taken when painting a large collection of detailed animals" (Clottes 1997:212-213).

On the other hand, descriptions of areas that are thought to relate primarily to individual or private activity reflect more expedient types of activity or intention. For example, in the tunnel of Le Gabillou, which Lewis-William suggests was a place where "individual vision questers" would pass, no "elaborately painted" images occur. All of the images are engravings (2002:233-235) made with a "few sure strokes" and are simpler "implying less time was spent (1997:335-336). These are "swiftly executed engravings," with *no* "crowding or superimposing images or dense clusters" (2002:233-235). On the other hand, the Apse of Lascaux is described as being "rarely traversed," where images occur on the walls and ceilings, and are mainly engraved with "*complex* super-positioning" which is "difficult to decipher" (ibid). In "other areas" of Niaux (in reference to areas other than the Salon Noir) Clottes describes images as being "dispersed all along" the walls and "drawn more quickly with far less detail" (1997:212-213).

Lorblanchet describes the "modest space" in the passages in Pergouset as involving techniques of "finely engraved lines" that were "scarcely perceptible" and not the "more easily visible paintings" which "seems to confirm the desire to conceal the images." He suggests that this desire seems

> evident not only in the lightness of the lines but also in the extreme schematic rendering of some images (while others are very realistic), as well as in the incomplete nature (or even voluntarily headlessness) of the sketches (rough outlines) made up of a few basic lines that neglect fleshy elements and visual appearances. (2001:149)

Other researchers discuss the "hidden" and almost undecipherable images in spaces that were "reserved for a few people" (de Beaune 1995:201-202), and the few and rare (e.g.,

bird) images that occur in confined or difficult to access places (such as at the bottom of wells or very ends of diverticules) (Baffier and Girard 1998:109-110).

Thus, researchers have clearly begun to observe a general pattern in terms of the difference in image characteristics between different types of spaces. Combined with the physical characteristics of the space, visibility of the images, and their clustering (or dispersed nature), insights may be gained into the use of the space in terms of group, communal, public activity versus private or perhaps personal areas. **Table 1** in **Appendix A** provides a list of a *sample* of descriptions, or "expectations" as discussed above and elsewhere. The goal of Section 4.2 is to render explicit and operational these expectations for systematic data collection and analysis in order to examine whether such patterns of associations (between image characteristics and physical/visibility contexts) have a patterned occurrence or whether their placement is more random.

The basic components of these assumptions can be briefly summarized as follows:

1) For Group-oriented images: i) enough floor space and ceiling height should surround images to accommodate small or large groups; ii) images should be large enough to be viewed by groups; and iii) images should occur in locations that allow easy viewing while engaging in group associated activities. Where the goal was to impress a group of people, it is also assumed that there should be significant effort involved in the creation of the art.

2) For Private/Personal/Individual images: i) images should frequently occur in confined spaces or at least in a greater variety of spatial contexts; ii) since there are no constraints on areas suitable for group viewing, there should be more variability in image size and location on the cave surfaces with a high proportion of small images suitable for viewing at a close distance; and iii) there should be a higher frequency of 'expedient' and crude images (which involve less time and effort to create).

Overall, these descriptions or "expectations" involve the following basic attribute categories: 1) measurements of the physical space surrounding the images (referred to as "area measurements"); 2) viewing considerations (referred to as "visibility conditions"), and 3) technical, physical and qualitative aspects of the images (referred to as "image characteristics"). Other categories could be included, involving lighting and acoustic measurements, and information on proxemics (i.e. optimal viewing position, area, distance, etc). Table 4.1 below summarizes these categories and the specific variables recorded for each. The following sections will discuss how each of these variables are measured and the basic conceptual approach to their analysis.

Category	Variables
Measurements of the physical space	1) chamber location and 2) size, 3) floor configuration and 4) wall topography
Viewing considerations	1) optimal viewing area, 2) viewing obstructions, 3) viewing position and 4) image height above the floor
Image characteristics	1) image size, 2) technique, 3) color, 4) subject and 5) quality
Other	1) lighting and 2) acoustics (not included in the analysis)

Table 4.1: Attribute categories and specific variables recorded for each.

4.3. CONCEPTUAL FRAMEWORK

4.3.1. Activity Areas and the Recording of Physical Space

An analogy for the approach taken when examining the potential relationships between physical space and various images is similar to the activity area analysis of structures such as longhouses on the Northwest Coast of BC (Huelsbeck 19940, housepits in the Interior of BC (i.e. Lepofsky et al. 1995; Spafford 1991), pueblos in the Southeast or other. In order to study activity patterns in these sites, the clustering and associations of different artifact types is essential. It is also important to look at their relative proportions in different areas (i.e. density and diversity). However, it is critical to situate such information into the

physical nature of the space (e.g., near doorways, small versus large rooms), and the associated features (i.e. walls, hearths, storage pits). The first step to such analyses normally involves dividing up the study area, site, or structure into approximate and meaningful units for analysis (e.g., doorway, room, hearth area) and to then attempt to understand the differences in activities between these areas, or the specific use of an area. The distribution of artifacts may be examined according to their functional attributes when examining activity patterns, or broader domains may be examined such as their practical versus prestige or display qualities to look at potential domestic versus special function areas of sites or structures.

A similar general logic is applied to the caves in order to analyze potential group versus individual activity areas. Area measurements are considered for each cave, which involve dividing up the cave into approximate and meaningful units of analysis that are defined by the natural spatial divisions within the cave (e.g., entrance area, passageway, large chamber, corridor, small diverticule or other areas). Initially many of these spaces are grouped into Restricted areas (which could only accommodate one or two individuals at a time) versus Open areas (which could potentially accommodate large groups), and then examined in greater detail.

Within these areas, subgroups of visibility conditions can be defined on the basis of either high or good visibility (suggesting a potential for intended viewing), and low or poor visibility (suggesting viewing was not intended or was not an important consideration in the placement of the image). A similar analogy may be the division of a structure into rooms, their grouping in terms of personal/individual spaces or larger and possibly communal spaces. Within these rooms, features such as benches, storage areas, hearths, or other features may be factored in to provide a better understanding of the limitations on space,

movement and group size which may help to refine understanding of the potential range of activity.

Within these area and visibility conditions, image characteristics are examined in terms of their technical and qualitative attributes and symbolic content, and classified as either Type 1 images (expedient or "practical" and possibly individual/personal) versus Type 2 images (exhibiting elaborate or "display" type attributes and possibly group/public oriented). Distributions of these types can then be used in a fashion similar to examining the distribution of practical versus prestige types of artifacts for example. The distribution of these different artifact types around features within rooms of a structure may be used to address whether rooms may have had more of a practical/personal/individual functions, or whether some rooms may be oriented toward specialized group activity in which greater investment in display artifacts may be seen.

Although there may be considerable variation in cave (and chamber) use and considerable change or development in associated ritual activity over time, the "deposition of artifacts" (placement of images) is not expected to be random or structurally amorphous. As well, in the context of ritual, cultural practices are expected to be more structured and continuous which should be reflected in the patterned use of space. Therefore, an examination of image distribution should reflect ritual structure, although deciding what associations may be most important to examine in terms of the choices and intentions behind image placement is more of a methodological challenge. The assumption made in the development of this methodology, which is based on the expectations or hypotheses of various cave art researchers regarding cave use, is that the placement of images relates to individual versus group activity. Variation within each of these domains may exist which may also influence image content and visibility. The question is whether group activity appears to

be a component of most cave use, and whether insight into their nature or the nature of their activities can be obtained. The methodology described here, the variables, the approach to their analysis and the conceptual, activity area, approach, will hopefully achieve some level of insight into these questions. The following sections explain the approach taken to measuring aspects of each of these categories and provide variable definitions and a description of their recording.

4.3.2. Viewing and the Recording of Visibility Conditions

Most archaeological analyses of activity areas and image distributions in caves have involved two dimensional plotting on plan maps or cross sections. By integrating visibility considerations and proxemics (i.e. viewing position and optimal viewing distances) into the analysis of image distributions, an effort has made to consider space more three-dimensionally when examining image distributions. Although visual phenomena have long been regarded as important in archaeology and especially cave art, "the acts of 'seeing' and 'looking' have been very hard to operationalize in any traditional, methodological sense" (Wheatley and Gillings 2002:201). Visibility is rarely incorporated into analyses in any systematic or formal way, perhaps because

> Concepts such as 'panoramic', 'prominent' and 'hidden' may well be useful heuristics, but are very hard to investigate in practice. … As a result, the incorporation of visibility or intervisibility with archaeological interpretations has tended to be anecdotal, at best. Although a number of techniques were developed through the 1970s and 1980s … the first systematic attempts to exploit the visual characteristics, or properties, of locations came in the early 1990s with … Geographic Information Systems (GIS). (ibid:201)

Prior to GIS and other three-dimensional imaging software, some attempts were made to integrate visibility into the understanding of site use or activity area patterns. Some of these early studies involved Renfrew's (1979) and Fraser's (1983) visibility analysis of stone cairns in the Orkney's to explain the observed distribution of cairns on the landscape.

Renfrew tried to formalize a methodology for collecting visibility information by producing

maps with overlapping zones of decreasing and increasing visibility to quantify intervisibility

between cairns. Fraser used a series of visibility-classes, involving "Distant" (>5km),

"Intermediate" (500-5km) and "Restricted" (<500m) to standardize fields-of-view. Trends in

rock art studies starting in the early 1990s also began to take an interest in visibility studies in

order to examine site location on the landscape (i.e. Bradley 1991, 1995). Such studies

attempted to translate "the perceptual and essentially human acts of seeing and looking into

the heavily simplified concepts of field-of-view and line-of-sight … and visibility-class"

(Wheatley and Gillings 2002: 203). Greater interest in visibility and visual perception in

archaeology came with shifts to an emphasis on understanding the individual and the role of

individuals as active agents interacting with their surrounding meaningful world, and the

introduction of "embodied approaches" stemming from phenomenological emphases on the

importance of bodily movement within space and visual cues (Devereux 1991; Thomas

1993; Tilley 1994). However, these studies generally tend to lack formal methodologies

(Wheatley and Gillings 2002:204).

The approach taken in this thesis to analyzing visibility is similar to reciprocal

viewshed in GIS, generated to identify from where in the landscape (or on the cave floor) a

point (image) would be visible, intervisibility analysis (i.e. overlapping viewing areas), and

perhaps least-cost-path analysis (in terms of integrating visibility into understanding possible

'ritual pathways'). Although GIS would be useful for the types of analysis in this thesis, it

was considered too costly and cumbersome for the purpose of this more exploratory type of

analysis. If data collection and analysis were replicated, GIS could be employed in terms of

both visibility analysis and in the spatial analysis of image distributions. However, in this

thesis emphasis is placed on 'optimal' viewing conditions, which involves a number of

sensory or perceptual observations, that are not amenable to capture with various computer software. Section 4.4.2 below discusses the approach taken in this thesis to attempt to formalize a methodology for collecting data on viewing and visibility.

Visibility conditions arguably played an important role in the placement of images in caves in the context of both group and individual activity, however they would not have been the only factor considered. Symbolic or practical reasons may have been involved in the choice of the location for the placement of images. Visibility conditions may have become more important when considering spaces which were prepared specifically for the intention of group activity or "impressing an audience" in the context of a group-oriented activity. Viewing may or may nor have been important in individual activity contexts. In private or personal contexts images could have been intentionally hidden or placed in difficult to access areas. However again, in these contexts, image placement may have been unrelated to visibility or viewing, such as the placement of 'anti-social' subject matter in hidden or difficult to access areas (Loubser 2008). By examining the distribution of image characteristics and symbolic content according to spatial and visibility conditions, insights into such nuances may emerge, and a different patterning in symbolic content may be detected.

4.4. DEFINING VARIABLES

This section defines the variables used in this study in operational terms.

4.4.1. Area measurements

Chamber size and configuration, chamber location, and wall topography were taken into consideration when documenting the physical space in which images occur. Spaces were categorized as either restricted or open and image distributions were examined within these spaces. Cross sections, plan maps and photographs were used in categorizing spaces.

Restricted spaces are very small or narrow chambers, which could only accommodate one or two individuals at a time. Such spaces include very narrow diverticules with high or low ceilings or very small chambers for example. In most cases, these spaces arguably reflect more private or individual types of activity areas.

Open spaces include chambers in which groups could potentially be accommodated. In some cases, such as narrow corridors, only small group sizes (sometimes 2-3 individuals) could be accommodated. In other cases, such as large entry chambers, more individuals could potentially be accommodated. The assumption is *not* made that these areas reflect group activity, although these areas are considered locations which could have *potentially* accommodated group activity (while Restricted spaces could not).

i) Plan maps

Chamber size and configuration (meter length and width according to floor area) were determined using plan maps. In some cases images occur on portions of walls which extend beyond the floor boundary (see **Fig. 4.1** below). These variations are considered in the in the section on visibility conditions below. However, in terms of measuring the total amount of space available (and classifying it as Restricted or Open), floor area measurements

were used. The following figures provide examples of plan maps from both Restricted and

Open spaces, indicating how chamber size and configuration were examined.
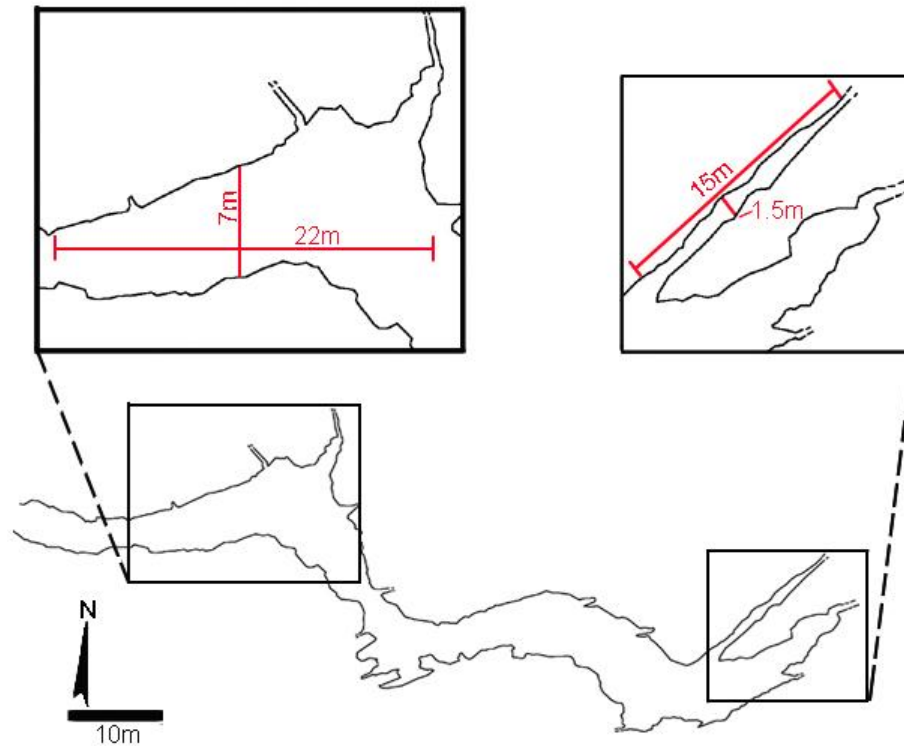
Figure 4.1: Plan map of Bernifal providing examples of how floor area measurements were taken to assist in assessing chamber size and configuration. On the left is the entry chamber of Bernifal, which is classified as Open. On the right are the ending diverticules of the cave, which are classified as Restricted.

ii) Cross sections

Cross sections were also used to assist in determining chamber size and

configuration (chamber width, ceiling height and wall topography). Angles of walls on which

images occur were also recorded with cross sections which were taken into consideration

when later assessing viewing position and the total amount of space available for viewing.

Figure 4.2 below provides an example of how measurements were taken from cross sections.
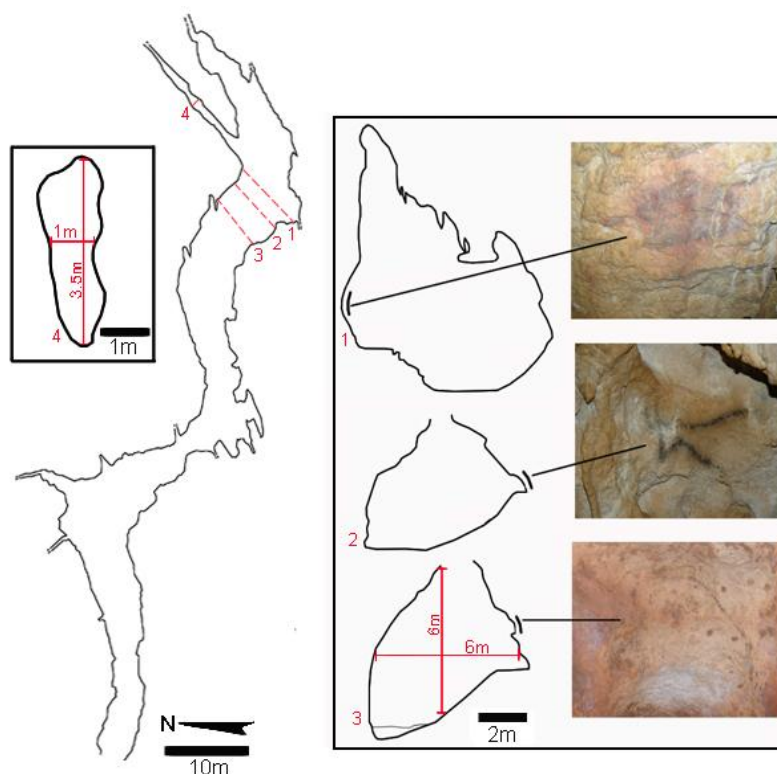
Figure 4.2: Plan map of Bernifal providing examples of cross sections which were used to assist with determining chamber size and configuration (chamber width, ceiling height and wall topography). Cross sections were also used when examining visibility conditions as discussed below. On the left is an example of a cross section from the ending diverticule of the cave, which were classified as Restricted. On the right are examples of cross sections from the large central passage area which were classified as an Open space. Cross sections from this Open space also indicate image location.

iv) Photographs

Since three dimensional space is exceptionally difficult to capture even with maps, cross sections and visibility measurements (discussed below), photographs were also taken of each chamber space. These were used in assessing chamber size, configuration and wall topography in the categorization of spaces into Restricted or Open. Photographs were also used to provide more detail on the immediate physical context of images, viewing obstructions and other visibility and spatial constraints. Figure 4.3 below provides an example of photographs taken in Font-de-Gaume of an Open area (left) and Restricted area (right).
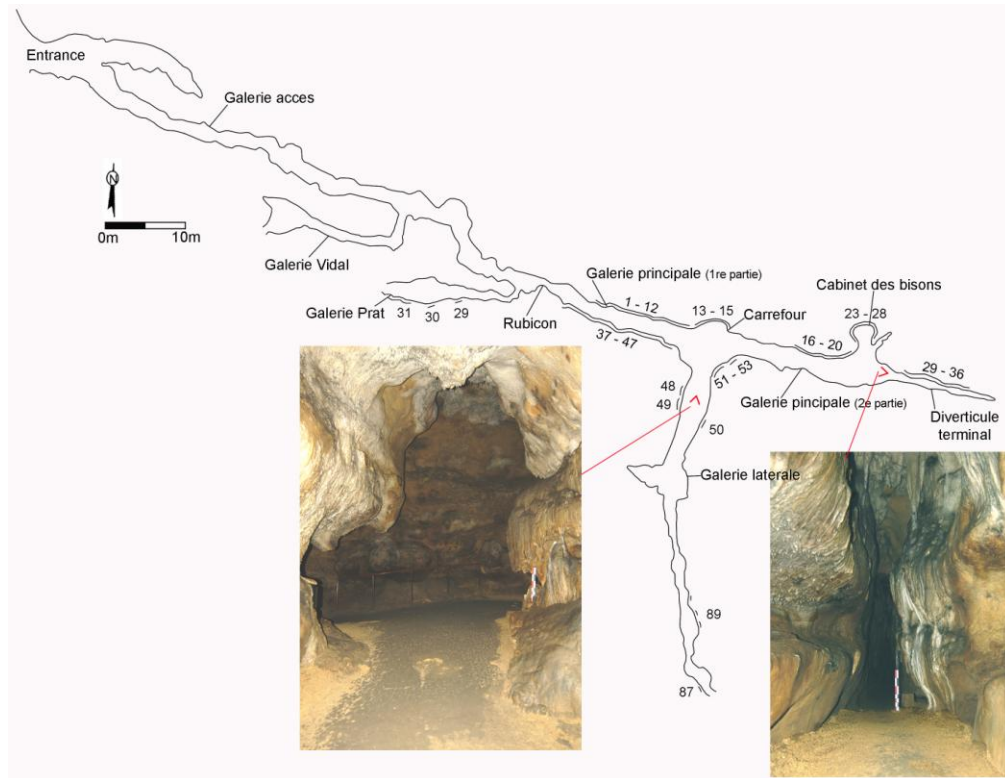
Figure 4.3: Plan map of Font-de-Gaume with examples of photographs taken of the Carrefour (Open space) and the Diverticule terminal (Restricted space). (Photographs of the interior of Font-de-Gaume, taken by Philip Jugie, courtesy of the Musée National de Préhistoire in Les Eyzies-de-Tayac)

4.4.2. Visibility conditions

Within Restricted and Open Spaces, visibility conditions were considered. Although images occur in Open spaces, their visibility may be very poor if the image is located on an overhang for example. Within Restricted spaces, visibility conditions may also vary and may potentially influence where image making concentrates (this will be discussed in the Section 5.3.5 on Combarelles). Viewing area, viewing obstructions, height above the floor and viewing position were measured to categorize visibility conditions as either good or poor within Open spaces, and to examine variability within Restricted spaces. The following explains how each variable was measured.

i) Optimal viewing area and viewing obstructions

Optimal viewing area refers to the total area in which a complete image could be optimally viewed. This was measured by recording the optimal viewing angles on either side of the image as well as the minimum and maximum optimal viewing distances. Optimal viewing area was combined with height above the floor and optimal viewing position, as well as details on viewing obstructions to calculate the total amount of optimal viewing space in square meters. To clarify, optimal viewing area was measured by determining the:

1) Angle at which the complete image was visible when standing on either side;
2) Minimal distance at which the complete image was clearly visible, and;
3) Maximum distance at which the complete image could be optimally viewed before it was no longer clear.

These measurements were plotted on a graph to calculate the viewing area for each individual image. Figure 4.4 below provides an illustration of how this was calculated.
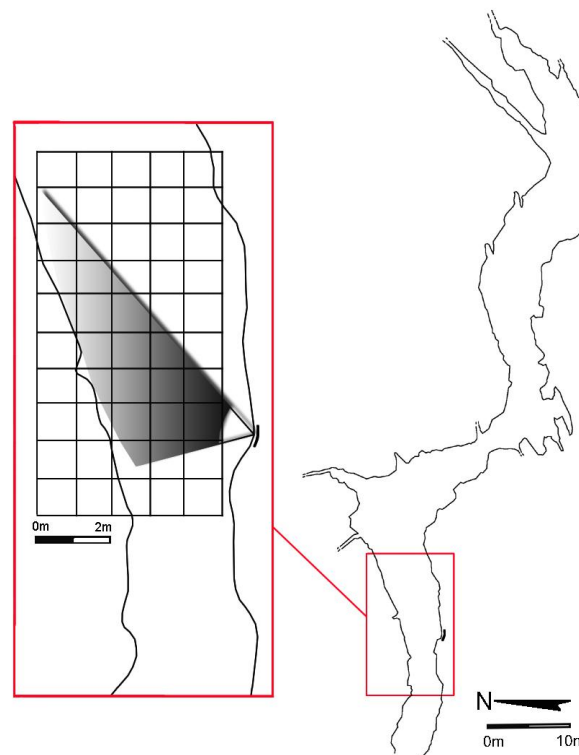
Figure 4.4: Plan map of Bernifal showing the viewing area of one image in the entry chamber (two painted hands), with the minimum and maximum optimal viewing distances and method of quantifying the total estimated squared meters of viewing area.
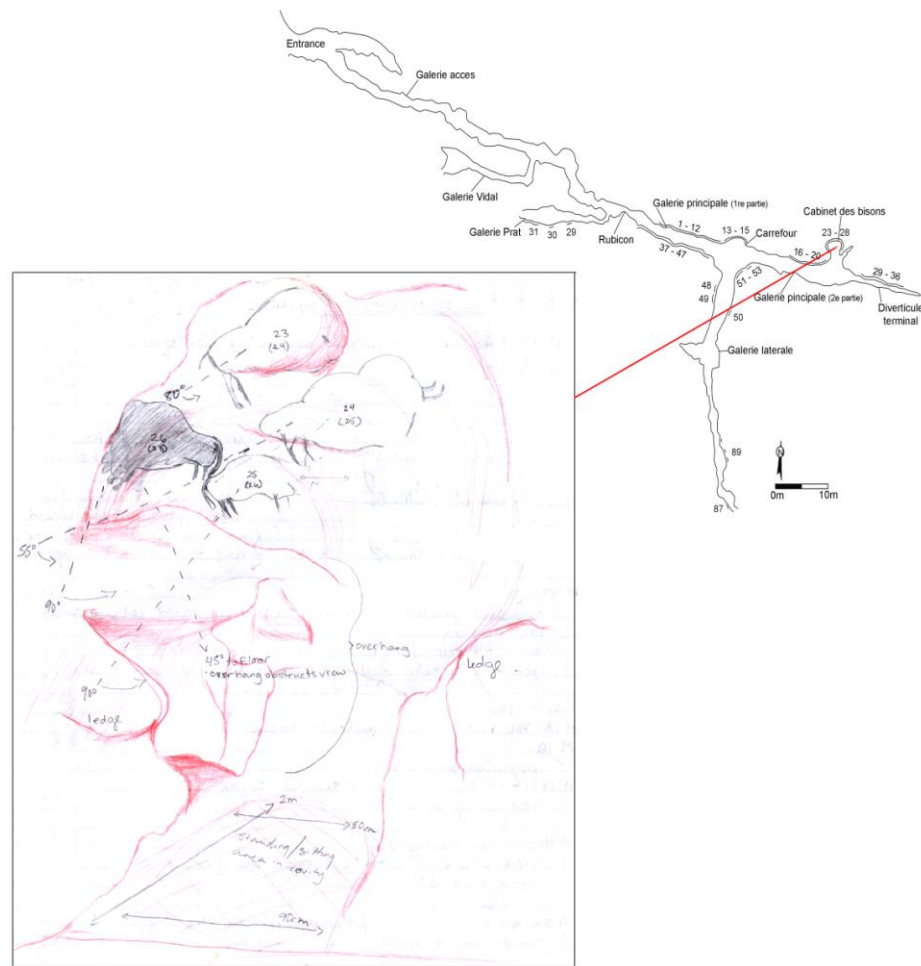
Figure 4.5: Plan map of Font-de-Gaume illustrating an example of rough notes on viewing observations taken while in the cave in 2002. Viewing angles and obstructions were transferred onto enlarged versions of plan maps of each area, and meters squared within the viewing radius were quantified. Image height above the floor and optimal viewing position (which viewing obstructions sometimes influenced) were also factored in when quantifying total viewing area.

ii) Viewing position

The optimal viewing position was recorded in order to assist with determining the total number of individuals that could potentially view the images at one time. For example, in an area of one square meter, 3-4 individuals could comfortably fit if standing. However, only 1-2 individuals could comfortably fit when squatting. Optimal viewing area was sometimes difficult and subjective to measure when images could be viewed when both standing and squatting, although squatting could be more 'optimal' because of image angle.

In order to avoid incorporating subjective assessments as much as possible, squatting or lying down viewing positions were only used in clear situations such as when images occurred on downward angling walls or on the under side of overhangs.
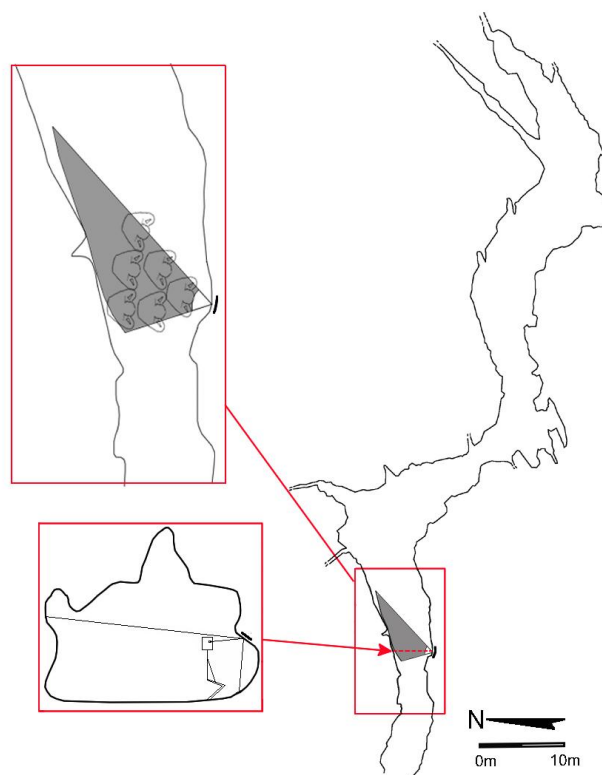
Figure 4.6: The cross section above illustrates an example of a situation when both standing and squatting viewing positions could apply. The plan section illustrates an example of how optimal viewing area and viewing position are combined to provide an estimate of the total number of individuals who could optimally view an image at one time. In this case, sketches of six individuals are inserted (although more could fit within the optimal viewing area). If the image is high above the floor, all individuals could potentially view the image when squatting. If the image is close to the floor, only the individual closest to the image could optimally view it.

iii) Image height above the floor

Height above the floor was measured normally from central bottom portion of the image. When it was not possible to collect height above the floor from an image in the cave, this information was then collected from publications if available. Identification of the original floor level was problematical for a number of reasons, although, when possible,

individuals familiar with the geological history of the cave were consulted as well as published material.

4.4.3. Image characteristics

i) Subject

Image subject matter is sub-grouped into mammals, human forms, lines and dots, geometric forms, and other (which includes unidentifiable subjects). Table 4.2 below lists the specific subject matter included in each of these sub-categories. When it was difficult to determine subject matter, publications were consulted and used to confirm identification of subject matter in general (when possible).

Mammals		Human forms	Dots/lines	Geometric forms	Other
Horse	Bouquetin	Hand	Dots	Tectiform	Unidentified
Cervid	Rhino	Face	Lines	Cross & arrow signs	Bird
Mammoth	Saiga	Eye	Smudge	Lozenge	
Bison	Back of animal			Oval, Circle	
	Unidentified animal			Star	

Table 4.2: A list of every subject type within the database is sub-grouped into mammals, human forms, dots/lines, geometric forms and other for analysis purposes.

ii) Technique/Color

Technique and color are recorded as either painted or engraved. For painted images, categories include black, red and polychrome (red and black). No other colors occurred or sculpted images. When natural formations were used to create part of the image this was recorded as part of image complexity.

iii) Size

Image height and length were measured according to the maximum dimension of the images along X and Y axes relative to the floor. Figure 4.7 provides an example of how these measurements applied. All dimensions were recorded in centimeters. Image size was

recorded as part of visibility considerations as opposed to image subject matter since in the

case of geometric forms or various other difficult-to-identify images, it was sometimes

unclear what the intended length or height of the image subject matter was.
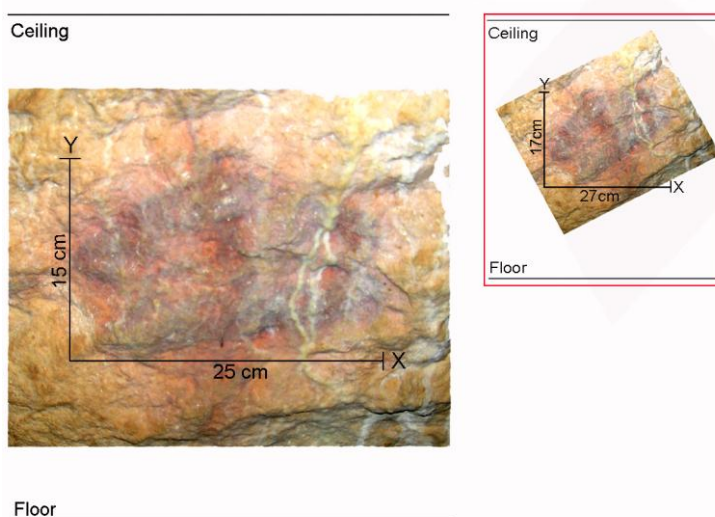
Figure 4.7: A polychrome painted tectiform in Bernifal, which provides an example of how size is measured along the maximum length and width of the image, with the length measurement following the X axis roughly parallel to the cave floor, and the Y axis roughly perpendicular to the cave floor. On the left is an example of an image laying roughly parallel to the floor. On the right is an example of measurements from an image that is slightly angled relative to the floor. In this case, the maximum length or width and height of the image is slightly greater than if it were lying parallel to the floor. Normally, only minor variations would occur.

iv) Quality

Image quality involves a number of assessments concerning the potential effort

investment, planning and preparation, skill or training, clarity of image, line quality, and

related characteristics. Variation in quality could relate to a number of factors (changes over

time, individual artists, effort investment and intended or unintended consumption,

preservation or other factors).

An effort was made to establish a set of criteria that could be systematically

measured or assessed for each image. The criteria stem from the descriptions, observations

or expectations stated by various researchers concerning the artistic production of the image

which were discussed at the beginning of this chapter; examples are documented in

Appendix A. The following is a summary of descriptions which relate specifically to aspects

of images which are encompassed with terms of image "quality" and "complexity":

> Images in Open spaces are often described as "spectacular and very visible" (de Beaune 1995:201-202), where "time was taken when painting a large collection of detailed animals" (Clottes 1997:212-213). As places with "elaborately painted images" or "carefully painted images with some simpler engravings" and remains of "simpler" engraved images "showing that the area was not exclusively reserved for one kind of activity," (Lewis-Williams 1997:335-336, 2002:232). Lewis-Williams and others have argued that a great deal of care went into the manufacture of paint (1995:149), and that the "considerable quantities of paint and the construction of scaffolds required in making these images…most likely required the active participation of a large number of people" (1995:150).

> Images in Restricted spaces are often described as lacking clarity, "hidden and almost undecipherable (de Beaune 1995:201-202), "difficult to decipher engravings" (Lewis-Williams 2002:233-235) and "scarcely perceptible (Lorblanshet 2001:149). They are often further described as being "drawn more quickly with far less detail" (Clottes 1997:212-213), engraved with a "few sure strokes" and "swiftly executed" (Lewis-Williams 1997:335-336) "finely engraved" with a "lightness of lines" and "made up of a few basic lines" involving "extreme schematic rendering of some images" with an "incomplete nature, or even voluntarily headless" (Lorblanchet 2001:149).

These descriptions discuss issues of line quality and clarity, completeness of subject

matter, planning and preparation, time involved and more. A list of attributes was developed

to attempt to systematically assess these aspects of images, which included:

- › Line quality and clarity (with some consideration of preservation issues)
- › Completeness of subject matter (when subject matter can be determined)
- › Anatomical detail or other detail (as mentioned in the descriptions above)
- › Artistic complexity (i.e. showing three dimensions or perspective, shading for example)

- › Technique (i.e. engravings being more expedient as implied in descriptions above)
- › Special pigments and amount of pigment (i.e. time, preparation or planning)
- › Technical complexity (i.e. in terms of engraving an outline of the image first, using natural outcrops as part of the subject form or other)

Assessments of image quality are obviously very problematic especially in terms of

interpretations, and may warrant the focus of a separate thesis to adequately address. These

attributes and other similar ones may result from differences in stylistic traditions, artists'

skill, or other types of intention, for example, which may be unrelated to individual versus

group contexts of activity. For purposes of recording, images which show attributes described in Restricted spaces, which reflect more "expedient" activity or intention, are classified as Type 1 images. Images that show attributes described in Open spaces, which reflect more "elaborate" or "display" type intention, are classified as Type 2. Subcategories are sometimes used for each type in order to better classify images as showing attributes that place them at either extreme or just showing a greater number of attributes associated with either Type. In other words, Type 1, "expedient images" category involves both Quality category 1 (all attributes suggesting expedient intention) and category 2 (most attributes suggesting expedient intention than not). Type 2, "display images" involves Quality category 4 (all attributes suggesting display type intention) and category 3 (more attributes suggesting display type intention versus expedient intention).

Type and Sub-category		Attributes
1 ("expedient")	1	Involves only expedient attributes (i.e. "crude" images)
	2	Higher proportion of expedient attributes
2 ("elaborate")	3	Higher proportion of "elaborate"/display type attributes
	4	Involves only "elaborate" or display type attributes

Table 4.3: Primary and sub-categories used to record image "quality."

The recoding of this variable was done for each image located during visits to the cave, and subsequently re-evaluated and refined using photographs or published drawings for each image from each cave. Photographs were assembled, grouped into Type 1 or Type 2 images and sub-grouped according to the categories discussed above. Assessments were re-examined by another individual and compared to assessments made during the cave visits. Since there is such a strong continuum in the attributes considered as part of this variable, the two broader subgroups of Type 1 and 2 generally involve less subjectivity. These types are primarily relied upon for analyses. Figure 4.8 below provides an example of a Type 1 (sub-category 1) and Type 2 (sub-category 4) image.
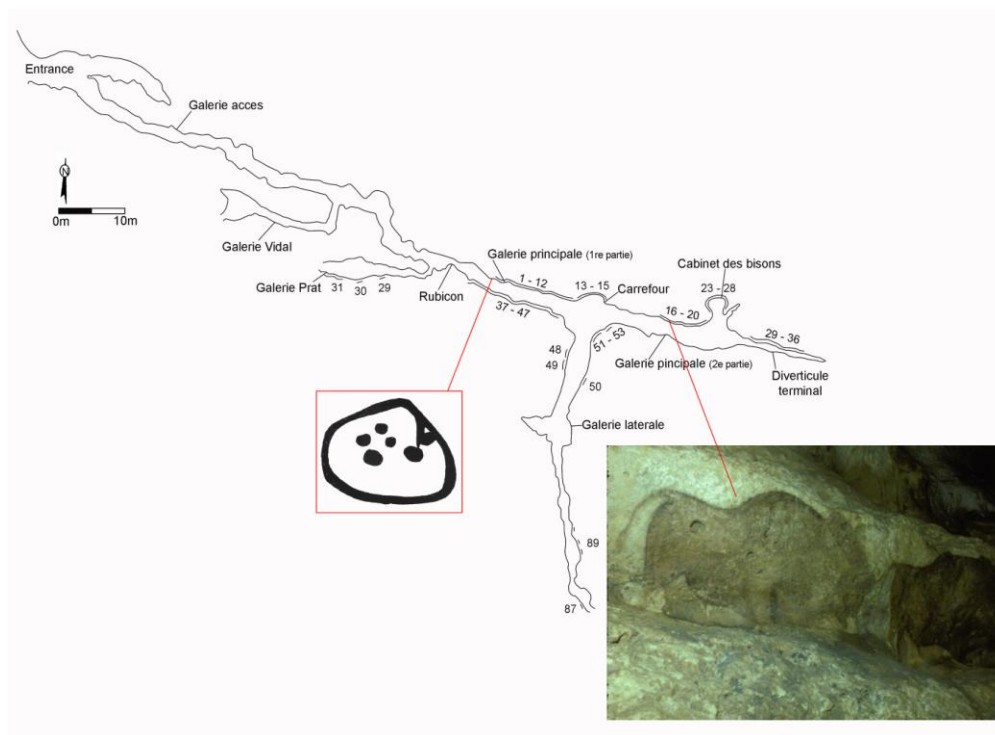
Figure 4.8: Example of a Type 1 image (left) and Type 2 image (right) from Font-de-Gaume. In this case, the Type 1 image is an engraved circle with punctuations in the center, which uses the natural contours of the cave wall as part of its form. Therefore, although classified as Type 1, it is placed into Quality sub-category 2, as showing a generally high proportion of "expedient" type attributes. The Type 2 image, on the other hand, is a large (over 100cm in length) polychrome (red and black) painted bison. This is placed into Quality sub-category 4, as showing definite "elaborate" or "display" type attributes.

4.4.4. Other variables explored

i) Over-marking (superimpositioning)

Over-marking, which is also referred to as superimposing and relates to the number of times images overlap each other. As suggested in the descriptions summarized above, under quality and at the beginning of the chapter as well as in Appendix A in addition to discussion by other researchers (i.e. Hayden 2003; Ucko and Rosenfeld 1967; Maringer and Bandi 1953), over-marking may suggest more expedient types of activity or intention or that

the images were not necessarily intended for viewing (i.e. that the process of making the image may have been more important). On the other hand, over-marking may be the result of repeated visits during different seasons as suggested by Aujoulat (2004) for painted panels in Lascaux. However, two different phenomena may be represented by over-marking if Open versus Restricted contexts are taken into consideration. For example, most of the suggestions by researchers discussed in **Appendix A** refer to restricted spaces which presumably reflect more individual or private activity. In these contexts, over-marking may reflect more expedient intention. In Open spaces, such as the elaborately painted Hall of Bulls in Lascaux which Aujoulat refers to, or in the polychrome painted chambers of Font-de-Gaume, over-marking may potentially reflect seasonal use of the cave or additions to previously existing images for elaboration or display purposes. Dense or "complex superpositioning" (i.e. Lewis-Williams 2002:233-235) in engravings may potentially also reflect an area of concentrated, or very different activity.

The recording of this variable was somewhat exploratory and was notes as either:

1) Absent, meaning no images overlapped
2) Present, meaning at least two images overlapped each other
3) Dense or complex, meaning more than two images overlapped

Engravings generally tend to involve more over-marking than painted images, which may provide further support for their more expedient intention in most cases. Interpretive possibilities will be discussed in *Chapter 5* in the sections on Restricted spaces and Combarelles.

ii) Experimental Variables

On a more experimental level, attempts were made to include lighting and acoustic measurements. Using a variable light source, attempts were made to determine the approximate minimal candle power necessary to clearly view each image from within the

optimal viewing distance. The optimal lighting position was also recorded (usually close to the wall but to the side of images to see engravings clearly).

In terms of acoustics, some researchers have suggested that there is a correlation between the location of deep cave paintings and the type of resonance of the location (i.e. Devereux 2001; Devereux and Jahn 1996). In the case of Font-de-Gaume and Lascaux, Waller (1993:501) suggests that "the images of horses, bulls, bison and deer are found in regions with high levels of sound reflection, whereas feline art is found in regions of the cave with poor acoustics." Acoustic reflectivity of spaces within optimal viewing areas of images was estimated by making simple hand-claps, judging whether sounds were reflected back or dissipated and measuring results with a standard sound-level meter. Originally, attempts were made to obtain greater precision sound analysis equipment, but this proved too expensive and cumbersome for field and research conditions.

After recording several caves in this fashion, it became evident that neither lighting conditions nor acoustic qualities as they were recorded were very useful for the analyses in this thesis. One candle power was generally more than enough to illuminate all but the largest of images, and what little information was provided was redundant with the effects of image size.   While a considerable literature has accumulated concerning the acoustic qualities of spaces in front of cave images such as the studies mentioned above, no such association was apparent using the simple acoustic test employed here, and no further efforts were made to assess or analyze these qualities. Furthermore, in order to obtain even somewhat good useful results, each of these domains required far more effort and precision in terms of methodological refinement, application, analysis and interpretation than was reasonable to attempt to include in this study.

4.5. QUANTITATIVE TECHNIQUES

Because of individual variability in skill, motivations, and opportunities of the artists that created images in the caves, any analysis of art to deal with questions posed in this thesis must employ quantitative techniques to identify the strength of trends, tendencies, associations, and clusters in the data. This can be done at several different levels. Examination of attribute state distributions can provide an initial assessment of random or non-random occurrences, as well as natural break points in distributions. Multimodal distributions are especially useful in identifying different populations or sources of variation.

Scatterplots, cross-tabulated tables, and vertical series of bar graphs are useful for examining relationships or associations between two variables as well as for identifying discrete clusters of similar cases. In considering more than two variables, cluster analysis can be particularly useful for identifying cases with strong similarities. All these techniques have been productively employed in this analysis.

Given the problem orientation of this thesis, its theoretical foundations, and basic assumptions, a number of explicit hypotheses and test expectations are generated in Chapter 5. If both individual and group viewing of images were intended in these caves, then there should be distinctive types, sizes, techniques, qualities, and spatial contexts displayed in any large population of images. These should be manifested by bimodal distributions of continuous variables and non-random associations between certain variable states. Whether such distributions and associations actually exist provides tests of the model and the assumption used in this thesis (as well as the adequacy of variable formulations and recording).

CHAPTER 5 ~ ANALYSIS and RESULTS

Overview

      Given the preceding framework concerning the importance of identifying individual

versus group viewing of images and the nature of those individuals or groups, it has been

possible to structure a series of relevant observations on image characteristics and their

spatial contexts to potentially identify images intended for individual versus group viewing.

It is now possible to proceed to the explicit statement of several general hypotheses and

develop test expectations for each. If the data conform to these test expectations, the

hypothesis can be considered supported, whereas if the data fail to conform to test

expectations, the hypotheses should be reconsidered, auxiliary hypotheses developed to

account for nonconforming results, and/or better proxy attributes must be developed to

more accurately reflect the target variables of interest. There are three major hypotheses to

be evaluated in the results presented here, each dealing with a more in-depth and complex

level of analysis of the data.

5.1.1 INTRODUCTION

The first hypothesis postulates that if caves were used for both individual and group activities, distinct image characteristics and visibility contexts will occur corresponding to the types of individual versus group activities. In other words, significant differences in images and their visibility contexts should indicate differences in intended group viewing versus private or individual image making not intended for viewing by others.

i) Expectations

If both group and private activities took place in the caves, the following differences in image characteristics and associated visibility contexts are expected to occur.

	Image Characteristics		
Activity type	Predominant size:	High Frequency of:	Use of:
Individual	Small	unskilled image making	Expedient media
Group	Larger	skilled image making	Prepared media
	Visibility Contexts		
Activity type	Viewing area:	Viewing positions/height:	
Individual	Small	Hi proportion of squatting (below chest height)	
Group	Large	Almost exclusively chest height or higher	

Table 5.1: Expected image characteristics and visibility characteristics
of images associated with individual viewing and group viewing.

ii) Possible Tests

1. According to the first hypothesis, and assuming some constant types of behaviour (e.g., preferences for viewing images situated more or less horizontally to the normal line of sight, and preferences for viewing images at distances so that they fill the center of one's field of vision with consideration to image size), the distribution of values of the *image characteristics* should exhibit distinct patterns reflecting individual versus group related images.

In the most ideal situations, a bimodal distribution of image sizes could be expected to occur indicating two distinct image groups that are logically associated with differences in intended viewing and social contexts.

Nominal image characteristics such as media type and quality would also be expected to exhibit strong non-random distributions in relation to each other, as well as with size and *image visibility* characteristics.

Some differences in the general nature of image subject matter might also be expected to occur at the level of animals vs. anthropomorphs vs. tectiforms vs. lines and dots, and these should be non-randomly associated with other *visibility* and *image* characteristics.

2. According to the first hypothesis, the values for *visibility* variables should also exhibit distinctive distributions. This assumes that locations for making images to be viewed by groups were generally chosen for their potential to be seen by an intended number of people at a suitable height for group viewing. In contrast, images made by individuals for their own viewing could be made virtually any where and could occur in small spaces as well as larger ones. Thus, distinctive bimodal distributions may be less evident for this variable but the overall range of viewing spaces for individually viewed images should extend to much lower values than those made for group viewing.

Similarly, images made by individuals could be executed while standing or squatting (a general resting position for many hunter-gatherers). Thus, while images intended for group viewing should all be chest height or greater, images made by individuals for their own viewing could be spread over a broad range of heights above the floor and blur distinctive patterns. Thus, bimodal distributions may not be very pronounced for these variable values.

While height above floor is generally related to the optimal position for viewing images, wall contours sometimes make higher images difficult to view from standing positions. Thus, estimating the optimal viewing position (squatting or standing) may provide a better indicator of individual versus group intended viewing, with all the caveats that apply to evaluating height above floor characteristics.

3. In all cases, Hypothesis 1 leads to the expectation that optimal viewing position, optimal viewing area, and height above floor should be non-randomly associated with other *visibility* and *image* characteristics thought to be related to individual versus group image viewing.

5.1.2. RESULTS

Part 1 of this analysis provides a basic overview of the data pertaining to the above expectations using univariate analyses. *Part 2* examines associations between variables with the goal of determining what component of the dataset appears to involve private/individual versus display/group activity.

5.1.2.1. PART 1.1: OVERVIEW OF IMAGE CHARACTERISTICS

i) Image Size

In accordance with expectations, there is a bimodal (actually trimodal) distribution of image sizes (**Fig. 5.1**). Some natural breaks in the distribution of image size suggest three possible groups of image sizes: 0-45cm (small), 46-85cm (medium), and 86-125cm (large). Approximately three quarters (71.5%) of the images sampled (n=189) are small in size (0-45cm), most of which (54% of the entire sample) are very small in size (0-25cm). According to the expectations, this suggests that the majority of the images were probably not intended for viewing by more than one or a few people (especially half, 54%, of the sample). On the other hand, only a small portion of the sample (13.8%) consists of very large images (86-125cm), which are expected to occur in intended viewing or display contexts.

% (n=189)	Size
71.5	small (0-45cm), 54% of which are extra-small (0-25cm)
15.3	medium (46-85cm)
13.2	large (86-125cm)

Table 5.2 Proportion of all image sizes from the entire dataset
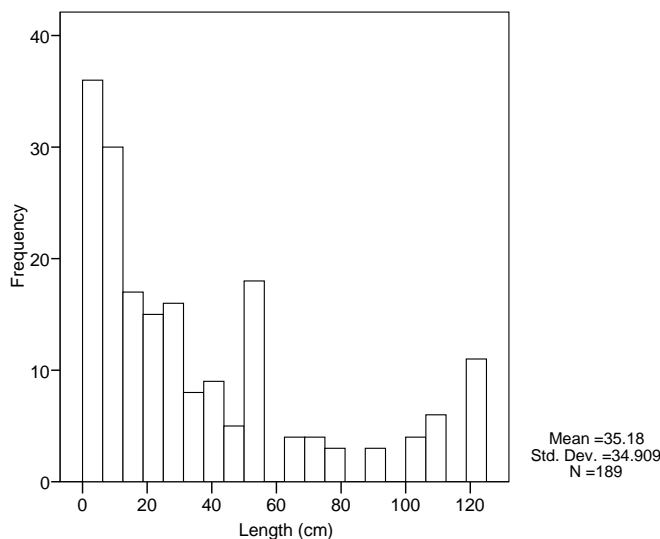
Figure 5.1: Histogram of Image Size. Natural breaks in the distribution of image size suggest three possible groups of image sizes: 0-45cm (small), 46-85cm (medium), and 86-125cm (large).

ii) Media Technique and Color

Overall there are relatively equal numbers of painted (53.9%) and engraved (46.1%) images in the sample (n=204). As discussed in the methods chapter, a higher frequency of engraved images is expected to occur in private contexts in addition to more expediently made paintings. Of the 53.9% of images that are painted, the majority (80%) are black. This may suggest that red (4.5%) and polychrome, or red and black, (15.5%) may be reserved for more display types of contexts. As discussed in *Chapter 4*, black painting may either be considered an expedient media (if charcoal based), or a prepared media (if manganese dioxide based). It was not possible to distinguish these in the field.

% (n=204)	Technique	Color	% (n=110) based on 53.9% of the sample
46.1	Engraved		
53.9	Painted	Black	80
		Red	4.5
		Red and black	15.5

Table 5.3 Proportion of Image Technique and Color

If the engraved and a portion of the expedient black painted images (especially those which occur in low visibility contexts) are considered together, then roughly three quarters of the sample according to image technique/color suggest personal/private viewing with a small portion (roughly 20% or more) possibly intended for viewing or display by groups of people. This would be consistent with the results discussed thus far.

iii) Quality and Complexity

Approximately three quarters of the sampled images (n=204) are of poor quality and complexity, which indicates that they were possibly intended for private/personal viewing. These results seem to complement inferences made from image size distributions and proportions of image technique. If this were the case then associations between quality/complexity and these other image characteristics (and potentially viewing area) should occur.

% (n=204)	Quality / Complexity
72.5 / 77	Poor
27.5 / 23	Good

Table 5.4 Proportion of Image Quality and Complexity

iv) Over-marking

Over-marking occurs in approximately half of the sample (43.3%), however, a high density of over-marking (i.e. images are over-marked more than once) is very infrequent (4.5%). In terms of the expectations being tested, it is hypothesized that a greater degree of over-marking may be present in contexts that were not intended for viewing, but which might have been used frequently. Alternatively, over-marking may reflect more constraint on

the available wall space in the cave, or a greater use of the cave over time. These possibilities are explored in more detail below.

% (n=201)	Overmarking
56.7	Absent
38.8	Present
4.5	High density

Table 5.5 Proportion of Image Over-marking

5.1.2.2. PART 1.2: OVERVIEW OF VISIBILITY CHARACTERISTICS

i) Optimal viewing area

Based on the distribution of optimal viewing measurements, there are possibly three groups of viewing spaces that can be identified (**Fig. 5.2**): 0-11.9m^2 (small), 12-16m^2 (medium), and 29m^2 (large) viewing areas. For the purposes of quantitative analysis the later categories (12-29m^2) are grouped together since they clearly represent spaces suitable for large group viewing. Small and medium sized viewing areas are further subdivided into extra-small (0-1.9m^2) in which only a single individual could fit, small (2-4.9m^2) in which 2-3 individuals *could* fit but which were likely only used by single individuals, and medium (5-11.9m^2) which could accommodate small groups (i.e. 4-5 individuals).

Approximately three quarters (72.3%) of the images sampled (N=184) have small viewing areas (0-4.9m^2), half (38.5%) of which have extra-small viewing areas (0-1.9m^2). The distribution of viewing areas suggests that the majority of cave images were not intended for viewing by groups (perhaps the 'process' of making these images was often more important than the product or viewing). On the other hand, only a small percent of images (8.1%) have viewing areas (12-16m^2; 29m^2) large enough to accommodate large groups. The fact that some images have such large viewing areas may be significant in terms of intended group

size or associated activity. However, medium and large sized viewing areas may simply reflect the use of available space by individuals.

% (n=184)	Viewing area
72.3%	small (0-4.9m²) [38.5% 0-1.9m²; 33.7% 2-4.9m²]
19.6%	medium (5-11.9m²)
8.1%	large (12-16m²; 29m²)

Table 5.6 Proportion of Optimal Viewing Area
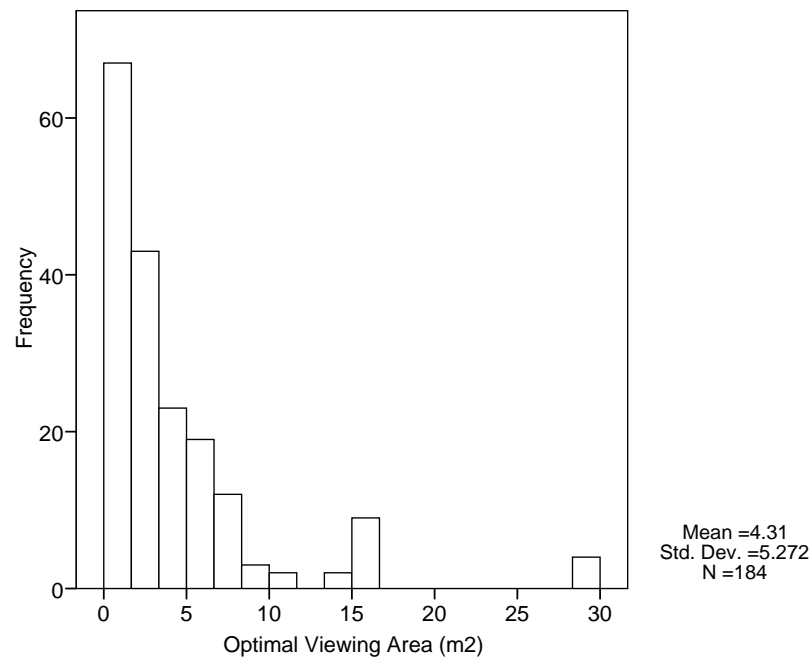
Figure 5.2: Histogram of Optimal Viewing Area. Three groups of viewing spaces that can be identified: 0-11.9m² (small), 12-16m² (medium), and 29m² (large) viewing areas.

ii) Height above the floor

There appears to be three possible groups of images based on natural breaks in the distribution of image height above the floor (**Fig. 5.3**): 0-70cm (low or poor visibility), 71-210cm (medium or 'visible'), and 211-550cm (high visibility). The majority (53.3%) of the sampled images (n=180) occur at visible heights above the floor (71-210cm). A significant portion of the sample (38.9%) also occurs closer to the floor (0-70cm), whereas only a small

portion (7.8%) occur in very high locations (211-550cm). This may either suggest that the majority of the images were made when standing (53.3%) or crouching (38.9%), depending on the height or age of the individual (i.e. adult versus child). On the other hand, this may suggest that the majority (53.3%) of the images were intended for viewing and therefore placed in visible locations. Those images (7.8%) placed in very high locations and very low locations close to the floor (31.1% at 0-19cm) could reflect either display considerations or the intentional placement of images in less visible or more private locations.

% (n=180)	Height above the floor
38.9	low (0-70cm above the floor) (31.1% 0-19cm; 7.8% 20-70cm)
53.3	medium (71-210cm above the floor)
7.8	high (211 – 550cm above the floor) (6.7% 211-345cm; 1.1% 550cm)

Table 5.7 Proportion of Height above the Floor
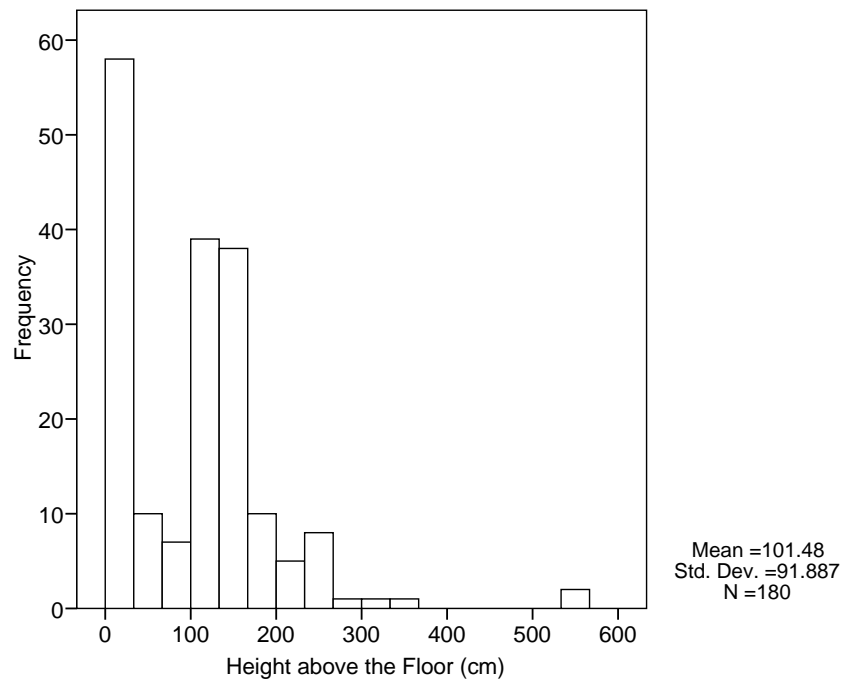
Figure 5.3: Histogram of Height above the Floor. Based on natural breaks in the distribution of image height above the floor: 0-70cm (low or poor visibility), 71-210cm (medium or 'visible'), and 211-550cm (high).

iii) Optimal viewing position

The majority (65.5%) of the sampled images (n=202) are best viewed when in a low, squatting or crouching position. Therefore they may not have been intended for viewing in group contexts (or not intended for viewing period). While similar to basic characteristics and trends in most other variables, the proportion (65%) of squatting and crouching is much higher than the proportions of images occurring close to the floor (39%). This therefore seems to reflect the fact that a portion of the images that occur at the more visible heights above the floor are placed on portions of the wall that angle down thus necessitating a squatting position for viewing.

% (n=202)	Optimal viewing position
1	lying down
64.5	Squatting
34.5	Standing

Table 5.8 Proportion of Optimal Viewing Position

iv) Summary

In summary, univariate distribution results of viewing area, image size, optimal viewing position, quality/complexity, and possibly technique suggest that a high proportion of the images (possibly up to three quarters of the sample) were potentially not intended for viewing by more than one or possibly 2-3 individuals. A much smaller proportion (<10%, which show more display type characteristics) were more arguably intended for viewing by larger groups. Height above the floor is the only variable that might indicate that more than 25% of the images were meant to be viewed by larger groups. Yet, at the same time a high proportion of images do occur close to the floor in difficult to view locations suggesting that some images at higher heights are placed on portions of the wall that angle down, constricting view. Thus, if considered in combination, height above the floor and viewing

position may also indicate that about 75% of the images were intended for viewing by groups. In addition, in considering techniques used to make images it may be that most engraved and black painted images were not intended for general viewing, whereas those intended for viewing by a group included either a portion of the black painted images, red or polychrome.

5.1.2.3. PART 2: ASSOCIATIONS BETWEEN VARIABLES

Having established basic distributions of the variable states recorded in the caves, the associations between variables will now be examined. Ideally all characteristics thought to be indicative of individual image making and viewing would co-occur in the same images, while all of the characteristics thought to typify images meant for group viewing would co-occur in the same images. But results are seldom so simple, and it is always possible that no association exists between the variable states of the different variables. A number of associations are examined using scatterplots, T-tests and cross-tabulations.

Size was considered to be one of the most indicative variables of personal versus group viewing and is therefore heavily relied upon for examining associations between variables. If small and extra-small images were potentially more often not intended for viewing, and large images were more often intended for display purposes or viewing by groups, then small image sizes should also be more associated with low image height above the floor, crouching or squatting viewing positions, and probably more expedient image techniques (engraved and simple paintings), lower quality in general, and a greater representation of smaller viewing areas.

i) Quality/Complexity and Image Size

If larger images were intended for display purposes then they should be of higher quality and complexity. If small images were more often not intended for viewing then they should show a higher frequency of poor quality/complexity. Image size is represented by plotting image height against image width (**Fig. 5.4**).
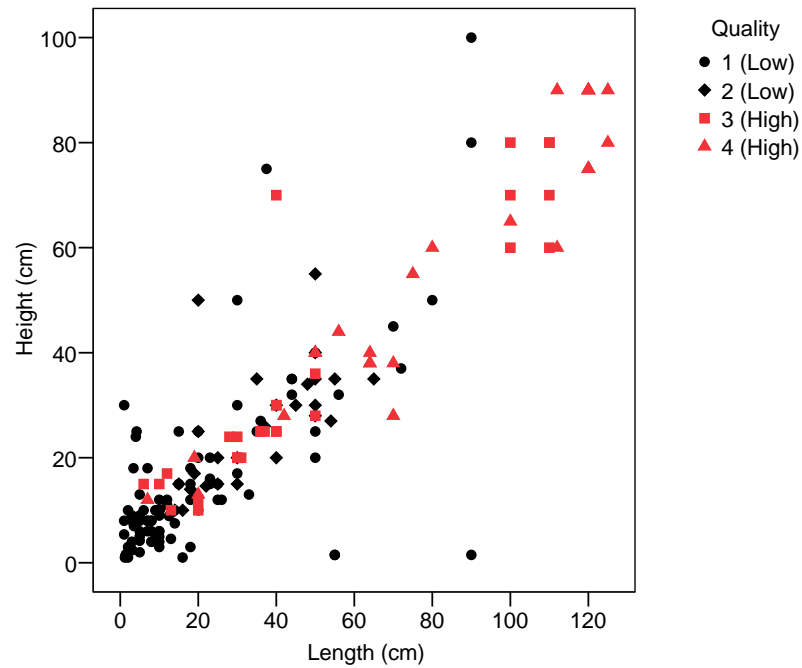
Figure 5.4 Image quality according to Image size. In this case, strong association between image heights and lengths occur, which is expected.

		x-Small size	Small size	Medium size	Large size
Quality	Low	93	113	18	3
	High	9	22	12	21
Complexity	Low	97	122	19	2
	High	6	13	13	22

Table 5.9 Frequency of image quality/complexity according to image size

Image quality/complexity has a strong tendency to increase with image size, suggesting that the majority of small images were not intended for group viewing, whereas larger images were more likely to have been intended for display.

The overwhelming majority of low quality images are small and extra-small in size, while the overwhelming majority of large images are of high quality/complexity. These results strongly support expectations, however, there is also a significant number of images that are small in size but of high quality (10-20%). Assuming that all small images were made for personal viewing this is an expectable outcome since there could be a considerable range of variation in artistic talent and training among the population of individuals entering the caves for private purposes and leaving images. These figures may indicate that only about 10% of the population may have had training or unusual talent in image making, or that such differences may be due to temporal influences on cave use, style of image making, availability of pigment and pigment making technology, or other factors.

ii) Media: Technique/Color and Image Size

The association of image size and technique is somewhat similar to the relationship between image size and quality/complexity (**Fig. 5.5**). Polychrome painted images generally only occur in the larger size ranges. Engraved images cluster in the extra-small size range but spread throughout the small/medium size range which is where most red painted images also occur. Although black painted images occur throughout the size ranges, they occur most frequently in the extra-small and small sizes. Thus, in terms of the original expectations it appears as though the larger images tend to involve slightly more effort (i.e. polychrome painted), whereas the smaller images display frequency or expedient media techniques (engraved and small black).
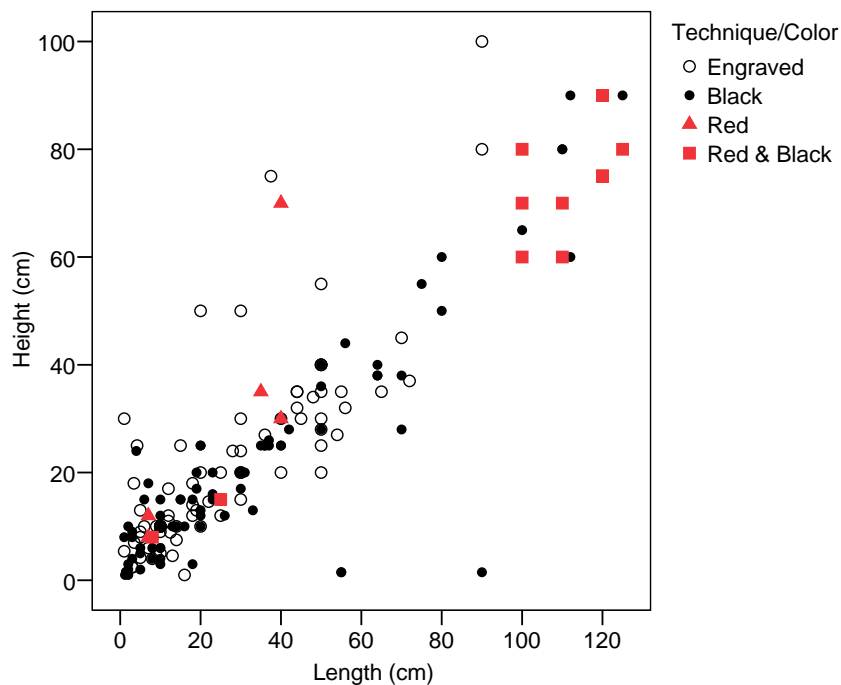
Figure 5.5: Image technique and color according to Image size.
Polychrome images constitute the larger sizes.

iii) Viewing Area and Image Size

If the expectations in Hypothesis 1 are correct, and if viewing area is an indication of the intended viewing context (i.e. individual versus group), then a higher occurrence of small and extra small images should occur with small viewing areas, and a higher occurrence of large images should occur with large viewing areas. Correlation tests (non-parametric because data is so skewed) show that there is a significant correlation, but it is very weak.
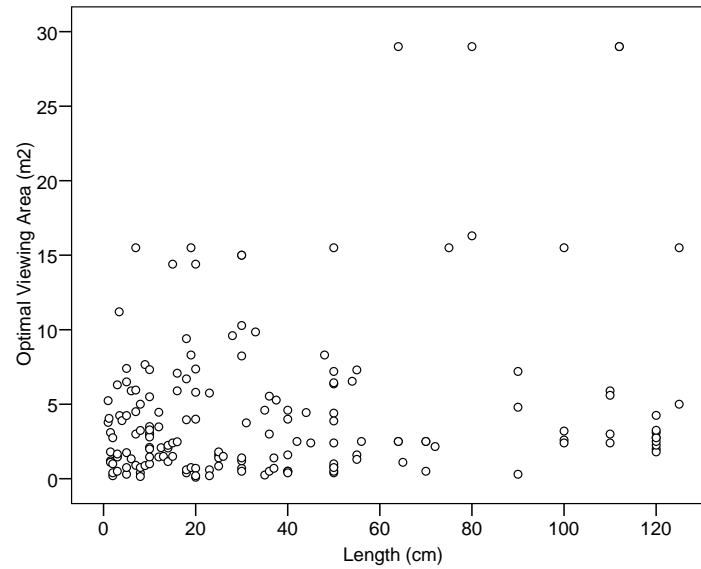
Figure 5.6: Optimal viewing area according to image size. In this
case, there is very weak association between these variables.

Correlations			Image Area	OpVA
Kendall's tau_b	Image Area	Correlation Coefficient	1.000	.108(*)
		Sig. (2-tailed)	.	.039
		N	187	168
	OpVA	Correlation Coefficient	.108(*)	1.000
		Sig. (2-tailed)	.039	.
		N	168	184
Spearman's rho	Image Area	Correlation Coefficient	1.000	.160(*)
		Sig. (2-tailed)	.	.038
		N	187	168
	OpVA	Correlation Coefficient	.160(*)	1.000
		Sig. (2-tailed)	.038	.
		N	168	184

(*)Correlation is significant at the 0.05 level (2-tailed).

Table 5.10 Correlations between Image Size and Optimal Viewing Area

Further examination of the correlation between image size and viewing area show

that although a higher proportion of small and extra small images occur in small and extra

small viewing areas, a higher proportion of large images does not occur in large viewing

areas (**Fig. 5.6**). The highest occurrence of all image sizes, including large is in small viewing

areas, spaces that are large enough for small groups, which are most common in the caves. In those viewing contexts which are more arguably private or not intended for viewing (extra-small viewing areas), extra-small images are most common and very few large images occur which is consistent with the expectations. Whereas, images with large viewing areas consist of a relatively equal amount of small, medium and large image sizes occur, which is not fully consistent with the expectations.

While it is true that the smallest images have overwhelmingly extra-small and small viewing areas, and that the three largest viewing areas are associated with images over 60cm in length, there is little apparent patterning in the intermediate values. A number of factors may explain this low level of association between size and viewing area. For example, individual image makers may not have been constrained to only using small spaces, but could have used large spaces and wall areas for making their personal images. On the other hand, an insufficient recording of viewing area characteristics could also be affecting results. For example, in Combarelles, while viewing angles may have been wide thereby creating medium or larger viewing area measurements in terms of floor spaces, severe constraints on vertical space (which is not reflected in viewing areas, but is reflected in height above the floor and optimal viewing position) essentially meant that no more than two people could have viewed most of these images at one time. Why there should be a high proportion of large images with small viewing areas is more difficult to explain.

In summary then, smaller size images tend to be poorer in quality/complexity, and are more often the result of expedient techniques of production. In contrast, larger images tend to be high quality/complexity, have and have more definable, elaborate images and polychrome images. A high proportion of the small and extra-small images (i.e. roughly three quarters) tend to occur in small viewing areas, although some also occur in larger viewing

areas. Therefore, those images which occur in the extra-small size range appear not to have been intended for display purposes or group viewing (according to the expectations), whereas those in the small and medium size ranges, in which quality/complexity increase vary more in terms of their intended viewing.

iv) Height above the Floor and Image Size

Is there any correlation between image size and height above the floor, which may indicate intended viewing? The scatterplot below suggests not. Most images occur at very visible heights above the floor (**Fig. 5.7**). What may be significant is that large images primarily occur in visible locations, whereas smaller images occur in visible and close to the floor locations, suggesting an increase in the non-intended viewing component of the images as size decreases, although some visibility still seems to remain important. The range of variation in more visible height locations may suggest two different activities or intentions (i.e. private and display), whereas the concentration of small and extra-small images in low height locations provides further support for more of a private domain of activity.
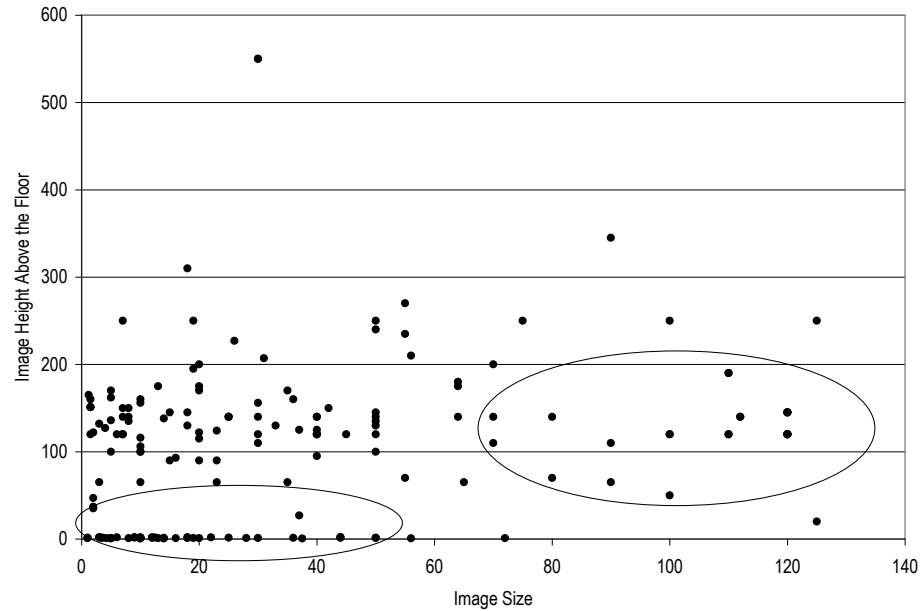
Figure 5.7: Image height above the floor according to image size. The circles highlight details discussed above (with a concentration of small images close to the floor and large images only occurring at visible heights above the floor).

v) Viewing Area and Image Size

Similar observations can be made about viewing area measurements (**Fig. 5.8**). Although the majority of images are small in size, those that occur in arguably non-intended viewing contexts are primarily extra-small and small in size. In contrast, the primary location where large (presumably display images) occur is in visible locations. Again, greater variation in size is observed in areas of greater visibility suggesting possibly two different domains of activity (private and display), in contrast to areas of less visibility which appear to exhibit image characteristics suggestive of private activity.
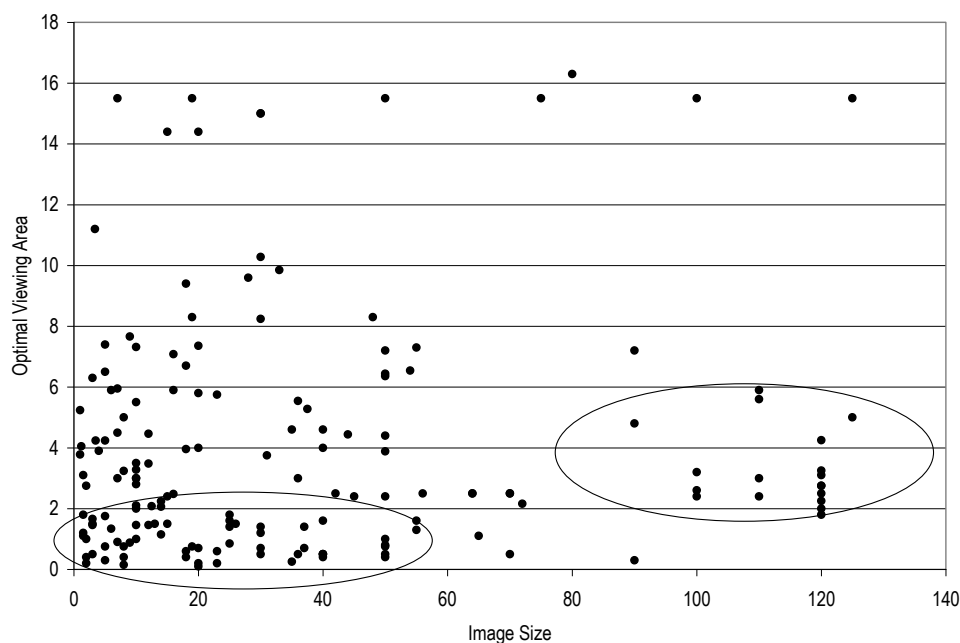
Figure 5.8: Optimal viewing area (excluding outliers at 29m2) according to image size. The circles highlight details discussed above (with a high proportion of small images in small viewing areas and large images primarily in larger viewing areas).

vi) Viewing Area and Image Quality/Complexity

Image size and quality/complexity exhibit non-random associations, yet image size does not correlate with viewing area. Therefore, image quality/complexity is not expected to closely associate with viewing area. The original expectations however, were that a higher frequency of low quality/complexity images should occur in contexts which were not intended for viewing, and a higher frequency of high quality/complexity images should occur in contexts which were intended for viewing or display.

The main difference shown in the histogram below that examines associations between image quality and optimal viewing area is that a portion of high quality (level 4) images occur in larger viewing contexts, which is in part guided by a few outliers (**Fig. 5.9**). Overall there seems to be very little difference in viewing areas for low (1, 2) and high (3, 4) quality, a distribution which is essentially mirrored by image complexity.
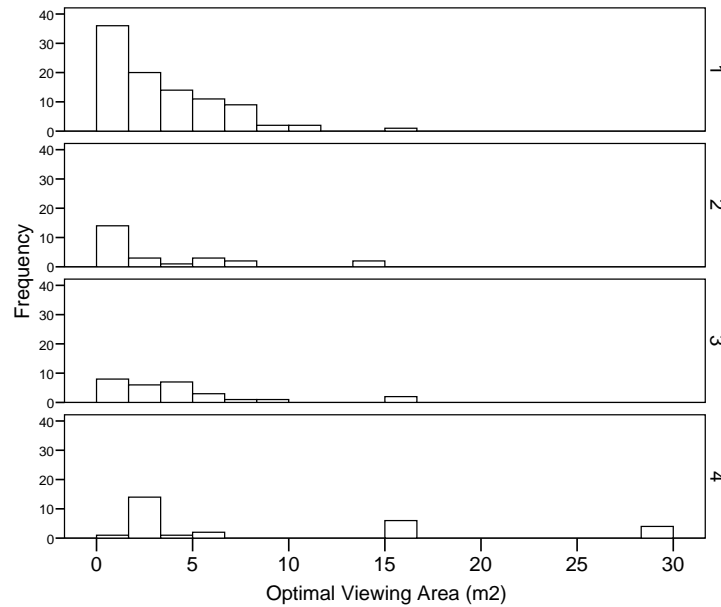
Figure 5.9: Image quality according to viewing area. In this case, slight bimodal distributions are seen in high quality levels, whereas very low quality levels have a much greater proportion of small viewing areas.

Kruskall-Wallis test[1] for difference in medians (which assumes equal variance that is not present, but there are similarly shaped distributions), concludes that there are differences in group medians. However, the Median Test[2], which has no distributional assumptions (as such, if it finds a statistically significant difference, it is very convincing), concludes that there is no statistically significant difference in the medians.

[1] Ranks	Image Quality	N	Mean Rank
Optimal VA	1	95	83.48
	2	25	69.68
	3	28	94.29
	4	28	116.55
	Total	176	

Test Statistics(a,b)	Optimal VA
Chi-Square	13.188
df	3
Asymp. Sig.	.004

a Kruskal Wallis Test
b Grouping Variable: Image Quality

[2] Frequencies		Image Quality			
		1	2	3	4
Optimal VA	> Median	47	8	17	15
	<= Median	48	17	11	13

Test Statistics(b)	Optimal VA
N	176
Median	2.750
Chi-Square	4.657(a)
df	3
Asymp. Sig.	.199

a 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 12.4.
b Grouping variable Image Quality

Table 5.11 Correlations between Image Quality and OpVA

Despite the lack of correlation between overall image quality/complexity and viewing area, at the extremes it is clear that those images which are of poor quality/complexity occur in small or extra-small viewing areas more frequently, and those images which occur overwhelmingly in larger viewing contexts are predominantly of higher quality/complexity.

5.1.3) A REVISED APPROACH

Given some of the ambiguous results from test expectations derived from Hypothesis 1, it is possible that the measures used to assess the *visibility* conditions of images are flawed or that other approaches are required to test their relationships to other variables. It may be useful, for example, to use broader visibility definitions which do not require detailed understanding of correlations between multiple, sometimes problematic, variables. One way of doing this is to situate visibility measures in their physical contexts, such as restricted spaces versus more open spaces (which can be further subdivided). Given previous arguments and hypotheses, *visibility conditions* and *image characteristics* should be differentially distributed in restricted spaces versus more open spaces – as well as in subdivisions of those spaces based on visibility characteristics. Thus, Hypothesis 2 will explore whether there are different *image characteristics* and/or *visibility characteristics* associated with restricted versus open spaces in the caves.

5.2.1. INTRODUCTION

The basic assumptions and premises of Hypothesis 2 are the same as Hypothesis 1.

However, it is further postulated that areas of caves that can be characterized as "restricted"

areas should have been used exclusively by individuals making images, while more "open"

areas could have been used by individuals and are spacious enough to accommodate group

activity.

Thus, if caves were used for both group and individual activities, differences *in image*

characteristics should occur in restricted versus open areas. Significant differences in images in

different physical contexts may then indicate differences in intentions or associated social

contexts (i.e., group-intended viewing versus private/individual images not intended for

general viewing). In this analysis, examination of viewing potential occurs according to open

versus restricted areas, rather than at the level of visibility conditions as defined in

Hypothesis 1.

i) Expectations

If both group (intended viewing) and private (non-intended viewing) activities took

place in the caves the following differences in *image characteristics* and their associated physical

contexts could be expected to occur, as summarized in the table below. Restricted areas can

be expected to contain mainly small, engraved (or black), cruder images, while open spaces

should contain most of the larger, high quality, ochre images as well as varying numbers of

smaller, engraved (or black), cruder images. In fact, depending on the relative intensities of

individual versus group uses of the caves, individual-type images could actually outnumber

group types of images in the open spaces. However, even if this is so, the vast majority of

group type images (larger, finer, ochred) would still occur in open spaces rather than in restricted spaces.

Physical Context	Visibility	Image Characteristics
Restricted Spaces	Low	High proportion of small size range, low quality, engraved and black painted, and poorly defined subject matter
Open Spaces	Low	High proportion of small size range, low quality, engraved and black painted, and poorly defined subject matter
	High	Significant proportion of large size, high quality, images in prepared media (ochres, paint formulas), with more focused, redundant image subjects

Table 5.12 Expected image characteristics in low versus high visibility conditions in both Restricted and Open spaces.

ii) Tests

In order to test this hypothesis, it is necessary to subdivide cave interiors into restricted (R) and open (O) areas as defined by their natural physical boundaries and features. Restricted spaces consist of:

i. narrow passageways between chambers (generally less than 1.5 m wide often with projections but few constraints on standing height);

ii. tunnels with ceilings generally less than 1.5 m from the floor (thus restricting vertical movements and positions), but sometimes proportionately wider (as in Combarelles);

iii. narrow diverticules (generally less than 1.5 m wide), and sometimes extremely difficult to access;

iv. alcoves that are somewhat spacious (up to 2-2.5 m in width), but not long enough to accommodate more than a few people.

Other areas are considered to be "open" spaces. However, within these open spaces, some images exhibit expected visibility characteristics of more private images (low height above the floor, squatting viewing positions--optimal viewing area would not be relevant

here) or are located in low visibility contexts, such as the black dots in Area 2 of Bernifal that observers must climb up four meters on a wall in order to see. Such "low visibility" images in open spaces should display strong, non-random associations with *image characteristics* typical of individual images (small size, low quality, expedient media).

Examination of the relative distribution of image characteristics both between and within restricted and open spaces, to see if the expected characteristics are differentially represented, should provide a useful test of Hypothesis 2.

5.2.2. Results

The overall distribution of image characteristics between and within Restricted and Open spaces are roughly what is expected. Relative proportions of image characteristics within each area type are first discussed below.

i) Image Characteristics within Restricted and Open Spaces

Restricted spaces show a higher proportion (n=76, 63%) of small images (0-45cm) and although a relatively high proportion (n=36, 36%) of medium sized images (46-85cm) occur, the majority of these images tend to occur toward the smaller end of the size range (46-55cm) which is visible in the histogram of images sized in **Figure 5.10** below. On the other hand, larger sized images (55-120cm) are almost absent from these contexts (<10%). In addition, a higher proportion of engraved (n=90, 66%) and black painted (n=44, 32%) images occur, while red and polychrome images are again almost absent (n=2, 2%), and an exceptionally high proportion of low quality (n=119, 87%) images occur.

Open spaces show quite different distributions in most image characteristics. A bimodal distribution occurs in image size, which is visible in **Figure 5.10** below. There are slightly more (n=53, 53%) small images than large or medium-sized images, although a relatively large proportion of large images (roughly 40%, including the larger size of images encompassed in the medium size range) also occurs. Bimodal distributions in other image characteristics also occur. Very different from restricted (R) spaces, open (O) spaces have a relatively high occurrence of prepared media (n=43, 29%) in the form of either red or polychrome paintings. A large proportion of the painted images are black (n=44, 65%) and very few (n=4, 6%) are engraved, which is very different from R spaces (although this is potentially an enhanced effect related to preservation factors or the incomplete sampling of

Font-de-Gaume chambers were engravings were not recorded). In addition, a much greater proportion of the images in O spaces are of high quality (n=39, 57%) than seen in R spaces, although a relatively high frequency (n=29, 43%) of low quality images also occurs (again probably partly due to incomplete sampling in Font-de-Gaume). Nevertheless, these patterns are relatively strong, and it seems doubtful that sampling has entirely created them.

ii) Image Characteristics between Restricted and Open Spaces

Results also show that almost all of the larger sized images (n=23, 96%) and red pigment (n=20, 90%) occur in O spaces, as well as the majority (n=39, 70%) of the high quality images (irrespective of any sample biases). In contrast, the majority of the smaller sized images (>70%, n= c.100 with small and smaller sized medium images included) occur in R spaces, as well as almost all of the engraved images (n=90, 96%) and a high proportion (n=119, 80%) of the total number of low quality images (incomplete sampling in Font-de-Gaume may again enhance this trend). These distributions indicate that a much higher proportion of the total number of expedient images (as defined in this study) occur in R spaces, whereas potential 'display' images tend to overwhelmingly occur in O spaces.

Dots/lines constitute over half (n=80, 59%) of the images in R spaces, whereas they only constitute approximately one quarter (n=18, 26%) of the images in O spaces. Mammals constitute relatively equal proportions of the images in R (n=48, 35%) and O (n=42, 62%) spaces, and human forms occur slightly more frequently in O (n=7, 10% of the images) versus R (n=4, 3%) spaces. The results also show that the majority (81%) of the total number of dot/lines and geometric forms occur in R spaces, whereas roughly half of the total number of mammals occurs in both R and O spaces. Overall, the subject matter of indicates a much greater emphasis on expedient image forms in R spaces than O spaces,

although mammals are frequent in all contexts (which is expected based on the overall corpus of Paleolithic images).

Image Characteristics		R Spaces (n=136)		O Spaces (n=68)	
		Count	%	Count	%
Size	Small (0-45 cm)	76	63	36	53
	Medium (46-85 cm)	36	36	9	13
	Large (86-125 cm)	1	1	23	34
Color	Engraved	90	66	4	6
	Black	44	32	44	65
	Red	1	1	4	6
	Polychrome	1	1	16	23
Quality	Low	119	87	29	43
	High	17	13	39	57
Subject	Mammal	48	35	42	62
	Human	4	3	7	10
	Dots/lines	60	44	15	22
	Geometric	20	15	3	4
	Other	4	3	1	2

Table 5.13 Distribution (frequency and proportions) of image characteristics (length, color, quality and subject) according to Restricted (R) and Open (O) areas.
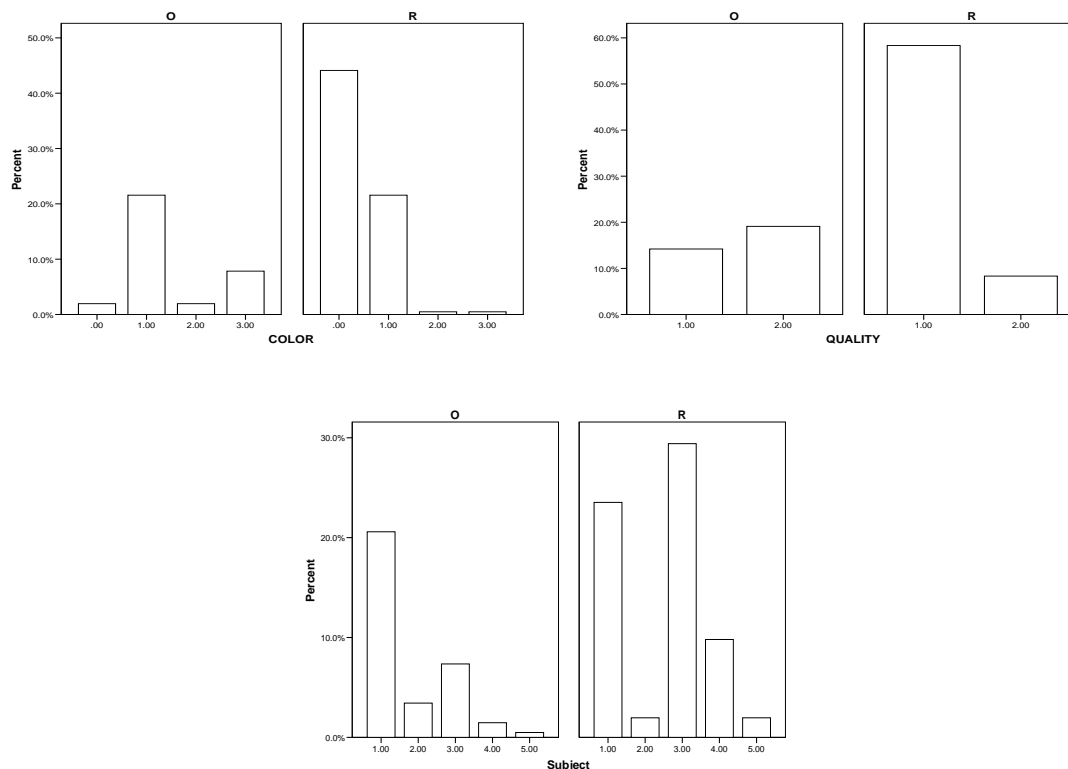
Figure 5.10: Distribution of image characteristics according to Restricted (R) and Open (O) spaces. Proportions of images per R versus O areas are displayed in bar charts for Color, Quality and Subject, whereas frequencies are displayed in histograms for image size (length, cm).   Quality: 1-high; 2 = low. Collor: 1-engraving; 2 = black; 3 = red; 4 = polychrome. Subject: 1= mammals; 2= humans; 3=dots and lines; 4=geometrics; 5= other.

In summary, a very high frequency of the images (roughly 80 or more percent) in R spaces may be classified as 'expedient' (as defined in this study). In addition, over three quarters of the total number of 'expedient' images occur in R spaces. These results provide support for the original expectations regarding the types of images that would be associated with these contexts (restricted spaces), which presumably represent private or individual types of activity. However, a much smaller proportion of the images in R spaces (roughly 15 or less percent) show characteristics that suggest potential intended viewing. Either this portion of the sample of images in R spaces reflects the normal variation which occurs in these contexts due to factors such as variation in individual artists' skills, cultural or temporal

changes in style, or they may reflect differences in intended associated activity or social context. These different possibilities will be explored in more detail below in Hypothesis 3.

On the other hand, the bimodal distributions of image characteristics seen in O spaces indicate a high probability of intended viewing by groups, occurring for one portion of the images in these contexts. However, the slightly greater proportion of characteristics associated with 'expedient' images (roughly 60% of the images in O spaces) suggests that these contexts were potentially used more frequently for individual, private or non-intended viewing activities. Thus, a significant portion (half or more) of the images in these contexts may not be intended for viewing. Hypothesis 3, below, examines image sub-groups in more detail to explore a number of different possibilities.

A portion of the images which are large in size and complex in terms of color and technique (i.e. polychrome, red pigments and high quality) suggest that possibly up to 30% of the images in O spaces were intended for viewing or 'display' purposes. Whether this reflects group activities will be discussed in more detail below. However, based on the expectations of this study, these image characteristics strongly suggest the presence of a group activity component.

Overall, given the high proportion of probable non-intended viewing in both R and O spaces, these image results continue to suggest a strong overall emphasis on individual/private activities or non-intended viewing contexts, and a smaller component of group activity or intended viewing contexts in these caves. Both areas show variation and potential sub-groups of images which may or may not reflect variation in associated social contexts, which is the focus of Hypothesis 3.

5.3.1. INTRODUCTION

In addition to the simple dichotomy used to model the analysis thus far (individual versus group activities), it is certainly possible that a broader range of situations or activities are represented by images in caves. From this perspective, it may be useful to see if meaningful subdivisions can be established *within* restricted or open areas beyond the dichotomy already established. If some of the differences seen in *image characteristics within* open (or even restricted) spaces are due to differences in associated social contexts then any additional differences in *image characteristics* should be associated with some differences in *visibility conditions*.

On the other hand, if *image differences* within R and O spaces do not reflect differences in intentions, activities, or social contexts, then associations with *visibility conditions* within each type of space (R or O*)* should be random, as well as displaying a relatively random placement of images and hence less structuring of activity.

i) Expectations

In many ways, the expectations derived from Hypothesis 3 are similar to the expectations from hypotheses dealing with previous scales of analysis. The major additional expectation is that *image characteristics* are not randomly distributed in relation to *visibility conditions within* restricted and open spaces. Spatial clustering of subgroups (of the different image characteristics) might also be expected to occur in association with different visibility conditions if there were different types of structured activities that were part of rituals or other social events.

To simplify this potentially complex analysis, I will refer to images with characteristics of individual viewing (small, expedient, low quality images) as Type 1 images. Images with characteristics postulated as appropriate for group viewing (large, high qualtiy, prepared media images) will be referred to as Type 2 images. When plotted against *visibility characteristics* (height above floor, optimal viewing area, optimal viewing position) within open or restricted spaces, Type 1 images should occur largely, but not exclusively, in low visibility areas of open spaces and in restricted spaces (**Fig. 5.11**). In fact, they could be randomly distributed across all types of spaces within the caves. A statistical preference for restricted areas undoubtedly could be used to infer something about the purpose of making such images and the conceptual frameworks that motivated individual image making.

In contrast, under the assumptions of Hypothesis 1, Type 2 images should only occur in high visibility areas (**Fig. 5.11**), whereas under the assumptions of Hypothesis 3, there may be special conditions under which Type 2 images could occur in restricted spaces. Determining whether these occurrences are real special situations or whether these occurrences are simply variations within a random distribution of attributes will depend on the degree of clustering of *image characteristics* across the field of *visibility conditions* in both restricted and open spaces, as well as on the existence of spatial clustering of these special types within the caves.

Several subdivisions might be anticipated in **Fig. 5.11** such as Type 1 images that occur high above the floor with very large optimal viewing areas. There are also somewhat more accessible places within the *restricted spaces* of caves that may have been intended for viewing images by small groups of individuals. To the extent that these form discrete clusters of associations between attributes within each type of space (R or O) as well as distinct clusters within the caves, they may be identified as actual subtypes. For instance, within the

restricted spaces, about 20 percent of the images consist of high quality medium-sized images a few of which are painted. If these predominantly cluster together in the more accessible parts of the *restricted spaces* of caves, it may be argued that they were meant for viewing by small groups of individuals. However, if image characteristics and visibility conditions appear randomly mixed, and if postulated subgroups of images are randomly distributed in cave areas, the hypothesis of distinct activities would have to be rejected on the basis of the data used in this thesis.

It should be emphasized that if these subtypes exist, they should not occur in all contexts, rather are postulated to cluster within the cave contexts which show distinctive accessibility characteristics (visibility conditions) and audience capacities. If these image types do not reflect differences in social intention/activity (and are simply due to variation within image production, individual or temporal artistic styles, or other factors), then distinct spatial clustering should not occur depending to some extent on the distribution of wall spaces suitable for image making, and on such factors as the distance from the entrance which may affect the general frequency of images across space.

ii) Tests - Restricted and Open spaces

In order to test these expectations, I used the Restricted and Open space classification as previously established to divide the sample of images. A visibility graph was then constructed for each type of space which is show in **Fig. 5.11**, and an assessment was made of the coherency and degree of clustering. Clustered identified included:

›   Low height above floor, small viewing area (optimal viewing position of squatting);
            - Small, narrow space with low ceiling
            - Individual activity
›   Chest or head height, small viewing area (optimal viewing position of standing);
            - Small, narrow space with height ceiling

> - Individual activity
> › High off the floor, large viewing area depending on lighting (unusual viewing positions);
> > - High on a ceiling, difficult to access, probably not intended for display
> > - Individual activity
> › Chest to ceiling heights, large viewing areas (optimally viewed standing);
> > - Large spaces, room to move around
> > - Potential group activity (possibly characteristic group activity)
> › Low height above the floor, smaller optimal viewing areas (squatting viewing position)
> > - Small spaces but more room to move around than in individual areas
> > - Potential small group activity

Image characteristics were examined for each of the subgroups to determine if there were strong associations of specific types of characteristics with particular subgroups, that is to determine if there were any of the expected associations between *visibility conditions* and *image characteristics*. Finally, subgroups were plotted on the cave plan of Bernifal (the most suitable cave studied for this type of analysis) to determine the extent to which these subgroups clustered within the cave.

5.3.2. OVERVIEW OF RESTRICTED AND OPEN SPACES

As discussed under Hypothesis 1, a greater frequency of small viewing areas (0-4.9 m^2), visible heights above the floor (70-210 cm) and squatting viewing positions occur in the entire sample. When examined according to R versus O spaces, greater variation was seen in O spaces as well as bimodal distributions in all characteristics (suggesting two possible domains of intention or associated social contexts), and roughly 80% of the images in R spaces exhibited more expedient image characteristics suggesting greater emphasis on private/individual activity.

However, similar to the distribution of image characteristics according to R and O spaces, distributions of visibility characteristics suggest potential subgroups which may or may not reflect differences in activities or intentions in terms of the associated social contexts. This is more apparent in O spaces where images occur in both high visibility and low visibility contexts. Roughly 60% or more (n= >50) of the images in O spaces occur at visible heights above the floor (71-210 cm) with good visibility in terms of the viewing areas (>2 m^2). A smaller portion of these images (30% or less) have poor visibility conditions in respect to their low or exceptionally high heights above the floor or very small (<2 m^2) viewing areas. On the other hand, in R spaces, the majority of images (c.90%, n=>130) tend to cluster in small viewing areas (0-4.9 m^2) yet have substantial have substantial visible heights above the floor (71-210 cm). However, a small proportion of the images (c.10%) have slightly higher visibility conditions. Optimal viewing position mirrors these results with a very high proportion of images viewed optimally by squatting in R areas in contrast to very low proportions in O areas.

Visibility Conditions		R Spaces (n=144)		O Spaces (n=68)	
		Count	%	Count	%
Optimal viewing area	Small (0-1.9 m²)	66	46	15	22
	Medium (2-11.9 m²)	78	54	38	56
	Large (>12 m²)	0	0	15	22
Height above the floor	Low (0-70 cm)	11	7	8	12
	Medium (71-210 cm)	132	92	47	69
	Low (210-550 cm)	1	1	13	19
Optimal viewing position	Low	22		45	
	High	45		23	

Table 5.11 Distribution (frequency and proportions) of visibility characteristics (Optimal viewing area, Height above the floor and Optimal viewing position) according to Restricted (R) and Open (O) areas.
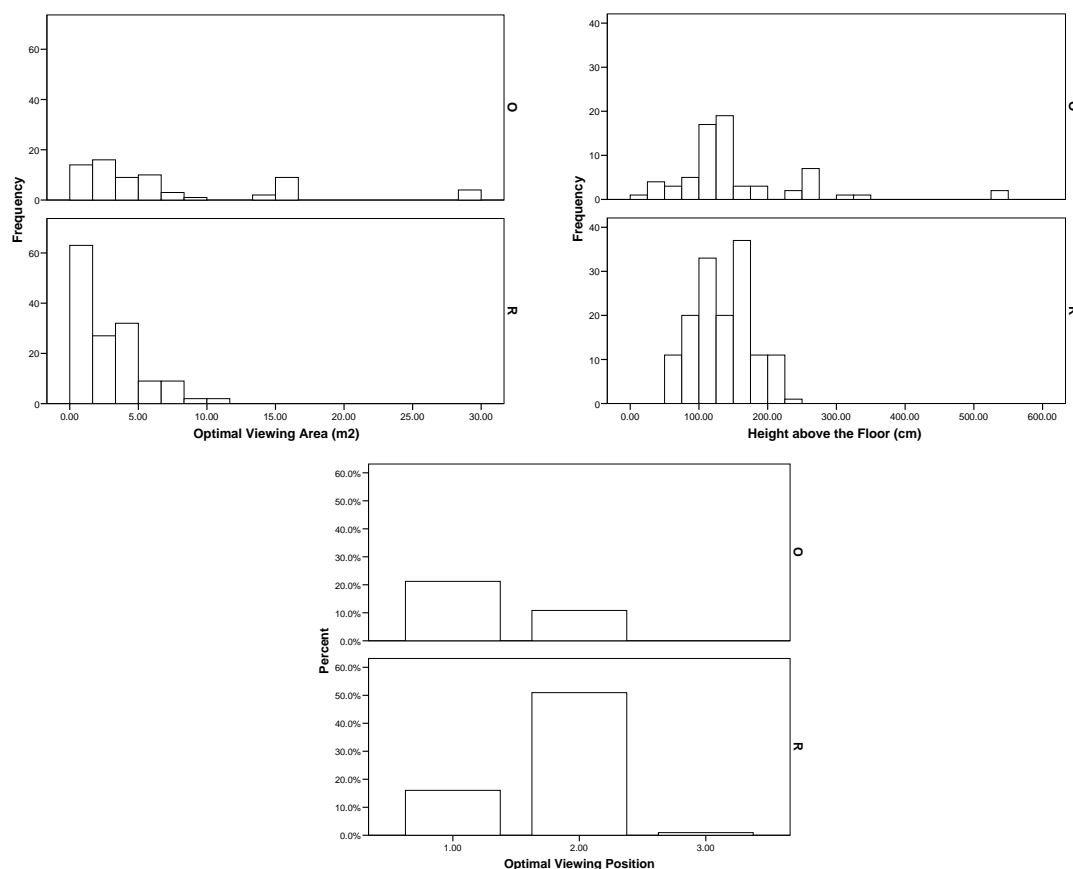
Figure 5.11: Distribution of visibility conditions according to Restricted (R) and Open (O) spaces. Proportions of optimal viewing position (standing, squatting and lying down) are displayed in bar charts. Frequencies of height above the floor and optimal viewing area are displayed in histograms.

In summary, the variability in *visibility conditions* in each type of space (R and O) suggests that visibility subgroups may potentially occur within these different physical contexts. As expected, R spaces appear to primarily include low visibility conditions, although a small proportion of images (c.10%) occur in slightly more accessible contexts (according to visibility conditions). O spaces also involve low and high visibility conditions, with the majority of images (c. 60%) occurring in high or good visibility contexts. The following sections examine possible subgroups in R and O spaces in more detail.

5.3.3. RESTRICTED SPACES

i) Overview

Scatterplots and cluster analysis are used to examine associations between *visibility characteristics* in order to assist with identifying subgroups in Restricted spaces. All cave areas that are included in the category of R spaces are used in this section of the analysis. Examining the data in this way provides a suitable compromise between simplifying data to assist with examining associations, yet still retaining enough detail on the degree of variation between subcomponents of R spaces.

Associations between height above the floor and optimal viewing area in the following scatterplot suggest two potential subgroups of images (**Fig. 5.12**). *Group 1*, illustrated in black symbols, includes Areas 1.2, 2.1, and 4.2, in Bernifal, C, J, I, and K in Villars, 4 in Font-de-Gaume and possibly 2.2. in Bernifal. All of the images in these areas (excluding Area 2.2 in Bernifal) have fairly small (<1.9 m^2) viewing areas, and all occur within roughly 100-150cm above the floor. *Group 2*, illustrated in red symbols, includes Area 4.1 in Bernifal, 5 in Font-de-Gaume, A, B and R in Villars, and possibly Combarelles. All of the images in these areas (excluding Combarelles) occur within a slightly higher range of heights above the floor (between roughly 130 – 175cm) and have slightly larger viewing areas of 2-3 m^2. The relationship of "Bernifal [2.2]" and Combarelles to the other subgroups may be clarified with other methods of analysis.
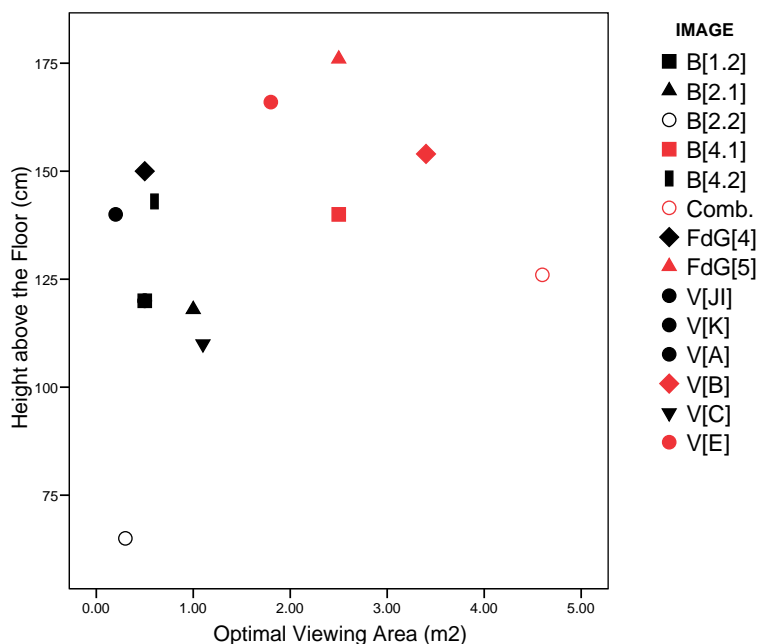
Figure 5.12: Scatterplot examining associations between optimal viewing area and height above floor of cave areas classified as restricted spaces. Group 1 = black symbols (very small viewing areas); Group 2 = red symbols (with slightly larger viewing areas)

Based on the same height above the floor and optimal viewing area criteria, potential subgroups are explored using Hierarchical Cluster Analysis methods. Single linkage or nearest neighbor was used across clusters to determine distances between them (which is done by determining the distance of the two closest objects in the different clusters). Complete linkage or furthest neighbor (method determines distances between clusters by the greatest distance between any two objects in the different clusters), was also used since this method is especially useful when the objects actually form naturally distinct 'clumps', which is likely based on their association in the above scatterplot and visual assessment of their individual visibility measurements. Ward's method (using squared Euclidean distances) was also used to examine potential subgroups. This method is distinct from the other methods because it uses an analysis of variance approach to evaluate the distances between the

clusters. In short, it attempts to minimize the Sum of Squares (SS) of any two (hypothetical) clusters that can be formed at each step.

A total of 20 tests were run using the various methods discussed above and various ordering of the data. All tests provided similar results in terms of clusters and distances between clusters. However, the position of "Bernifal [2.2]" differed in terms of its closeness to Group 1, although it consistently remained distinguishable from the other areas. Results from Ward's method (using squared Euclidean distances) are displayed in **Figure 5.13.** Similar subgroups occur to those identified in the above scatterplot. In this case, Combarelles is shown to be more closely related to Group 1 and, as already mentioned, Bernifal [2.2] remains somewhat independent.

```
                     C A S E   0         5        10        15        20        25
        Label          Num     +---------+---------+---------+---------+---------+

   Villars[JI]          12      ─┐
   Villars[K]           13      ─┤
   Bernifal[1.2]         1      ─┤
   Bernifal[2]           3      ─┤
   Ccombarelles          6      ─┤                       ┌─────────────────────────┐
   Villars[4.2]         10      ─┘                       │                         │
   Bernifal[2.2]         2      ───────────────────────┘                           │
   Font-de-Gaume[5]      8      ─┐            ┌──────────┐                          │
   Villars[E]           11      ─┘            │          │                          │
   Bernifal[4.1]         4      ─┐            │          └──────────────────────────┘
   Villars[4.1]          9      ─┤            │
   Bernifal[4.2]         5      ─┤            │
   Font-de-Gaume[4]      7      ─┤            │
   Villars[4.1]         14      ─┘────────────┘
```

Figure 5.13 Hiearchical Cluster Analysis (Ward's method using squared Euclidean distances) to examine for potential subgroups within Restricted spaces. Results are based on image viewing area and height above floor measurements. Clusters labels are according to area divisions within the caves.

Based on visual examination of visibility measurements, associations in scatterplots, and Hierarchical Cluster Analysis used to identify potential subgroups within R spaces, all of which provide similar results, the following subgroups can be identified:

1.1 Includes Villars [C, J, I, K], Bernifal [1.2, 2.1] and Combarelles
1.2 Includes Bernifal [2.2]
2.1 Includes Villars [E], Font-de-Gaume [5]
2.2 Includes Bernifal [4.1, 4.2], Villars [A, B], Font-de-Gaume [4]

Average visibility measurements for each area within each subgroup are provided in Table 5.4. The overall average height above floor and optimal viewing area measurement for Group 1.2 are 119 cm & 1.4 m^2. Although, if Combarelles is removed from this subgroup average height above the floor remains similar (117 cm), yet optimal viewing area reduces to 0.7 m^2. Optimal viewing area measurements within Combarelles varied considerably due to the nature of the wall angles and length of the ctunnel, posing a problem within this cave. This issue is discussed in more detail in below. For the time being, Combarelles averages will be excluded, however, this cave will still be discussed in the context of Subgroup 1.2 of R spaces.

Average height above the floor and optimal viewing area measurements for Group 2.1 are 156 cm & 1.9 m^2, and for Group 2.2 are 148 cm & 1.4 m^2. The differences between these groups are slight, although a difference between less than one and a half meters viewing area and almost two meters viewing area can be significant in terms of how the space was potentially used. Finally, measurements for Group 1.2, which only involves Bernifal [2.2] are 65 cm and 0.3 m^2, indicating a much smaller space than the rest of the groups.

In **Figure 5.14** average height above the floor and optimal viewing area measurements for each subgroup within R spaces are displayed. In general, an increase in

height above the floor is associated with an increase in optimal viewing area, except in subgroup 2.1, which involves Area 5 in Font-de-Gaume and Area E in Villars. In this case, even though images occur high on the ceiling, viewing area indicates the space is still very restricted, similar to subgroup 2.2 (Areas 4, 4.1, 4.2, A and B in Bernifal, Font-de-Gaume and Villars). Subgroup's 1.1 and especially 1.2, indicate much more restricted space and limited visibility.
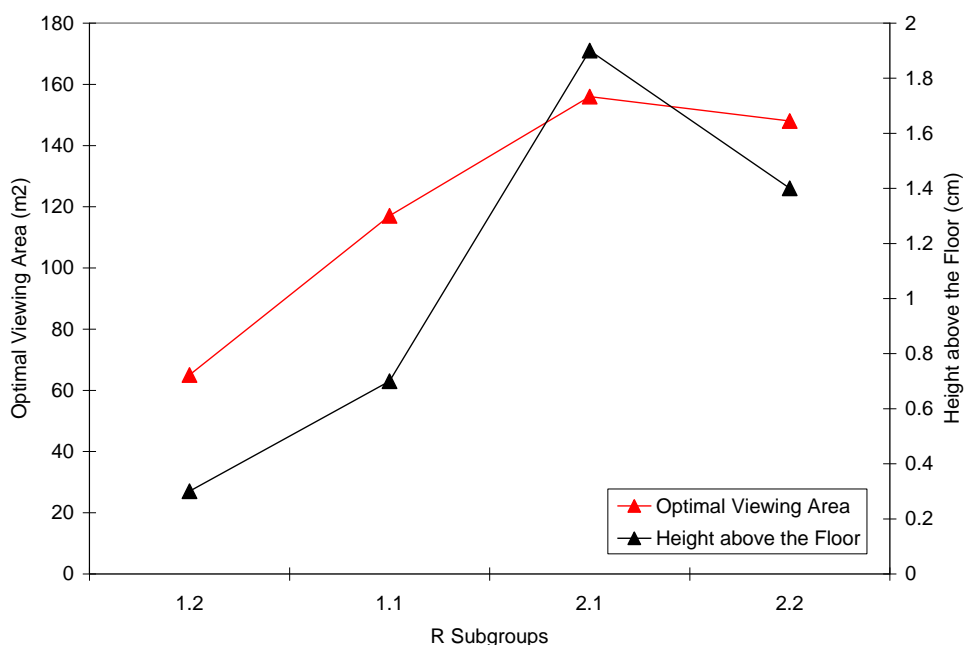
Figure 5.14: Line graph showing average optimal viewing area and height above floor measurements for subgroups within R spaces.

Group	Areas	Optimal Viewing Area (m2)	Height Above the Floor (cm)
1.1	Villars [C, J, I, K], Bernifal [1.2, 2.1] and Combarelles	65	0.3
1.2	Bernifal [2.2]	117	0.7
2.1	Villars [E], Font-de-Gaume [5]	156	1.9
2.2	Bernifal [4.1, 4.2], Villars [A, B], Font-de-Gaume [4]	148	1.4

Table 5.12 Average (and Range) Height above the Floor and Optimal Viewing Area measurements for each area according to groups identified in Scatterplot associations and Cluster analysis.

ii) Image Characteristics according to Visibility Subgroups in Restricted Spaces

According to the expectations, these subgroups may show differences in their *image characteristics* that potentially reflect differences in intention or associated activity/social context. According to the overall distributions of *image characteristics* in R spaces discussed previously, roughly 15% of these images may potentially reflect intended viewing, even if only by very small groups or single individuals (as might occur if they repeatedly returned to given locations for special purposes versus single event image-making and viewing). In contrast, the majority of the images probably reflect more personal or private use of the cave, in which images were not intended for viewing subsequent to their making.

If this hypothesis regarding the nature of image proportions in R spaces which was formulated above is correct, then differences in *image characteristics* should be non-randomly associated with differences in *visibility conditions*. In other words, differences in *image characteristics* should occur between the subgroups identified above. If significant differences are seen between these subgroups, then this would provide support for the hypothesis that differences in visibility conditions potentially reflect differences in associated activity/social contexts. If this is the case, then an argument could be made that the activity in R spaces <u>has</u> multiple components (minimally two). If significant differences are not seen between these subgroups, then this would suggest images are more randomly distributed throughout R spaces. If this is the case, then an argument could be made that the activity in R spaces does <u>not</u> have multiple components.

Unfortunately sample sizes within the subgroups are too small for statistical tests. Thus, distribution charts and tables of proportions of image characteristics will be used to examine differences within and between subgroups.

Large image sizes only occur in subgroups 2.1 and 1.1 (excluding Combarelles). Thus, aside from subgroup 1.2 (which only has one image), size suggests that subgroup 2.2 involves only expedient images, whereas a small portion of images in subgroups 2.1 and 1.1 have images that may indicate intended viewing (**Fig. 5.15**).

In terms of image color, subgroup 2.1 shows a higher probability of intentional viewing since no engraved images occur (**Fig. 5.15**), and a relatively high proportion of red pigment occurs (12%, n=1). In other subgroups, engravings constitute 25% (n=4 in 2.2) and 55% (n20 in 1.1) of the images. While only one(3%, n=1) red image occurs in subgroup 1.1.

Image quality also suggests potential intended viewing in subgroup 2.1, with over 70% (n=12) of the images being of high quality. On the other hand, almost all of the images in the other subgroups show more expedient or low quality, with a few exceptions (n=2, 6%) in subgroup 1.1.

In terms of image subject, subgroup 2.1 again shows a higher probability of intended viewing with the much higher proportion of mammals (70%, n=12) to other subject types. Subgroup 1.1 also shows potential for intended viewing since most of the images that occur in this subgroup are mammals (39%, n=14) and human forms (39%, n=14). On the other hand, the high proportion of dots and lines in subgroup 2.2 suggest potentially greater emphasis on more private/personal use.
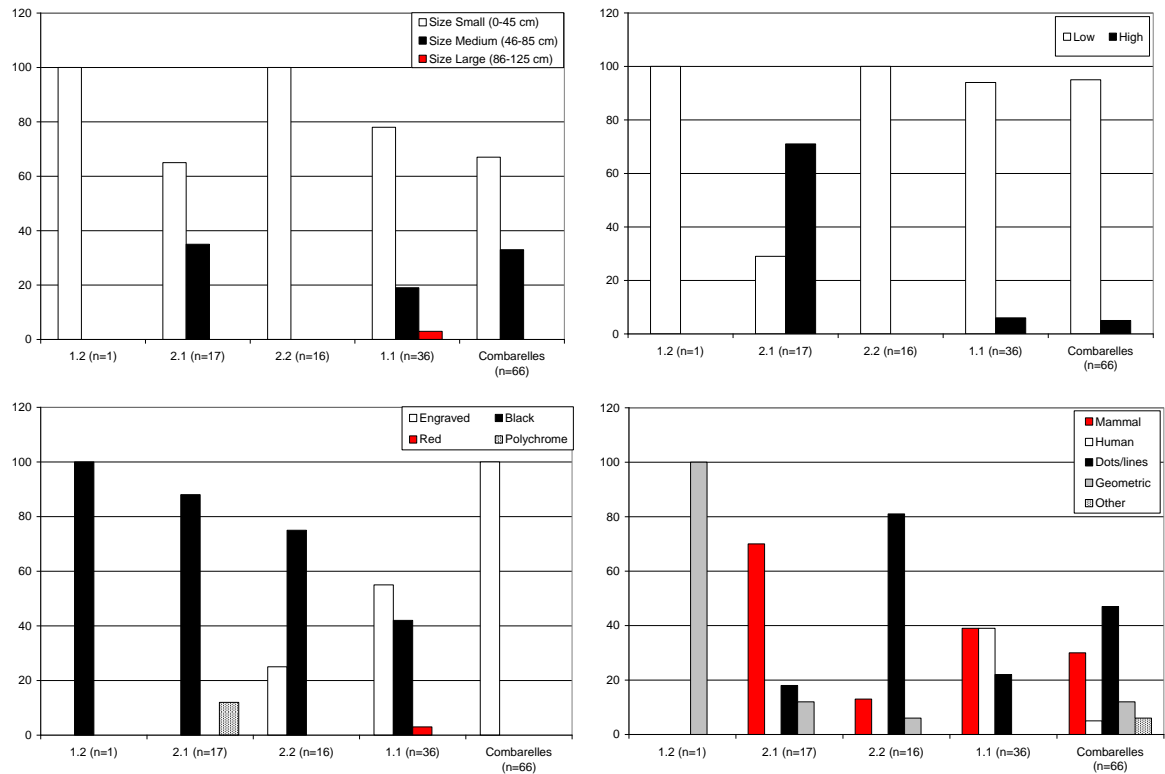
Figure 5.15: Bar charts showing variable characteristics of restricted area subgroups.

Image Characteristics	Group 1.2		Group 2.1		Group 2.2		Group 1.1		Combarelles	
	N=1	%	N=17	%	N=16	%	N=36	%	N=66	%
Size										
Small (0-45 cm)	1	100	11	65	16	100	28	78	44	67
Medium (46-85 cm)	0	0	6	35	0	0	7	19	8	33
Large (86-125 cm)	0	0	0	0	0	0	1	3	0	0
Color										
Engraved	0	0	0	0	4	25	20	55	66	100
Black	1	100	15	88	12	75	15	42	0	0
Red	0	0	0	0	0	0	1	3	0	0
Polychrome	0	0	1	12	0	0				
Quality										
Low	1	100	5	29	16	100	34	94	63	95
High	0	0	12	71	0	0	2	6	3	5
Subject										
Mammal	0	0	12	70	2	13	14	39	20	30
Human	0	0	0	0	0		14	39	3	5
Dots/lines	0	0	3	18	13	81	8	22	31	47
Geometric	1	100	2	12	1	6	0	0	8	12
Other	0	0	0	0	0	0	0	0	4	6

Table 5.13 Variable characteristics for image subgroups in restricted areas.

In summary, according to image characteristics and the expectations applied to interpreting them, Subgroup 2.1 shows the highest probability of involving a component of intentional viewing (or in other words, greater investment in image making potentially for the purpose of being viewed). This subgroup of images has a high proportion of large sizes, greater proportion of red pigment than seen in other subgroups, and a lack of engraved images (which are thought to *generally* be more expedient). There is also a very high proportion (70%) of high quality images and mammals. These characteristics in isolation may not necessarily suggest intended viewing of the images, however, the overall differences are significant enough to suggest a difference in intention or associated activity/social context.

On the other hand, Subgroup 2.2 shows the highest probability of being more private in terms of the associated activity/social context. All of the images in this subgroup are small and of low quality. Although engravings only constitute a quarter of the images, 81% of the subject matter is dots/lines thus constituting the majority of the black paintings. Therefore, overall characteristics of this subgroup indicate a high likelihood of *more* private/personal and/or non-intended viewing than subgroups 2.1 and 1.1. Similarly, Subgroup 1.2, which has only one small, low quality, black painted geometric form (which occurs in very spatially and visually restricted location) also arguably reflects more private/personal action or intention.

Subgroup 1.1 shows potential of having a component of intended viewing contexts/images. Roughly a quarter of the images are larger in size, a smaller proportion of the images are of high quality (6%), and a small amount of red pigment occurs (3%). This combined with the high proportion of mammal (39%) and human forms (39%) suggest that

a portion of this subgroup may have been intended for viewing. Overall characteristics are very different from subgroup 2.1 and 2.2.

The sample of Subgroup 1.1 is also twice the size of the others (n=36), which may suggest that if sample sizes in the other areas were increased, variation would as well. However, the strong associations seen in Subgroup 2.1 with high quality mammals and Subgroup 2.1 with low quality dots/lines making up the majority of these images are relationships that do not appear to be represented in Subgroup 1.1. These observations encourage confidence that the subgroups are real and not products of sampling. One further method of analysis will be applied, which involves the investigation of spatial relationships between these subgroups within R spaces, and which will hopefully help to address some of these issues.

iii) Spatial plotting and discussion

If the subgroups determined above using *visibility characteristics*, which also arguably exhibit significant enough differences in their overall *image characteristics* (even though sample sizes are very small), actually do reflect differences in intention or associated activity/social context, then they would potentially also occur in spatially distinct locations within the caves.

The defining of units for the original analysis of visibility differences, which led to the subgroupings, was based on spatially distinct areas of the caves. This was done in order to simplify analysis, and it may now seem logical that the subgroups produced would then relate to spatially distinct areas of the caves. However, 15 different R areas from four different caves were included, and three main subgroups were identified when images were situated on scatterplot fields of visibility conditions. The same subgroups emerged when the image cases were subjected to cluster analysis. The subgroupings then suggest that some

areas show slightly greater ease in accessibility and visibility. These three subgroups showed

enough differences in their *image characteristics* to suggest non-random distribution and hence

possibly differences in the intention or nature of associated activity.

5.3.4. RESTRICTED SPACES - COMBARELLES

i) Introduction

Combarelles is composed of basically one long corridor/tunnel, which averages 1.5 cm in height and width with some, but little variation (**Fig. 5.16**). In most cases it is physically impossible for more than two individuals to view an image at a time, and arguably all viewing contexts constitute a more private/individual space. Combarelles therefore provides a good opportunity to test expectations regarding characteristics and visibility of images in private spaces. It also provides an example of the potential range of variation that may be expected to occur in a sample of images from private spaces.

ii) Image characteristics

Of the 51 images for which size measurements were taken, 43 are small while 35 of these are extra-small. Only a small portion of the images (15.7%, n= 8) are larger (medium, 50-72cm) in size. In terms of quality/complexity, of the 66 images for which assessments were made, 63, or almost all of the images are of low quality. Thus, in addition to the spatial constraints of the chambers, the high proportion of small and extra-small, low quality images further suggests that the images placed in this space were not intended for viewing. The small portion (<10%) of larger, high quality images require some explanation. The large high quality image characteristics could be related to a difference in activity or intention. However, the differences might more simply be accounted for in terms of the variation that would be expected with differing skills of the artists. If these images (the larger and higher quality) cluster in specific locations (locations which may also show differences from the surrounding areas in terms of physical or spatial features) then this may suggest a different activity locale (although probably still private). For example, these could be areas or zones

where more time was being spent, or where a different intention (or more important experiences) underlay the image making or special locations that were repeatedly visited by an image maker. Thus, image density and distribution combined with image characteristics might provide more insight into such differences.

iii) Image visibility

Measurements for optimal viewing areas do not at all reflect what was expected for small, private spaces. This is primarily because the viewing angles are quite wide along the long, narrow corridor. In these contexts there is very little restriction on lateral visibility for most images aside from chamber width (after a certain distance—**Fig. 5.17**). Thus, the 48 images for which viewing area measurements were taken, most (n=38) have viewing areas between $2 - 9.6m^2$, a few (n=2) even have larger viewing areas between $10.28 - 11.2m^2$. Very few (n=8) of the images have the expected size range of viewing areas within these types of spaces (between $0.5 - 1.8m^2$).

On the other hand, *all* of the images have the expected optimal viewing position (squatting) and heights above floor (between $0.5 - 2.17cm$). What this suggests is that although optimal viewing area provides the maximum 'boundary' of optimal visibility for the image, it needs to be considered together with height above the floor and optimal viewing position to utilize such measurements for group size estimates. The shape of the viewing area should also be considered. For example, in the case of Combarelles, although viewing areas are relatively large, this is along the length of the corridor as opposed to forming a wide space in front of the image. Thus, if optimal viewing position (squatting), height above the floor (low) are plotted onto the viewing area shape, then it becomes clear that in most cases no more than three individuals can view the image at one time.
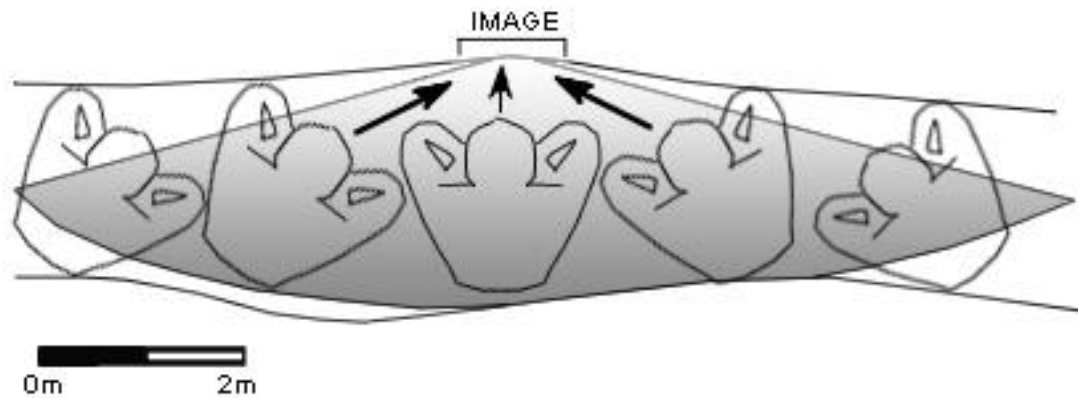
Figure5.17: Illustration showing viewing area shape, optimal viewing position, height above floor and estimated maximum number of individuals in Combarelles.

iv) Distribution of Image Characteristics and Visibility

Image size and quality do not appear to be associated in Combarelles. This is because, of the eight images that are larger in size, only two (which are actually the largest images, measuring 56 and 72cm in length) are of slightly higher quality. These images occur very close to the floor at the base of the chimney, where there is slightly greater room for viewing and hence larger viewing areas. The remaining six larger images (medium sized, 48-54cm) and three small sized high quality images cluster toward the back (or furthest extend in which images occur), which is also where larger viewing areas and the highest density of images occur. Thus, although images occur for over 20 meters in Combarelles, it appears that the area lying within the last 5 meters was used most intensively. In this area there is apparently more space, or at least greater visibility, and apparently, as a result, greater diversity and density of images occur (**Fig. 5.18**). In addition, the one other location in which there is slightly more space (around the chimney), there is also greater density and more variation in image size and quality.
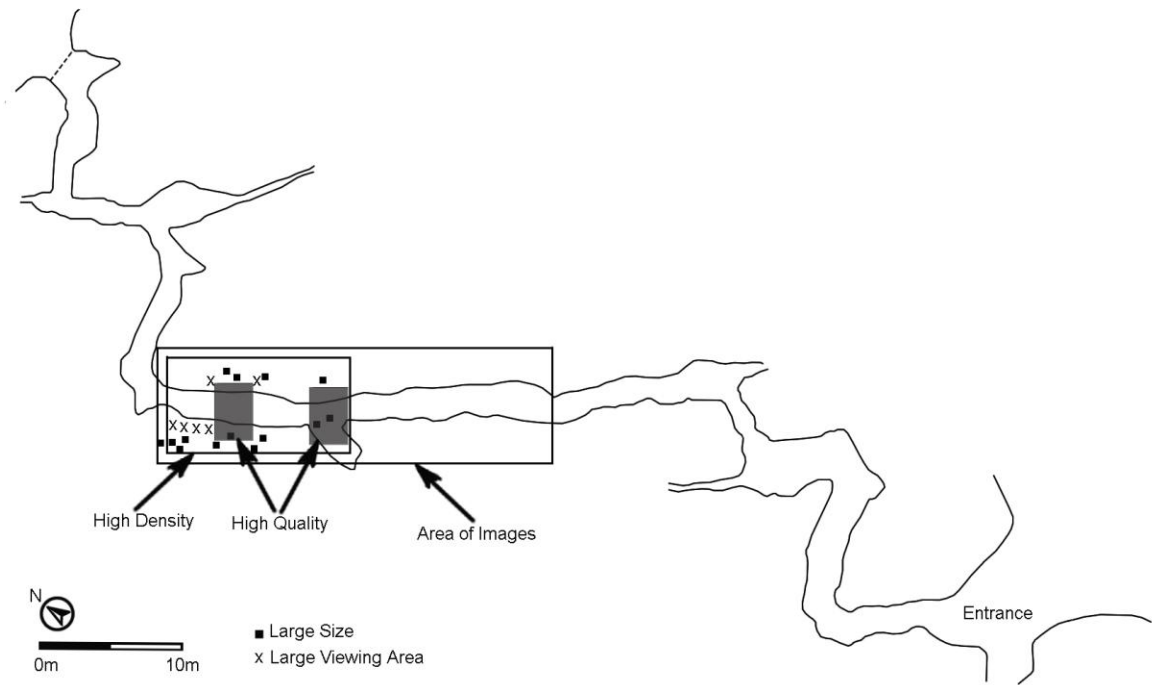
Figure 5.18: Map of Combarelles II showing the full area in which images occur, the location of high density, large and high quality images, and larger viewing areas.

This distribution can be interpreted in a number of ways. Individuals could have simply been placing more images, and spending more time on image making in the areas where there was more room or better visibility. Two or more individuals could have been making images in these locations resulting in greater density and diversity. These locations could have been used more frequently over time resulting in higher density from frequency of use, and greater diversity from variation due to different artists, or a number of other possibilities. Thus, it is interesting to note that at least in Combarelles, there *is* variation in image characteristics which seem to be roughly spatially associated with visibility or space availability, providing some insight into how different portions of the cave may have affected differences in image densities and ranges of characteristics. This distribution pattern would

suggests intentional selection of certain areas for specific activities, instead of the random placement of images on suitable wall surface.

Another issue with Combarelles, however, is the variable preservation of images. It is possible that the greater density and diversity of images exists deeper in the cave due to preservation effects. The cave supposedly at one time also had images on the ceilings and had a higher density along the walls toward the entrance (Archabeau, personal communication, 2004). How many images there were is unclear. It is possible, however, that at least in terms of the 20 meter stretch of images currently recorded, that similar preservation issues would have affected them more or less equally. Therefore the sample of images and present analysis from this portion of the cave should be somewhat reliable, although this is difficult to assess.

v) Summary

In summary, Combarelles provides not only an example of the potential range of variation in small, arguably more private spaces, but also provides an example of the problems that can be encountered with viewing area measurements. The image characteristics in Combarelles are, for the most part, what would be expected for images which were not intended for viewing. The combined visibility characteristics (viewing area, height above the floor, viewing position) are also what would be expected, yet, viewing area measurements on their own are very misleading. The one area in which larger and higher quality images occurs suggests more complexity to the activities or intentions in private areas than expected, if this is not the result of other factors such as a change in cave use over time, variation in artists skills, or other considerations. The results from Combarelles can provide a sort of template which reflects the possible range of variation in arguably small/private

spaces, against which other, larger and more complex caves (in which individual and group activity may have occurred) can be compared. Similar variation should therefore potentially result in small/private spaces in other caves, and larger spaces which may reflect similar activity.

In contrast to Combarelles, a good case can be made for differential use of some restricted areas in the other caves which contain high quality, prepared media images in areas with distinct visibility characteristics. These images and spaces may have been used by people with specialized roles such as shamans or trained artists. Still other R areas exhibit dots and lines which may be other types of individuals or constitute different types of individual images or testaments of visits. Such types of personal images might vary over time or within social groups, or even within ranked ritual groups, featuring dots by some, handprints by others, or expediently made engravings at other times. Some subgroups may correspond to a type of graffiti image making, while others may have been created as part of spirit quests, and still others may have been created as specialized professionals. Perhaps the analysis of subgroups within the open areas of these caves may be able to elucidate the nature of individuals who were using the restricted areas.

5.3.5. OPEN SPACES

i) Tests

In order to test the expectations presented at the beginning of Hypothesis 3 regarding visibility conditions and image characteristics in Open spaces, I used a similar procedure to that followed in Restricted spaces. First, images were sub-grouped into poor visibility conditions and good visibility conditions.

Poor visibility conditions involved very small viewing areas (<2 m2) and low height above the floor (<70 cm), especially when combined with an optimal viewing position of squatting or lying down. Low visibility could also involve only very small viewing areas or only very low heights above the floor (i.e., <50 cm) in which visibility is restricted. Good visibility conditions, on the other hand, involved viewing area measurements greater than 2 m2 and heights above the floor of 70cm or greater, although normally not higher than 250 - 300 cm.

Visibility scatterplots based on height above floor and optimal viewing area were constructed for both low and high visibility contexts and assessments were made concerning the degree of clustering or subgrouping occurring within each visibility context. Based on these assessments, three potential subgroups within each visibility context could be identified. Examination of the individual cases within each subgroup showed a high degree of consistency in terms of one of more of the visibility criteria.

Image characteristics were then examined for each of the subgroups to determine if there were strong associations of specific types of characteristics with particular subgroups, that is, to determine if there were any of the expected associations between *visibility conditions* and *image characteristics*. Finally, subgroups were plotted on the cave plans to determine the extent to which these subgroups clustered within the cave.

ii) Results

a) Visibility Conditions

1. Distributions of Visibility Characteristics <u>within</u> Open Spaces

As discussed in Section 1 of the Results of Hypothesis 3 (Distributions of Visibility

Characteristics *between* Restricted and Open Spaces), bimodal distributions occurred in all

visibility characteristics in Open spaces which suggested two potential subgroups of images.

Approximately 60% of the Open space sample involved good visibility conditions (71-210

cm above the floor, and >2 m2 viewing areas), whereas approximately 30% or less involves

poor visibility conditions (<2 m2 viewing areas and either very low, <70 cm, or very high,

>300 cm, heights above the floor).

According to the expectations, significant differences in image characteristics should

exist between poor visibility and good visibility contexts in Open spaces. For example,

greater proportions of Type 1 images are expected to occur in poor visibility conditions.

Whereas, in good visibility conditions Type 1 and 2 images are expected to occur, however, a

greater proportion of Type 2 images are expected to occur in good visibility situations, or at

least in contexts which were intended for group viewing of the images. The following

sections will first examine poor visibility contexts and good visibility contexts in detail

separately and then compare their overall differences in terms of image proportions.

b) Low (Poor) Visibility Conditions

Poor, or "low" visibility (LV) conditions in Open spaces were identified by: 1) very

small viewing areas (subgroup LV-1), 2) a combination of the expected small optimal

viewing area, low height above the floor, and squatting optimal viewing position (subgroup LV-2), , and 3) restricted visibility in terms of exceptionally high heights above the floor (subgroup LV-3).

The mean optimal viewing area for images in Subgroups LV-1 (n=9) and LV-2 (n=5) is 0.9 m2, whereas the mean height above the floor is 137 cm. The optimal viewing area measurements for images in Subgroup LV-3 (n=3) on the other hand, are 7.2 & 15 m2, and height above floor measurements are 345 and 550 cm.

Association between these visibility characteristics in poor visibility contexts can be seen in **Fig. 5.20** below. Images are coded by their potential visibility subgroup. Distinct differences can be seen in terms of LV-1 images occurring in very small viewing areas yet visible heights above the floor, LV-2 images occurring in arguably more restricted spaces, and LV-3 images occurring in exceptionally high locations.
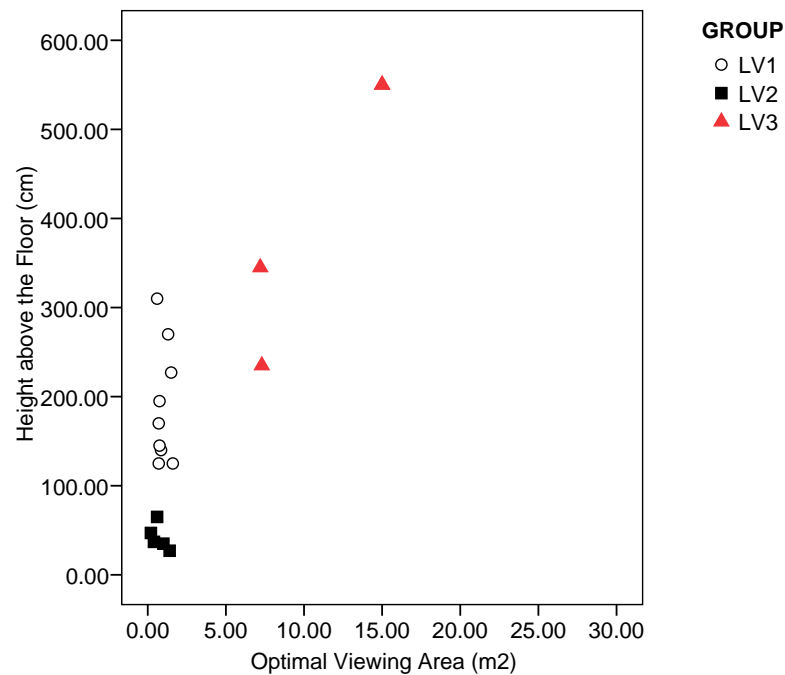
Figure 5.20: Scatterplot examination of associations between optimal viewing area and height above floor of images classified as being in low visibility contexts within Open spaces.

Average visibility measurements for each area within each subgroup are provided in Table 5.14. The overall average viewing area in Subgroups LV-1 and 2 is 0.7m2, although pronounced differences occur in their average heights above the floor of 42 cm for LV2 and 190 cm for LV-1. Average height above the floor for LV- 3 on the other hand, is 482 cm. As a result of their high height above the floor (mean=482 cm), these images also have large viewing areas (mean=12.4 m2).

Images in LV-2 arguably reflect intentional placement of images in more restricted, difficult to access (or view) locations within the more open caverns. The exceptionally high height above the floor measurement for LV-3 constrain visibility (especially due to the small image sizes that characterize this subgroup) and also arguably reflect effort made to place images in difficult to access or view locations. In terms of LV-1, however, although height above the floor does not suggest non-intended viewing, images with exceptionally small viewing areas yet high heights above the floor sometimes indicate very narrow crevasses or poorly visible wall contours (as discussed in the previous section on Restricted spaces). Thus, exceptionally small viewing areas most often suggest intentional placement of images in more restricted or difficult to access locations.

c) High (Good) Visibility Conditions

The remaining images in Open spaces, approximately 60% of the dataset, occur in good or "high" visibility contexts. The majority of images between 70 – 210cm above the floor (the definition of good visibility conditions), however, significant variation occurs in their viewing areas. According to the expectations, differences in visibility conditions may be associated with differences in intended audience or associated activity/social contexts. In

order to examine these expectations in more detail, preliminary subgroups of these images were generated based primarily on differences in their viewing area measurements. These subgroups included: 1) exceptionally large viewing areas of >8 m2 (subgroup V-1); 2) medium sized viewing areas of 3.5-8 m2, which could have accommodated larger groups and posed less restriction on activities associated with viewing (subgroup V-2), and; small viewing areas of <3.5 m2, which would somewhat limit the size of groups or activities (subgroup V-3).

The association between height above the floor and optimal viewing area measurements in good visibility contexts can be seen in **Fig. 5.21**. Images are coded by their potential visibility subgroups. Subgroup V-1 shows a high degree of difference from the other groups in terms of the exceptionally large viewing areas (mean=19 m2). Subgroup V-2 and V-3 on the other hand, form a somewhat tight cluster in smaller, yet still high visibility contexts. Viewing area measurements range from 8-29 m2 (mean=5.2), whereas in Subgroup V-2 measurements tend to have much smaller viewing areas (mean=2.7 m2).
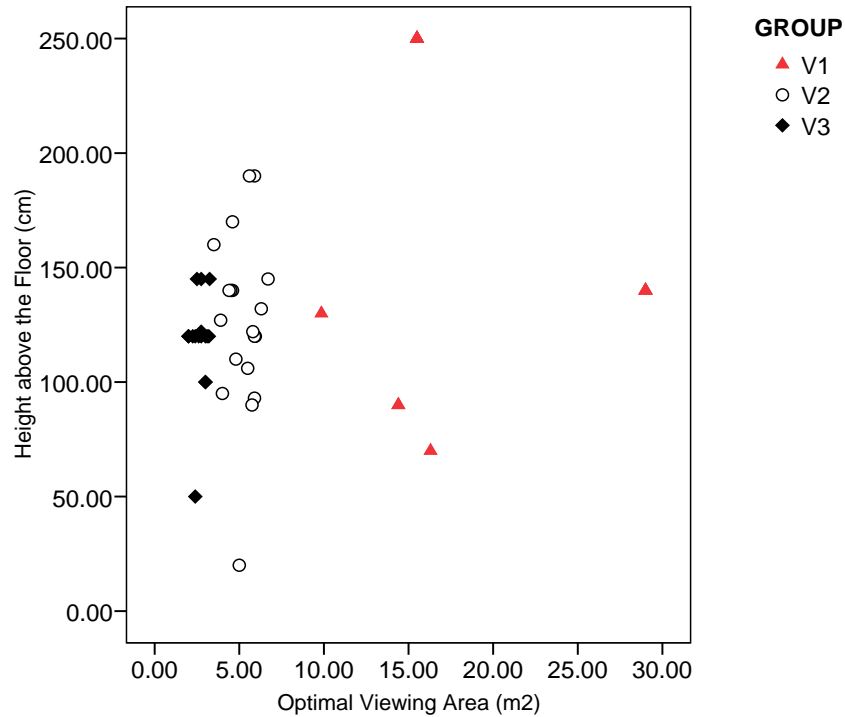
Figure 5.21: Scatterplot showing subgroup visibility characteristics of images in high visibility areas of Open spaces based on height above floor and optimal viewing area.

Subgroups, V-2 and V-3 thus constitute the majority of images in good visibility contexts (or "more accessible" visibility contexts). However, viewing areas in Subgroup V-2 are still relatively small and therefore reflect a subgroup of images that occur in still relatively restricted spaces, although accessibility is not nearly as constrained as images in the Restricted space category. Thus, Subgroups V-1 and V-2 constitutes the most "optimal" visibility conditions in terms of possible group viewing of the images in the context of group activities (depending on group size).

d) Summary

The average height above the floor and optimal viewing area measurements for each subgroup within O spaces are displayed in **Fig. 5.22**. The pattern between viewing

conditions in Low and High visibility contexts is quite different, although some comparisons can be made. Subgroup V-1 clearly stands out as different from other subgroups in terms of its ratio of viewing area to height above floor.
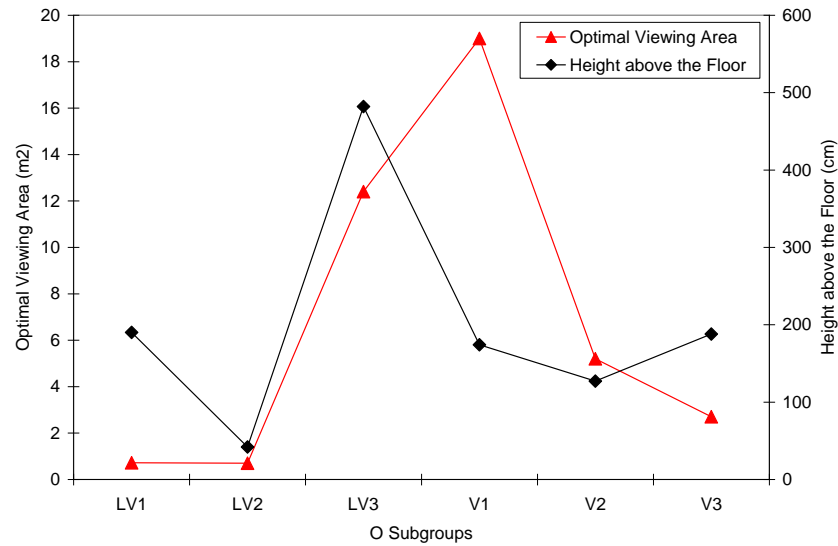
Figure 5.22: Line graph showing average optimal viewing area and height above floor measurements for subgroups within O spaces.

Group	Areas	Optimal Viewing Area (m2)	Height Above the Floor (cm)
LV1	VD (4), VH (1), VG (1), B3 (2), F6 (1)	0.72	190
LV2	VD (3), B3 (1), B1 (1)	0.7	42
LV3	B3 (3), VD (1)	12.4	482
V1	F1 (10), B1 (3), VH (1)	19	174
V2	VH (8), VD (1), VF (2), VG (1), B1 (4), F3 (3)	5.2	127
V3	F6 (13), B1 (2), VF (1)	2.7	188

Table 5.14 Visibility subgroups in Open spaces, according to low (LV) and high (V) visibility conditions, with corresponding cave areas, mean viewing area and mean height above floor.

In summary, the three subgroups within Low or Poor Visibility Contexts all arguably reflect non-intended viewing and possibly more personal or private associated activity/intention/social context. If expectations concerning the relationship between *visibility conditions* and *image characteristics* are correct, then the subgroups that exhibit poor

visibility in more Open spaces should display image characteristics that are associated with Type 1 images.

In summary, Subgroups V-1 and V-2 in particular could have accommodated group viewing in the context of group activity. *If* the expectations are correct concerning the relationship between *visibility conditions* and *image characteristics*, and *if* group viewing of the images in the context of group activity was a component of cave use (i.e., group activity/intended viewing is responsible for a portion of the images), then Type 2 images should occur as a significant component of these contexts and possibly represent a higher proportion of the images.

5.3.6. IMAGE CHARACTERISTICS

i) Overview

According to the overall distribution of visibility characteristics in Open spaces, poor or low visibility contexts represent approximately 26% of the sample (n=17 of 66). If expectations regarding the relationship between *image characteristics* and visibility conditions are correct, then differences in *image characteristics* in Open spaces should be non-randomly associated with differences in *visibility conditions*. In other words, differences in *image characteristics* should occur between high and low visibility contexts in Open spaces, and potentially between the subgroups defined within each of these visibility contexts, with a high proportion of Type 1 images in low visibility contexts and a relatively high proportion of Type 2 images occurring in high visibility contexts.

If significant differences in *image characteristics* are seen between high and low visibility contexts, then this would provide further support for the hypothesis that differences in *visibility conditions* may reflect differences associated with intention or activity/social context. *If* differences in *image characteristics* are not seen between high and low visibility contexts, then this would suggest images are randomly distributed throughout Open spaces.

ii) Results

As is evident in **Fig. 5.23**, almost of the images in low visibility contexts are small (n=16, 94%), most are black (n=15, 88%) and a greater frequency of low quality (n=11, 65%) occurs. Mammals comprise almost half of the images (n=7, 41%), while the rest are either dots/lines, geometric forms or difficult to identify forms (n=10, 59%). As a group, these images display more expedient characteristics. These results, combined with their low *visibility conditions,* provide support for the expectation that this group of images reflects non-

intended viewing, potentially private/personal contexts. Overall these images also show similarities to image types in Restricted spaces, suggesting that these two "domains" potentially reflect relatively similar activities/intentions.

On the other hand, images in high visibility contexts show slightly greater variation. However, a relatively high proportion of these images (28%, n=12) are large, high quality and polychrome, which reflects a slightly greater emphasis on Type 2 images in these contexts than in all other contexts thus far discussed. In addition, a higher frequency of large images occur (53%, n=25) than seen in other contexts. Other characteristics, however, reflect somewhat similar variation as other contexts, with relatively equal proportions of small (47%, n=24) and larger (53%, n=25) sized images, a slightly higher proportion of mammals (69%, n=34), overall high quality (75%, n=32), and black (57%, n=28) images.
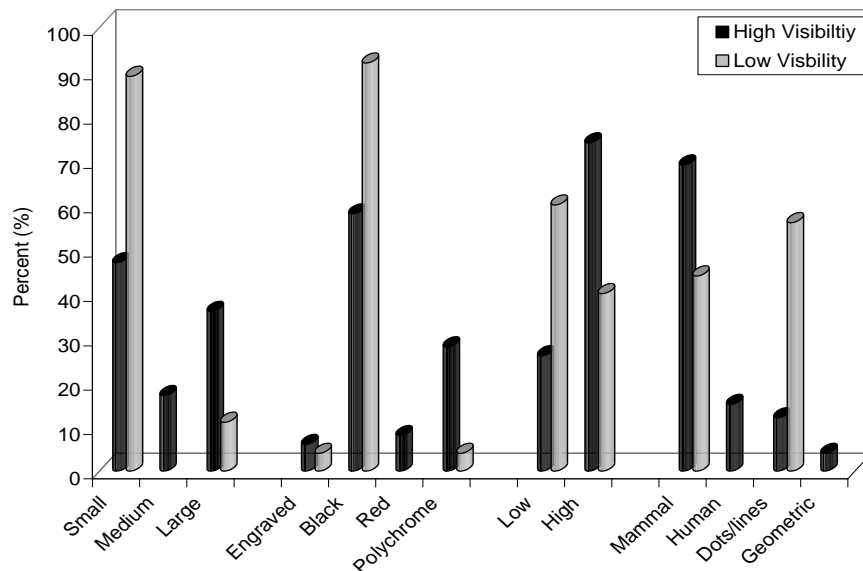
Figure 5.23: Bar graph showing the *image characteristics* of high vs. low visibility images in Open spaces.

Thus, images in both high and low visibility contexts show similar ranges of characteristics for most attributes, however, overall, they show some pronounced differences

from one another in the relative importance of specific attributes. These results provide support for the expectations that low visibility contexts were used primarily for individual image making and viewing, whereas higher visibility contexts were used for both individual and group image viewing.. In addition, within each visibility context enough variation occurs to suggest that further associations between differences in image characteristics and visibility conditions may occur. This will be explored in more detail in the following section.

a) Low versus High visibility contexts

The hypothesis explored in R spaces was that *image characteristics* differences might be non-randomly associated with *subgroups* of *visibility conditions*, which might suggest subcomponents of activities/intentions within R spaces. Furthermore, that these subgroups (of visibility conditions and associated differences in images) would show patterned differences in their spatial distributions within or between caves which may further suggest difference in cave use. These same hypotheses will be applied to the examination of differences in image characteristics between subgroups within high and low visibility contexts.

b) Low visibility contexts

Overall, low visibility contexts show a higher proportion of characteristics associated with Type 1, or more expedient, images. However, variation in some of the image characteristics in the sample suggest that potentially up to 35% of the images may be more closely related to Type 2 images, potentially reflecting a difference in associated intention for image making. The question is whether any of the low visibility *subgroups* reflect significant enough overall differences to suggest support for such an idea. Differences in image

characteristics according to visibility subgroups are summarized in Table 5.15 and **Fig. 5.24** below. Their frequency of occurrence according to cave areas is shown in **Fig. 5.25**.

LV-2 (n=5) images, which occur in the most spatially constricted locations (in very small viewing areas and close to the floor), involve four small, low quality, black painted dots/lines, which can be classified as expedient or Type 1 images. One small, black, high quality mammal (in Area 3 of Bernifal, Image 28.2) also occurs, however, it is located closest to the floor (27 cm) and likely represents non-intended viewing. Overall, aside from one "quality" assessment, the majority of the images in this subgroup generally exhibit the expected characteristics for non-intended viewing contexts. These images occur in Area 3 of Bernifal and Villars[D], and Area 1 of Bernifal.

LV-3 (n=3) images occur at an exceptionally high height above the floor (and thus have exceptionally large viewing areas). They include two small, high quality black mammals, and one small, low quality large black line. Given their exceptionally high height above the floor it can be argued that these represent efforts being made to place images in difficult to access/view locations. In addition, the very small size of the mammals (30cm) and the fact that one of these images is a line suggests that viewing (or 'display') of these images was not actually intended. Thus, again, aside from some "quality" assessments, images in this subgroup show some consistency in terms of the expected characteristics for private/non-intended viewing contexts. This subgroup of images/viewing conditions only occurs in Area 3 of Bernifal and Villars[D].

LV-1 (n=9) images occur at relatively high heights above the floor yet have exceptionally small viewing areas, involve small, low black painted dots/lines (2) a high proportion of mammals (4), as well as one small, low quality polychrome and one high quality medium sized engraved geometric form. Therefore: 1) slightly greater variation

occurs within this subgroup of images; 2) overall proportions of image characteristics suggest slightly greater emphasis on non-intended viewing, however; 3) this subgroup of images may also reflect a combination of intentions. These images (and visibility conditions) occur in Area 3 of Bernifal and Villars[D] as well as Font-de-Gaume[6] and Villars[F,H], therefore showing more random distribution throughout the caves.

Since the sub-sample of LV-1 is slightly larger than the others it may better reflect the degree of variation which occurs in low visibility contexts or would occur if sample sizes in other subgroups were to increase. On the other hand, small sample sizes on their own are also potentially significant since it indicates very distinct differences in image densities (or frequency of occurrence) between low visibility and high visibility contexts, suggesting that low visibility contexts were more of an exception to the use of open spaces. Use of Open spaces for low visibility/Type 1/individual image making in most caves appears to have been of minor, but significant importance (**Fig. 5.25**), with one area of Bernifal and in Villars representing the greates use (although Font-de-Gaume was incompletely sampled in this respect and may well represent an exception).
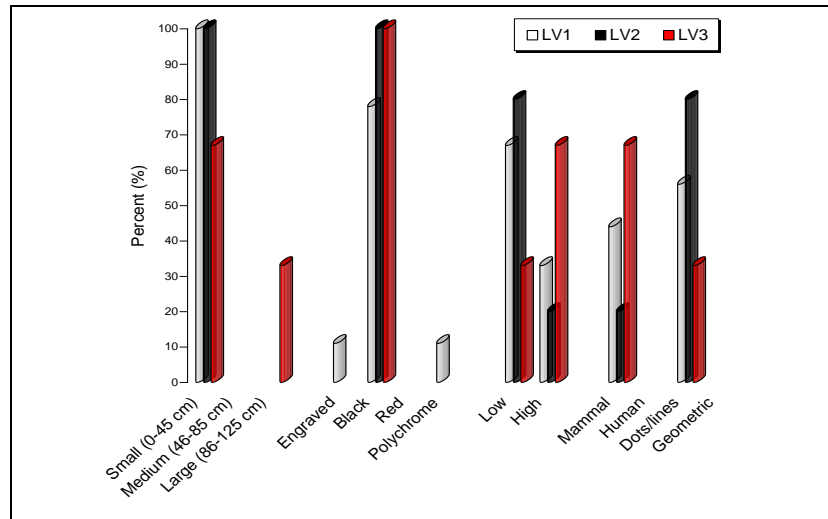
Figure 5.24: Bar graph showing the image characteristics of within the low visibility category of images in Open spaces.
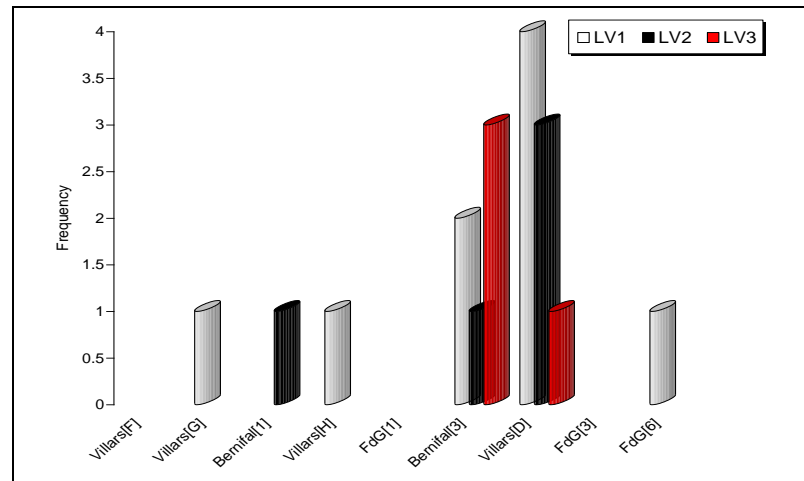
Figure 5.25: A bar graph showing the distribution by cave area of subgroups of low visibility images in Open spaces of caves.

In summary, aside from quality assessments, LV-2 and 3 strongly suggest non-intended viewing and possibly private/personal associated activity. Their spatial clustering in Area 3 of Bernifal and Villars[D] suggest that personal/private activity/social contexts were a component of the use of these areas. If, in the assessment of high visibility contexts, few images occur in these areas of the caves (especially Type 2 images), then this will further support the notion that the subgroups represent distinct areas of activity within the caves. Aside from a few quality assessments (which may be questioned due to the more difficult

nature of measuring this variable), the images show the expected image characteristics for non-intended viewing/private contexts.

Slight differences occur between the subgroups, although not as significant as seen in R spaces (yet sample sizes are exceptionally small). Differences between subgroups are perhaps not significant enough to suggest or indicate differences in activities/intentions, especially given the variation within subgroup V-1. In order to assess subcomponents within this "low visibility in Open spaces" category, and to better examine the question of whether there are meaningful subcomponents that reflect differences in activities/intentions), larger sample sizes are clearly needed. However, if considered collectively (as a group of images in low visibility contexts), they show a much greater proportion of "expedient" type images in comparison to the more bimodal image distributions of high visibility contexts in Open areas. Combined with their spatial clustering in Area 3 (mid-cave chambers), especially, and to a lesser extent in Area 1 (entrance areas) of Bernifal and Villars[D,H], an argument can be made that these low-visibility-in-Open-area images represent a distinct subgroup of images, activity/social context and intention in the use of the caves.

Low Visibility Contexts	LV1		LV2		LV3		
	n=9	%	n=5	%	N=3	%	Total %
SIZE							
Small (0-45 cm)	9	100	5	100	2	67	89
Medium (46-85 cm)	0	0	0	0	0	0	0
Large (86-125 cm)	0	0	0	0	1	33	11
COLOR							
Engraved	1	11	0	0	0	0	4
Black	7	78	5	100	3	100	92
Red	0	0	0	0	0	0	0
Polychrome	1	11	0	0	0	0	4
QUALITY							
Low	6	67	4	80	1	33	60
High	3	33	1	20	2	67	40
SUBJECT							
Mammal	4	44	1	20	2	67	44
Human	0	0	0	0	0	0	0
Dots/lines	4	56	4	80	1	33	56
Geometric	0	0	0	0	0	0	0

Table 5.15 Frequencies and proportions of image characteristics according to subgroups with low visibility images in open spaces.

c) High visibility contexts

Images in high visibility contexts of Open spaces show a significant range in characteristics, from small engraved to large polychrome images in relatively small to large viewing areas and anywhere from 70 cm above the floor (or less in a few cases) to 200 cm (or more in one case). Understanding these images from the perspective of the original expectations of this study poses a challenge.

Overall, images in high visibility contexts constitute 74% (n=49) of the images in Open spaces, and roughly 24% of the entire sample of images (of n=204). Based on the overall distributions of image characteristics in the discussion of Hypothesis 2, approximately 28-53% of this sub-sample of images may involve characteristics that can be associated with expectations for Type 2 images. On the other hand, approximately 67% (n=33) of the images in this sub-sample occur in the most optimal visibility conditions (Subgroups V-1 and V-2). According to the expectations then, the 28-53% of the sample that shows characteristics suggestive of Type 2 images should occur within this 67% population of images in optimal visibility contexts.

Although the samples for each subgroup are very small, some pronounced differences do occur (**Fig. 5.26**). Subgroup V-1 (n=14), is primarily (71%, n=10) composed of high quality black painted mammals, varying from small (42%, n=6) to larger sizes (58%, n=8), although some human forms (n=2), dots/lines (n=2) and one small, low quality red painted image occur also. Approximately a quarter of Subgroup V-2 (n=19) is composed of small, black painted mammals and dots/lines, although some medium sized images, red pigment and other variations (human forms, 1 engraved image) occur (n=4, 21%). Subgroup V-3 (n=16), for example, is primarily (80%, n=13) composed of large, high quality, polychrome painted mammals. Whereas, a small proportion of this subgroup (20%, n=3) is

comprised of small, engraved or black painted, low quality dots/lines and human forms.

Overall, there are some important differences in size, media, and quality characteristics

between subgroups, but image content tend to be similar.
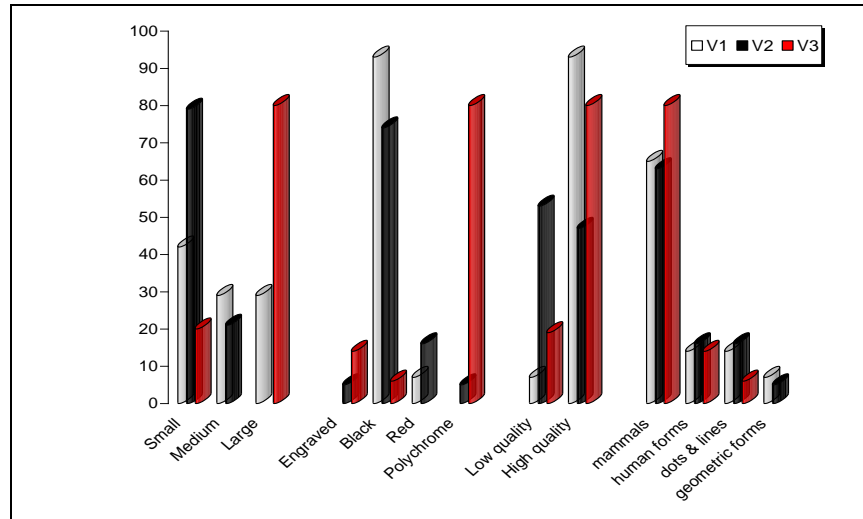
Figure 5.26: Bar chart showing the frequency of image characteristics
of subgroups within the high visibility category of images in Open spaces.

	V1		V2		V3		
	n=14	%	n=19	%	n=16	%	Total %
SIZE							
Small (0-45 cm)	6	42	15	79	3	20	47
Medium (46-85 cm)	4	29	4	21	0	0	17
Large (86-125 cm)	4	29	0	0	13	80	36
COLOR							
Engraved	0	0	1	5	0	14	6
Black	13	93	14	74		6	58
Red	1	7	3	16	7	0	8
Polychrome	0	0	1	5	0	80	28
QUALITY							
Low	1	7	10	53	3	19	26
High	10	93	9	47	13	80	74
SUBJECT							
Mammal	9	65	12	63	13	80	69
Human	2	14	3	16	2	14	15
Dots/lines	2	14	3	16	1	6	12

Table 5.16 Frequencies and proportions of image characteristics according
to subgroups within the high visibility category of images in Open spaces.

In summary, Subgroup V-3, which is primarily composed of large, polychrome mammals of high quality, shows the highest proportion of Type 2 images in the dataset, yet a small amount of variation occurs. This is largely due to the incomplete recording of images from Font-de-Gaume which did not include engravings from the Open areas. However, even with the addition of engraved images, the V-3 subgroup (mainly represented by Font-de-Gaume) would stand out in terms of the large size and polychrome media of its images. Interestingly, however, the visibility conditions associated with these images involved the least optimal visibility context of the subgroups. Although heights above the floor suggest good visibility, the very small average viewing areas associated with this group (mean=2.7 m2) suggest that it was a relatively restricted or somewhat less accessible space which would not have been able to accommodate group activity very well. These results do not really support the original expectations, although they seem to suggest an unexpected special subcomponent of group activity. Alternatively, these results may also highlight some fault with the initial assumptions of the study.

Subgroup V-1, which is composed almost exclusively of black, high quality images (over half of which are medium or large sized) has the most optimal conditions for images to be viewed/consumed in the context of small or large group activity. Subgroup V-2, shows some similarity to Subgroup V-1 in terms of image characteristics, which primarily involve black mammals, although size and quality are more mixed with many more small images of low quality. These images also occur in much more optimal viewing conditions (mean optimal viewing area=5.2 m2) than the any of the other subgroups.
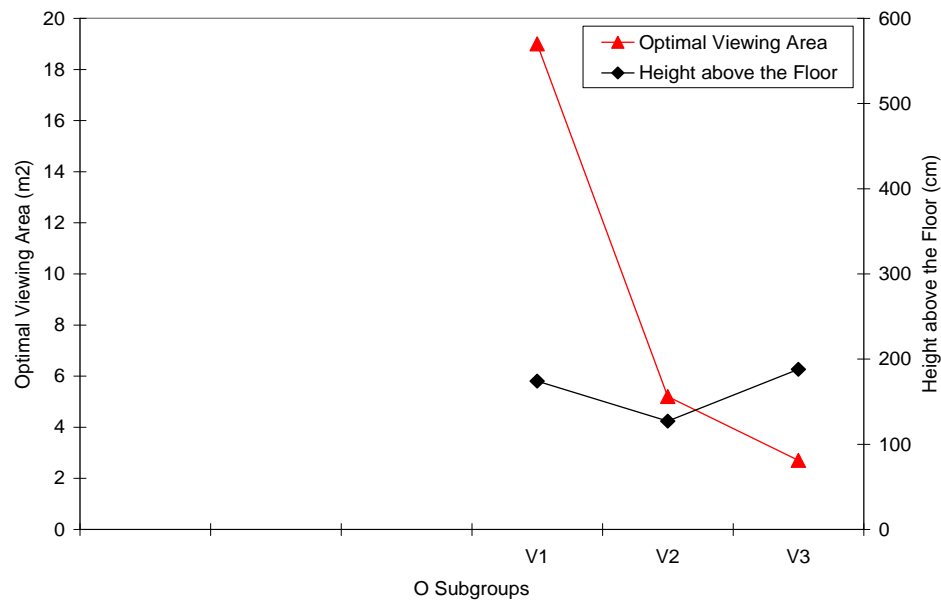
Figure. 5.27: Line graph showing average optimal viewing area and height above floor measurements for subgroups within O spaces.

Although not as convincing as Subgroup V-3, and clearly more variable, Subgroups V-1 and V-2 collectively exhibit characteristics which can be associated with Type 2 images (i.e. proportionally more larger sizes (except V-2), higher quality, red and black media) and which collectively differ from many of the images in more restricted spaces (excluding Subgroup R2.2). However, the significant occurrences of small images and low quality images (especially in the V-2 subgroup) do not differ significantly enough from other, more restricted contexts, to provide a convincing argument for intended viewing in V-2 locations, or in a few V-1 and V-3 locations. Even though it may seem likely that with their placement in these more open contexts, and their relative differences with R spaces, that they ought to reflect intentional viewing or perhaps group activity.

As stated in the earlier hypotheses, these high visibility contexts are expected to involve both private/personal as well as potentially more display type images *if* group viewing/consumption of the images was a component of the activity taking place within

these areas. When substantial variation does not occur within a subgroup of images, it is difficult to determine what portion of the images may be intended for viewing and which portion is not. However, even when substantial differences occur, it is sometimes difficult to be certain that this is due to differences in intended viewing, as Subgroup V-3 attests to. Therefore, at this stage one could potentially simply conclude that if group activity was taking place within the caves, that these viewing contexts (especially V-1 locations) represent such activity because of their good visibility contexts and their collective substantial (V-3) and significant "enough" (V-1) differences in image characteristics. Group size estimates could then be provided and interpretations presented.

As we saw in the analysis of R spaces, image subgroups showed distinct spatial patterning within the caves. Similarly, in low visibility conditions, although sub-sample sizes were exceptionally small and it was thus difficult to determine differences, these contexts tended to cluster in one area type of the caves. Thus, it might be expected that a similar phenomenon could occur with high visibility subgroup in Open spaces. These subgroups are different enough in their image characteristics (especially V-3 from V-2 and V-1, from other contexts) to suggest that they reflect differences in intention/associated activity or social context. Aspects of their surrounding physical context (i.e., chamber size, location within the cave, proximity to other, more restricted or private locations or the entrance, and could assist in evaluating whether or not group activity was potentially a component of their use (and a factor behind image making/intended consumption). If subgroups V:1-3 show differences in their spatial distribution between and within caves (which is likely given their differences in visibility conditions, in part related to their surrounding space), then this may further show important differences in the potential associated activities, and their spatial relationships with one another could provide additional insight in the structure of cave

use/activity. Finally, if on more detailed examination of spatial patterns, different image groups tend to cluster together (i.e., not spread out along the walls of the cave area) then this concentration of images (combined with their higher visibility conditions) may ultimately reflect intentional viewing, group activity or simply frequent use/selection of a particular location for some greater significance yet to be understood/determined.

On the other hand, if these subgroups do not cluster tightly in space within the caves, and images and occur more randomly throughout the open spaces, then the conclusion could be made that these subgroups do not reflect subcomponents of activity, but rather that images were simply placed according to available wall space. Thus, the "ultimate" question is what type of spatial distribution Subgroups V:1-3 display within and between the caves in the sample.

When image Subgroups V:1-3 are plotted according to cave areas, some very pronounced and potentially highly significant differences occur. For example, all but a few of the images in Subgroup V3, the mainly large, high quality, polychrome images, occur in Area 6 of Font-de-Gaume, although a few of the images from this subgroup occur in Area 1 of Bernifal. The one image which occurs in Area F of Villars is potentially an idiosyncratic exception (since it, on its own, it exhibits definite "expedient" characteristics). Therefore in terms of V-3 images, they tend to strongly cluster in Area 6 of Font-de-Gaume, a relatively narrow corridor (hence the small viewing areas). One potential interpretation of this space is that it functioned as a processional type of corridor or a passage from one area of activity to the next in the context of some type of group activity (presumably involving a social context in which impressing audience members was intended, given the more elaborate and display type nature of the images).

On the other hand, almost all of Subgroup V-1 images (which showed a high proportion of Type 2 image characteristics) cluster in Area 1 of Font-de-Gaume. A few of these images also occur in Area 1 of Bernifal and Villars. Such clustering may reflect distinct acitivities/ intentions in these locations (as might be expected of entryways to the "underworld" of the caves). Occurrences of Type 2 images also occur in chambers similarly located within the caves.

Subgroup V-2 also occurs in the entry areas (Area 1) of Bernifal and Villars, although locations of thee images are more dispersed throughout different cave area, consistent with what might expect of more individual types of image making activities.

At this level of analysis and with the low sample numbers in many subgroups or cave areas, these distributions potentially could simply reflect different spatial characteristics of the spaces. However, V-1 and V-3 do show a higher proportion of large, high quality images. Given the V-3 characteristics which are concentrated in Font-de-Gaume and the large portion of V-1 images represented by Font-de-Gaume, it may be safe / reasonable to suspect at this point that the V-1 and V-3 subgroups may reflect some level of intended viewing / group activity. More detailed individual assessments of the images and their immediate contexts may help to further refine this conclusion.

Surprisingly, almost none of the images from any of the subgroups occur in Areas 3 of Bernifal and Villars[D], which is where low visibility contexts of Open spaces tended to cluster. Thus, there appears to be a complementary distribution in cave spaces between the high and low visibility images in areas that are relatively open, but that occupy different regions of the caves. This too, may be related to individual versus group kinds of differences in image making.
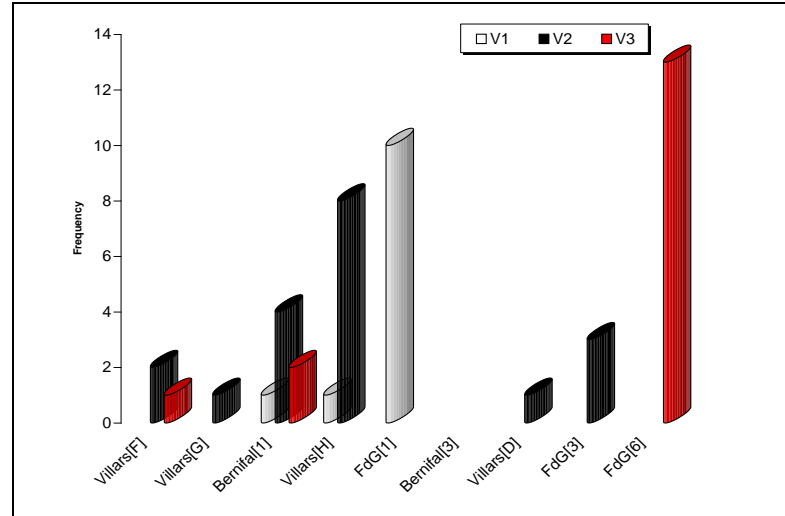
Figure. 5.28. A bar chart showing the relative distribution of high visibility images of Open spaces according to specific areas within three of the study caves (Combarelles did not have any open spaces). Subgroup V-1 and V-3 images cluster in Font-de-Gaume, but also occur in the entry of Bernifal and Villars. V-2 images are much more widespread.

Thus, what can be concluded from this is that Font-de-Gaume shows strong intended group viewing characteristics in terms of at least two of its areas and image subgroups (V-1 and V-3 as well as R2.2). Villars and Bernifal contain possible group / intended viewing areas in their entrance locations, while Area 3 potentially involved a very small component of intended viewing (as seen in **Fig. 5.26**) although here there is a high proportion of low visibility / personal / private images similar to distributions of images in the low visibility category.

Some cave areas such as Villars F and G need further consideration since their image characteristics, when examined individually, reflect more expedient qualities. On the other hand, both Villars and Font-de-Gaume exhibit unusually high quality images in very small restricted spaces (constituting the R2.2 subgroup), which seems to represent a distinctive type of individual image making among the restricted space images. The rest of the images in the restricted spaces of the caves seem to reflect images made by individuals or

very small groups, drawn from a population with random abilities in image making, similar to the expectations derived from the ethnographies concerning general initiations or spirit quests undertaken by large segments of a community.

d) Summary

In sum, this analysis has demonstrated that there are a number of important non-random associations between image characteristics and viewing conditions. One of the strongest conclusions is that a surprising proportion of images in a variety of caves (c. 75% overall) appear to have been created by individuals for personal viewing. Some caves such as Combarelles appear to have been used exclusively for such activities, while other caves may also exhibit use by groups (involving image making) to varying degrees. Caves such as Bernial and Villars exhibit only slight evidence of potential group use and a predominant use by individuals (as defined in this study), whereas a few caves like Font-de-Gaume and probably Lascaux exhibit a more intensive use by groups, but were probably also used by individuals at various times. Group activities may have included individual image making as a component of the group use, but identification of such instances requires further analysis. Individual images can be divided into subgroups, as noted above with the R2.2 more specialized cases with distinctive spatial, image, and locational characteristics that may reflect specialized types of individuals making images.

Similarly, there appear to be subcategories of images in Open spaces reflecting some areas more heavily used by individual image makers, whereas others are more consistent with group gatherings, and perhaps processions.

CHAPTER 6 ~ SUMMARY and CONCLUDING DISCUSSION

6.1. INTRODUCTION

Analysis of the association between *visibility conditions* and *image characteristics* was undertaken at various scales. The first scale of analysis involved examining overall trends and associations in the distribution of variables from the entire sample in an attempt to identify subgroups which might reflect differences in activity or social contexts. Although a number of insights were gained at this scale, it was difficult to determine potential subgroups due to the weak associations between most variables. The scale of analysis, however, often affects and determines the patterns archaeologists detect (i.e., Crumley 1979; Marquardt 1985). As principles of chaos theory suggest, "some scales phenomena are patternless and disorganized, when at other scales they display strong patterning" (Ames 1991:935). Since it was difficult to detect many patterns at the first scale, analysis then focused on dealing with Restricted spaces and Open spaces separately. At this level a number of strong associations between *visibility conditions* and *image characteristics* emerged.

When examined in terms of distribution maps, the subgroups derived from the associations displayed similarity in their spatial patterning within caves, suggesting that these subgroups may reflect differences in activity or social context. In addition, some unexpected results occurred. These include:

1) In the case of Restricted spaces (in which there was a larger sample size to explore from 15 cave areas), three subgroups of visibility conditions resulted which showed distinct differences in images characteristics yet they roughly clustered in terms of their spatial location within the caves.

2) The fact that the majority of the sample from Low Visibility Contexts in Open spaces occurs in Area 3 of Bernifal and Villars (both areas are comparable in terms of their

spatial location within the caves, relationship to other subcomponents of the caves, and the general physical dimensions of their large chambers).

3) The fact that within High Visibility Contexts in Open spaces three subgroups of visibility conditions emerged which showed very different image characteristics.

3a) one of these subgroups encompassed Area 1 (the entry chamber) in both Bernifal and Villars;

3b) the two subgroups which reflected characteristics most associated with Type 2 (display) images occurred in Font-de-Gaume (which actually relates to a later period of cave use which will be discussed below), and;

3c) one of these subgroups, which involves over 95% of the polychrome images in the dataset, actually involves relatively narrow spaces.

Some of the conclusions drawn from these results include:

1) That there are subcomponents of the cave images and internal divisions within the caves that likely reflect differences in intentions/activity/social contexts.

2) That there are likely subcomponents wihtin the individual/private domain of cave use.

3) That group activity (at least as it is conceptualized in the expectations) potentially involves a relatively minor overall component of the caves.

4) That only one cave (Font-de-Gaume) shows characteristics associated with 'display' expectations (and even here there were anomalies of high investment polychrome figured in locations difficult for larger groups to view).

5) That there is potentially a strong similarity in terms of the organization of activity within a number of caves, especially between Bernifal and Villars, although these are also comparable to aspects of Font-de-Gaume.

6) That there is potentially a strong similarity between the activity/use of Combarelles
and Area 2 of Bernifal and possibly Villars (also a subcomponent of activities which
may occur in other caves such, i.e. Lascaux).

From these conclusions some more general interpretations can be made, which include:

1) That some caves involve both private or personal domains of activity as well as more
open activity (which may involve groups of individuals).

2) That these caves were probably not used for 'large group' activity.

3) That few caves involved a significant elaboration of images.

4) That there are similar facets and organizational components (or a "structure") to the
activities occurring within the caves which can be seen in the distribution of
"groups" of images and use of different physical zones.

The following sections provide a detailed summary discussion of these various results, first
according to the determined subgroups followed by overall summaries for the individual
caves.

6.2. SUMMARY OF RESULTS BY SUBGROUP

6.2.1.) Subgroups within Restricted spaces

i) Subgroup R-2.2.

The high proportion of dots and lines in Subgroup R-2.2 suggests potentially greater
emphasis on more private/personal use. This subgroup involved mean heights above the
floor and optimal viewing areas of 148 cm and 1.4 m^2 (respetively) indicating very narrow
areas yet images that were made while standing (although arguably not intended for viewing
or display).

When examined in terms of distribution maps, these areas tend to cluster as narrow diverticules toward the backs of caves (Bernifal, Villars and Font-de-Gaume). These spaces arguably represent some of the most private or personal spaces of the caves in which there was only enough space for one (or possible two) individuals to enter at a time. Although these areas may reflect sub-components of group activity, they arguably do not reflect group activity on their own or areas which involved intentional viewing.

ii) Subgroup R-2.1.

The high proportion of mammals (70%, n=12) in Subgroup R-2.1, the greater occurrence of red pigment (than other subgroups), as well as a greater proportion of high quality images suggests potentially greater emphasis on intended viewing. Minimally, image characteristics strongly contrast with Subgroup R-2.2 and potentially reflect a difference in intention or associated social context.

This subgroup involved average heights above the floor and optimal viewing areas of 156 cm and 1.9 m^2, respectively indicating small yet potentially more accessible places where images were placed relatively high. When examined according to distribution maps these subgroups only occur in one area of Villars and Font-de-Gaume, in small, somewhat round chambers.

Aspects of their images are remarkably similar. In this area of Font-de-Gaume, for example, the dominant subject matter is bison, which are painted on a slightly rounded ceiling providing an effect that they are "floating" (as a number of researchers and visitors to the caves comment). These bison fall within the medium size-range, and are all outlined in black, except one which is filled in (in black). In this area of Villars, the dominant subject matter is horses, which are also painted on the somewhat rounded ceiling providing a similar

"floating" effect. Also similar, these horses fall within the medium size-range and are all outlined, except one which is filled in (in black).

Although both of these areas are slightly more accessible than the areas involved in subgroup R-2.2, for example, they can only accommodate individuals or *very* small groups. However, the images suggest slightly greater investment, effort, planning and perhaps intention in terms of viewing, or use in a different social context. These areas potentially reflect intentional viewing by individuals or small groups in the context of more private/personal type social contexts.

iii) Subgroup R-1.1.

Subgroup R-1.1 involves the most restricted spaces, with average optimal viewing areas and heights above the floor of 0.3 m2 and 65 cm respetively. In terms of the images, a higher degree of variation is seen in this subgroup than in other subgroups of restricted spaces. Although some high quality images, larger sizes, red pigment and mixed subject matter occurs, over three quarters of the images are small in size (78%, n=28), of low quality (94%, n=34), and either engraved or painted black (97%, n=35). These characteristics, combined with low visibility conditions, potentially suggest an overall greater emphasis on non-intended viewing. However, the sample from this subgroup is twice the size as other subgroups (n=36) and may better reflect the degree of variation which normally occurs in these restricted areas.

When examined according to distribution maps, this subgroup tends to cluster in mid-section areas of Bernifal and Villars, and originally also encompassed all of Combarelles. Strong similarities can be seen between these cave zones. Combarelles, for example, is characterized by an exceptionally high density of engraved images of varied composition. The area encompassed by Subgroup R-1.1 in Bernifal involves similar image characteristics.

In fact, the vast majority of the engraved images in the Bernifal sample occur in this location. This area of Bernifal is quite unique in terms of its image characteristics and tightly clustered small density of engraved images and visibility conditions (involving downward angling walls and narrow diverticules). Similarities between characteristics of Combarelles and this area of Bernifal (which clustered in terms of their visibility conditions and which show strong similarities in image characteristics) may ultimately reflect a somewhat similar intention/social context. Area F of Villars, in which a large engraved panel-like image occurs in a passage-type area, may also reflect similar considerations. Its relative location within the cave (between Area 1 and 3) is similar to Bernifal, and potentially relates to a similar layout of activity sub-components within the cave, although this "passage" area does not appear as intensively used. A similar type of area (a narrow passage area with a high density of engraved images) occurs in Lascaux, which will be discussed in the section below on differences within and between caves.

6.2.2.) Low visibility contexts in Open spaces

Low visibility contexts in open spaces included either images that: 1) occurred very close to the floor (mean=42 cm), 2) exceptionally high above the floor (mean=482 cm), or 3) images at varied heights above the floor with very small viewing areas (mean=0.7 m2). All of these contexts have very limited visibility. These contexts involve a higher proportion of small (89%) and black (92%) images, and a high proportion of low quality (60%) and dots/lines (56%). Although some variation occurs, there appears to be greater emphasis on images apparently not intended for viewing (Type 1). When examined in terms of distribution maps, these subgroups clustered in Area 3 of Bernifal and Villars, which involves large chambers adjacent to more restricted areas. Images are more dispersed (than

in Area 1 of Bernifal and Villars as will be discussed below), although most of them occur along one wall (the left when walking from more open to more restricted areas).

In Bernifal, this chamber occurs toward the back of the cave, following the area of dense engravings (which was discussed previously in Subgroup R-1.1), and before the back restricted areas where primarily black dots and engravings occur. In Villars, a similar distribution occurs although less obvious due to the slight differences in visibility conditions. In this case, Area 3 follows the only location in the cave where engravings occur (which was discussed in Subgroup R-1.1), and before the more restricted areas of the cave in which primarily black dots occur. It is argued here that these, and other similarities between the caves (and in Lascaux, for example, where a similar area occurs after the area of dense engravings and before the back restricted portions of the cave), may potentially reflect similar structural components to the activities occurring within, which will be discussed in more detail below.

6.2.3.) High visibility contexts in Open spaces

i) Subgroup V-1

This subgroup of images occur on visible wall surfaces (mean=174 cm above the floor) in large chambers, resulting, in part, in large viewing areas (mean=19 m2). Image characteristics primarily include small and large, black, high quality (over 90%) mammals (65%) and other images (human forms, dots/lines). According to the expectations, this subgroup could, collectively, be classified as Type 2 images (i.e. display or intended viewing images). When examined in terms of distribution maps, these images clustered in Area 1 of Font-de-Gaume, a large chamber in the center of the cave, a space which could have easily accommodated small or potentially large group activity.

ii) Subgroup V-2

This subgroup of images occur on visible wall surfaces (mean=127 cm above the floor), with somewhat large viewing areas (mean=5.2 m2) yet not as large as the previous group indicating slightly smaller chambers. These images are primarily small, black mammals and other (75-80%) of relatively equal proportions of low and high quality. The majority of this subgroup cluster in Area 1 (the entry chamber) of Villars and Bernifal (although a few occur in Area 3 of Font-de-Gaume, and other locations in Villars[D,G,F]). Area 1 involves large chambers (similar to Area 3) which could have easily accommodated group activity. Images tend to concentrate in a particular location as opposed to the more dispersed placement of images in Area 3 (as discussed above). Similarities may occur between Bernifal and Villars in this respect, especially given similarity in their distributions overall, however, this will be discussed below as part of the cave summaries since more detailed consideration of Villars entrance is needed.

iii) Subgroup V-3

On average, these images occur slightly higher above the floor than the previous subgroup of images (mean=188 cm) yet have smaller viewing areas (mean=2.7 m2), indicating fairly narrow spaces. Image characteristics primarily include large, polychrome, high quality mammals (80%), although a small amount of variation also occurrs (c.20% small size, engraved, low quality, human forms or dots/lines). The majority of these images present the strongest case for Type 2 images (i.e. display type images). When examined according to distribution maps, this subgroup of images primarily occurs in narrow corridors of Font-de-Gaume. If viewing of these images was intended, associated with group activity, this would have likely involved a passage or movement from one area to the next. Whereas,

in the previous subgroups, V-1 and especially V-2, where images are more clustered in a particular area, the associated activity was likely concentrated in one location.

6.2.4.) Summary Discussion

In summary, the above subgroups, which: 1) were determined by differences in *visibility conditions*; 2) showed strong association with different *image characteristics*, and; 3) related to similar or comparable areas of the caves, potentially reflect subcomponents of activity or cave use. These results take into consideration the: 1) size of the physical space, wall topography and visibility conditions to understand possible group sizes; 2) clustering or distribution of images to understand where activities may have concentrated and what type of movement may have been involved, and 3) image characteristics within this context, to further attempt to interpret intentionality in terms of audience(s). Given these characteristics, some general interpretations concerning activities associated with subcomponents of the caves can be proposed. These include:

1) *Focused activity in large, open spaces* (i.e., Areas 1 of Bernifal, Villars and Font-de-Gaume). This may have involved group activities or 'dynamic' activities, concentrated in one area (given the clustering of images, the space available and the standing positions that would have been involved in most of the image making).

2) *Organized movements through long corridors* by individuals or small groups seem attested to at Font-de-Gaume in Area 6 where rows of mammals line the walls. Similar movements guided by images along wall surfaces in larger chambers/spaces may be represented in Areas 3 of Bernifal and Villars, where images are more randomly dispersed primarily along one wall.

3) *Individual image experiences*, or perhaps involving two to three individuals, spending time in narrow passages (as in Areas 2 of Villars and Bernifal or in Combarelles where engravings

cluster) for a particular purpose which may have greatly differed from the individual image-related experiences in some small chambers (e.g. Areas 5 of Villars and Font-de-Gaume where mammals are "floating" on the ceilings).

4) *Individuals making shorter visits* to the deeper restricted areas (e.g. Areas 4 in Bernifal, Villars, and Font-de-Gaume where a lower density of more randomly dispersed and often simple subject matter occurs). This includes marking visits in other random, yet difficult to access locations (i.e. Areas 1.2 and 2.1 of Bernifal and Villars).

These areas, and subcomponents of cave use may not actually reflect differences in activity or the function of different cave areas. They may result from a number of other causes of variation (e.g., temporal, cultural, individual or variations in preferences or styles). Thus, some of the distinctions made may potentially not relate to any real differences in cave function, and some may even reflect variations of a very similar activity by an individual (i.e. R-2.1). Nonetheless, major non-random distinctions do occur, and the interpretation explored here is that they potentially result from differences in associated activities or social contexts. Basic physical, spatial and visibility conditions would have limited or permitted different forms of activity and group sizes. Presumably different meanings were also associated with these different physical zones (e.g., open chambers near the entrance or small dark spaces in the backs of the caves) which would have influenced the activity that would be associated and possibly also the image making within. From this perspective, when the cave maps are compared patterns emerge, which may suggest similarities in terms of organizational components of the activities occurring within the caves. The comparable distribution of cave "sub-components" is discussed below.

6.3. DISTRIBUTION OF SUBGROUPS WITHIN AND BETWEEN CAVES

The following paragraphs will first describe the layout of the caves in terms of the subgroups defined, and will then discuss potential similarities between caves. Combarelles is excluded since it was discussed in Section 5.3.5 as part of Restricted spaces.

6.3.1. Bernifal

The distribution of subgroups (as defined through associations between visibility contexts and image characteristics) in Bernifal (see **Fig. 6.1**) involves the following:

Area 1: A large chamber near the entrance of the cave where images are somewhat clustered. The images from this area are grouped as V-2, "high visibility contexts in open spaces" with images of potentially mixed intention.

Area 2: A narrow passage toward the central part of the cave where a high density cluster of engraved images occur, grouped as R-1.1 (somewhat comparable to Combarelles). On either side are very small zones of more randomly placed images in exceptionally low visibility conditions which are grouped as R-2.2 (comparable to Area 4, and possibly suggesting *more* private/personal activitiy).

Area 3: A large chamber (comparable to Area 1) in which images are more dispersed (primarily along one wall), the majority of which are grouped as V-2 (low visibility conditions in open spaces).

Area 4: Small diverticules at the back of the cave (grouped as R-2.2) which are arguably private and possibly "personal" contexts. *Area 3* and *4* potentially reflect similar intentions since the images are placed in difficult-to-access locations. In Area 3, however, they occur mainly against one wall. Generally speaking they appear to reflect two different yet comparable activities.

Figure 6.1: Plan map of Bernifal providing a generalized overview of the location of image/visibility subgroups and cave areas (modified from Aujoulat 1975).

6.3.2. Villars

There is uncertainty regarding the precise location of the original entrance to Villars, with the suggestion that it could be at either end of the study area (at the end of Area A or H). Based on the similarity in the distribution of visibility/image subgroups defined in this study, to that seen in Bernifal, my suggestion is that the entrance is adjacent to Area H as opposed to Area A (see **Fig. 6.2**). When the cave is viewed from this perspective, the distribution of its potential subcomponents can be summarized as follows:

Area 1: A large chamber near the entrance of the cave where images are somewhat clustered. The images from this area are grouped as V-2, "high visibility contexts in open spaces" with images of potentially mixed intention, with very little strong suggestion of display type intention.

Area 2: A narrow passage toward the central part of the cave where engraved images occur. On either side are very small zones of more randomly places images in exceptionally low visibility conditions which are grouped as R-2.2 (comparable to Area 4, and possibly suggesting *more* private/personal activitiy).

Area 5: A small, somewhat round chamber in the central part of the cave where a cluster of mammals and other subject types occur, which collectively show characteristics which may suggest intended viewing (grouped as R-2.1).

Area 3: A large chamber (comparable to Area 1) in which images are more dispersed (primarily along one wall), the majority of which are grouped as V-2 (low visibility conditions in open spaces).

Area 4: More narrow diverticules at the back of the cave which are arguably private and possibly "personal" contexts (grouped as then R-2.2).

If Villars is examined from this perspective, then, aside from Area 5, it shows a similar distribution pattern as seen in Bernifal, and potentially other caves (i.e. Lascaux) which will be discussed below.
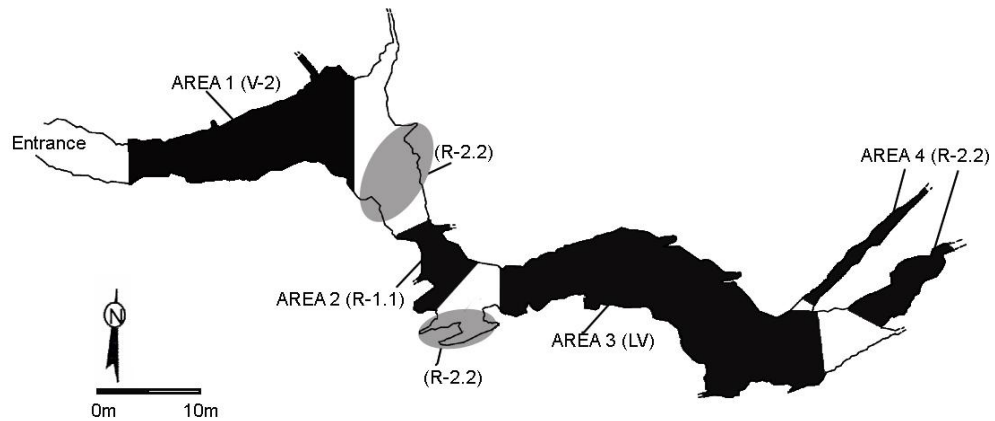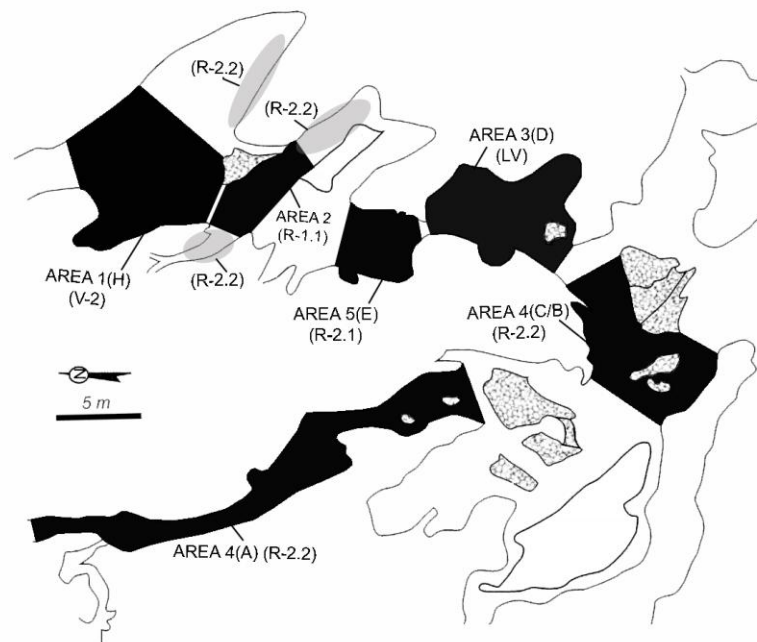

Figure 6.2: Plan map of Villars providing a generalized overview of the location of image/visibility subgroups and cave areas (modified from Delluc and Delluc 1977).

6.3.3. Font-de-Gaume

The layout of Font-de-Gaume is slightly different (see **Fig. 6.3**), however when the cave is viewed in terms of the subcomponents defined here, some similarities emerge. The distribution of visibility/image subcomponents in Font-de-Gaume involves the following:

Area 1: A large chamber in the center of the cave where images cluster. The images from this area are grouped as V-2, "high visibility contexts in open spaces" with images of potentially mixed intention.

Area 6: Relatively narrow passageways with high visibility of images, a high proportion of which are classified as Type 2 (display) images in this study (even though more variation would occur if the sample were increased, these are still the dominant image form in this area) and which line the sides of the walls.

Area 5: A small, somewhat round chamber in the central part of the cave where a cluster of mammals occur, which collectively show characteristics which may suggest intended viewing except for unusually small viewing areas (grouped as R-2.1)

Area 3: A large chamber (comparable to Area 1) in which images are more dispersed, some of which are grouped as V-2 (low visibility conditions in open spaces).

Area 4: More narrow diverticules at the back of the cave which are arguably private and possibly "personal" contexts (grouped as R-2.2).

In summary, Area 1, 3 and 4 are comparable to Bernifal and Villars, and Area 5 is comparable to Villars (as discussed earlier). The additional subcomponent, Area 6, perhaps reflects greater investment in the activity occurring within (which will be discussed below). Area 1 on the other hand, may reflect something much different than this area in Bernifal and Villars.

Figure 6.3: Plan map of Font-de-Gaume providing a generalized overview of the location of image/visibility subgroups and cave areas (modified from Roussot 1985).

6.3.4. Comparison with Other Caves

When these area distinctions and their image characteristics are compared to other caves, some interesting similarities can be noted. Lascaux is used as example since the dissertation produced by Aujoulat on Lascaux (see Aujoulat 2004 for the condensed published version) provides considerable detail on the types of data considered in this thesis (cross sections, image location on the wall, detailed plan maps, image size, height above the floor, image characteristics). Some data based on his dissertation was examined to obtain a general idea of how various components of the cave may compare with the four caves analyzed in this thesis. Future analyses could integrate this voluminous data more systematically (there are almost 2,000 images).

In Lascaux (see **Fig. 6.4**) there is a large entry chamber (i.e. Area 1) in which images cluster, occur in good visibility conditions and are some of the largest and most "elaborate"

images. A more narrow passage-like area follows to the south (Area 2) in which an exceptionally high density of engraved images cluster, and in which visibility conditions are somewhat limited due to chamber size. Around this area are small, more "private" types of locations such as the well. Following this area is a large chamber (Area 3), similar in some aspects to the entry chamber, although a lower density of images occurs here. Visibility conditions are unknown in this location, however, if this cave reflects a similar pattern or structure of use as discussed for the previous caves then visibility conditions in this location should vary (depending on wall morphology) and images should be slightly more dispersed than in the entrance chamber. Finally, small, narrow diverticules occur at the back of the cave (Area 4) in which only one or two individuals could fit at a time, and in which images occur more randomly. Although there is greater complexity (i.e. a greater degree of structuring) and more components to the entrance area of Lascaux, the general organization or structure of the cave (according to the relative differences in images, visibility and use of spaces) is similar to that seen in Bernifal and Villars.
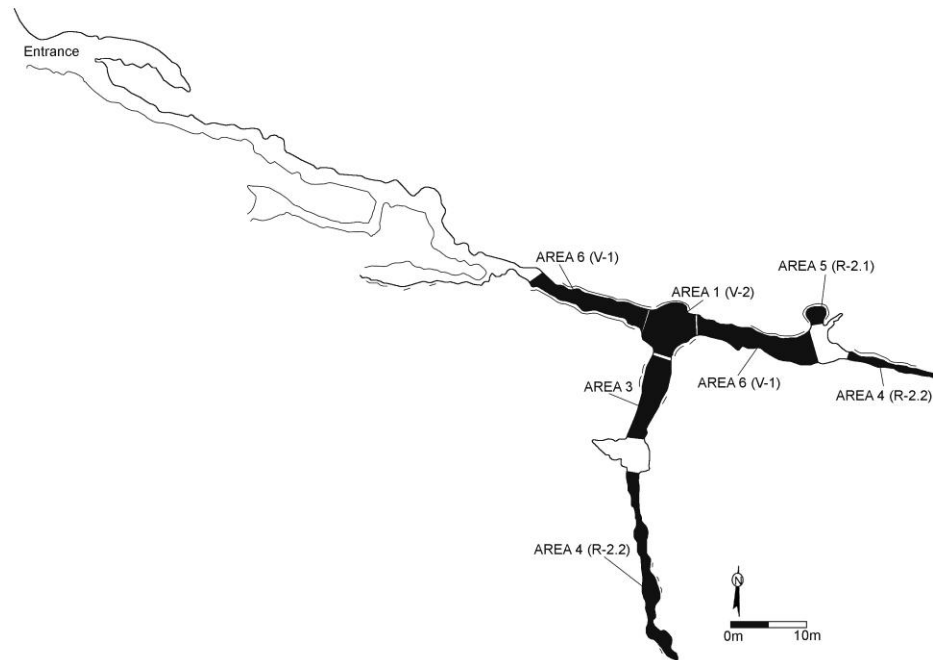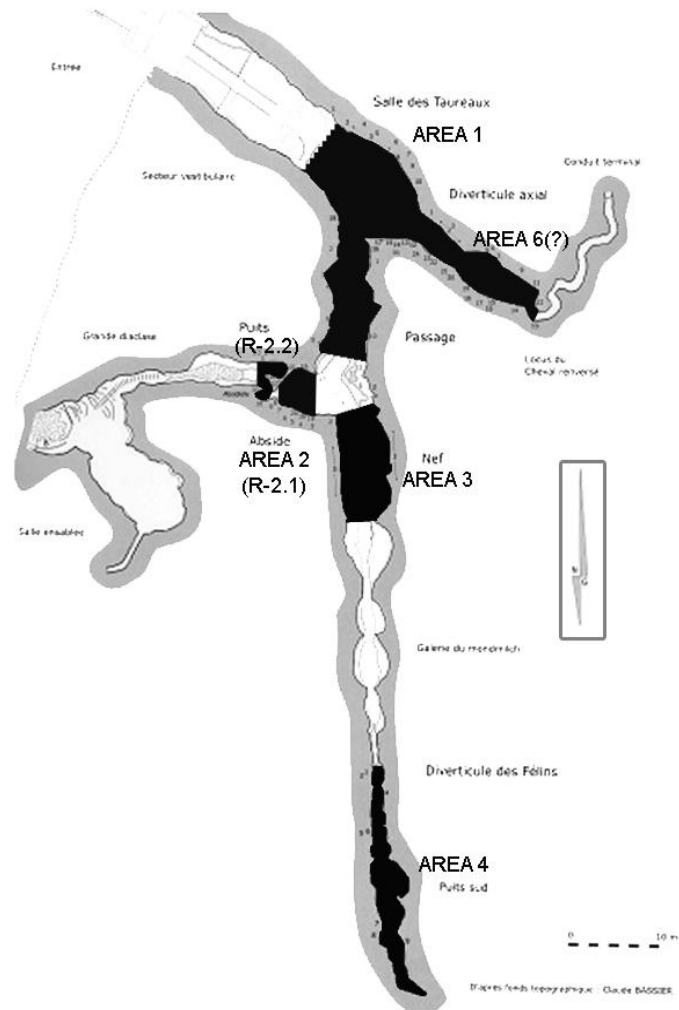
Figure 6.4: Plan map of Lascaux providing a generalized overview of the location of image/visibility subgroups and cave areas (modified from Leroi-Gourhan 1985).

From this perspective, similarities may also be seen with Altamira for example. The only location of the cave that is elaborately decorated is a large chamber adjacent to the entrance (a high or good visibility context), in which many large polychrome bison occur on the ceiling (Area 1). Following this area, however, images are somewhat more randomly distributed in low visibility contexts throughout a large chamber, perhaps similar to Area 3 in Lascaux discussed above. Images also occur in a very small and narrow area at the back of the cave, in which only one or two individuals could fit at a time (Areas 4 discussed for the other caves). Thus, similar "sub-components" of cave use may have also characterized cave

uses. In this case, a clear passage-like area of dense engravings between Area 1 and possible "Area 3" does not occur in Altamira. However, aside from concentrations of engravings which occur as part of the images in Area 1 and in the very far reaches of the cave at the back of Area 4, the only other "concentration" of engravings does actually occur after Area 1 and before what has been defined as Area 3. These engravings in Altamira consist of a cluster of marks that are called "macaroni" and other forms. Although the space, density and type of images in this location may be quite a bit different from those in Bernifal or Lascaux for example, this potentially represents a similar phenomena, such as in Villars. Since Altamira is from a very different region in the western Pyrenees, significant geographic distances could presumably also influence traditions of cave use, structure of ritual activity, and image characteristics (i.e., in terms of meaning and style).

Overall, these suggested similarities in the organizational structure of the caves may reflect similar subcomponents of activities related to similarities in the overall use of at least some caves. Group activities (or more "open" types of activities) possibly occurred in the entrance area (Area 1) of these caves, which could have included standing positions or various movements. Small group or more private activities probably occurred in the following passages, which may have included two different contexts of activity (the location of engraved images in Areas 2, and "rotundas" of Areas 5). The Passage through longer or larger corridors to the back of the cave may have been undertaken by one or two individuals at a time (i.e. the dispersed images in the low visibility contexts of Area 3), while the marking of visits in the back of the caves arguably only involved single individuals creating images in a dispersed fashion in the difficult to access contexts of Areas 4.

Of the different areas defined, only two locations, Areas 1 and 3, could have accommodated large groups. However, visibility conditions in Area 3 are relatively poor

(with some exceptions, e.g., Lascaux and Font-de-Gaume) and images are relatively dispersed. In Area 1, visibility conditions are good and images are clustered which suggests a focal point for activity. From an "activity area" perspective (e.g., Lewis-Williams 2002) Areas 1 may reflect group activity, which possibly involved small (e.g., Bernifal and Villars) or large groups (e.g., in the case of Lascaux). In Areas 3, on the other hand, the more dispersed and random placement of images along the walls (especially along one side of the wall in some caves) and their relatively low visibility, seems to reflect a more personalized passage to the far reaches of the cave.

This reconstruction of the possible organization of activities in the caves reflects a similar pattern to that discussed by Lewis-Willams (2002) for Le Gabillou and Lascaux caves. In Le Gabillou, Lewis-Williams makes a distinction between the entrance chamber and the tunnel leading to the deeper parts of the cave. He suggests that the entrance chamber was a place of "communal" or "preparatory" rituals, in which there is enough space for a few individuals and in which carefully painted images with some simpler engravings occur (1997:335-336). He further argues that the images which are only fragmentarily preserved with remains of "simpler" engravings show that the area was not exclusively reserved for one kind of activity (2002:232). In terms of the tunnel, in which space was more restricted, Lewis-Williams suggests the area was used for "individual vision questers." In this location the images are not crowded or overlapped and they appear to have been "swiftly executed" (2002:233-235). Aside from some patches of ochre that may be paint remains, there are no elaborate painted images, and all of the engravings are "simpler…implying less time was spent" creating them, perhaps with only a "few sure strokes" (1997:335-336).
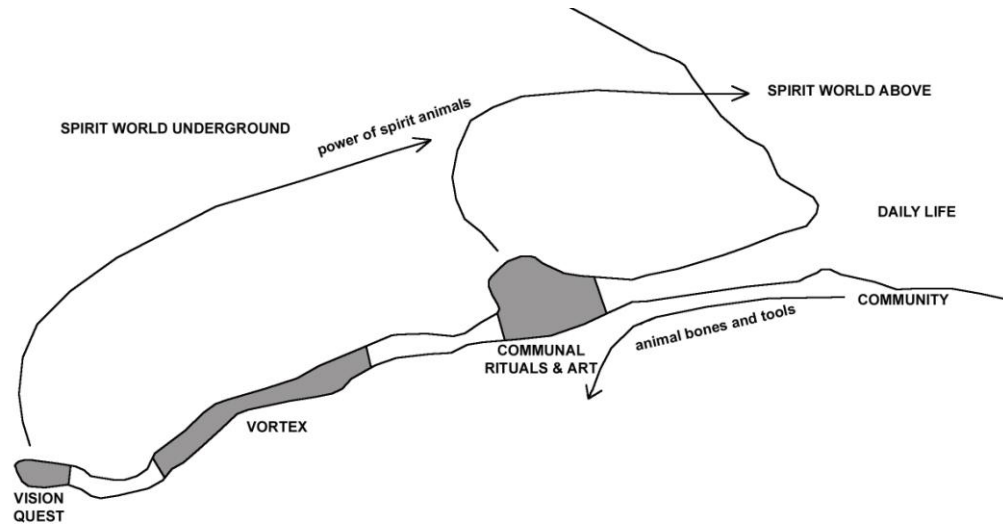
Figure 6.5: "Diagrammatic representation of the way in which Upper Palaeolithic people used caves" (modified from Lewis-Williams 2002:267).

The tunnel of Le Gabillou, as Lewis-Williams describes it, reflects a potentially similar phenomena to Combarelles and perhaps Pergouset. Comabrelles I and II stand out as being rather unique in their 700 meters (Combarelles I) or less (Combarelles II) of long narrow chambers filled with engraved images (similar to the tunnel described for Le Gabillou although with a much greater density of images). There is also a rather large and spacious entry area to Combarelles I and II which may have been used as part of cave rituals. If there is a similar structural aspect to the use of the Combarelles, such as the pattern suggested by Lewis-Williams, then we would expect to see traces of pigment which previously existed in the entry area of these caves. A portion of the entrance of Combarelles II collapsed and may cover pigment that previously existed. However, Archambeau (personal communication 2004) has mentioned that he has at least observed small traces of black pigment closer to the entry which has not been documented. Thus, this is perhaps one line of future investigation.

This pattern differs, however, from the caves of Bernifal and Villars, although the nature of the entry area described by Lewis-Williams could be extended to these caves.

However, Bernifal and Villars may reflect a difference or greater complexity in overall use, yet with similar subcomponents in terms of communal activities occurring toward the entry and individual "expedient" image making occurring further in, although potentially with more subcomponents and greater structuring of the use of space within the cave.

Figure 6.6 below provides an example of how activity in Bernifal may have been organized, from a similar activity area perspective, with the results of the visibility/physical context analysis and image characteristics integrated. In this case, communal or group activity is displayed toward the entrance, with individuals (perhaps only one at a time) passing into the far reaches of the cave, following one wall (where most of the images occur), taking time in the passage way to connect or commune with the cave or to mentally prepare themselves (where image differences in image technique and content suggest a very different intention and associated activity). Then, following the same wall to the back of the cave and finding a location to place an image, sometimes in very difficult to access locations. Individuals would then return afterward, perhaps along the other wall to the communal/group area. The passage may also be a sacred area frequently used by a single individual in other contexts during or around the time of group activities. Around the passage may be areas similar to the far reaches of the cave, more personal/private zones where those not brave enough or privileged enough would place their image in an equally difficult to access location. Some of the places are very small and narrow, suggesting the individual was of a fairly small size, perhaps an adolescent. Along the pathway to the passage

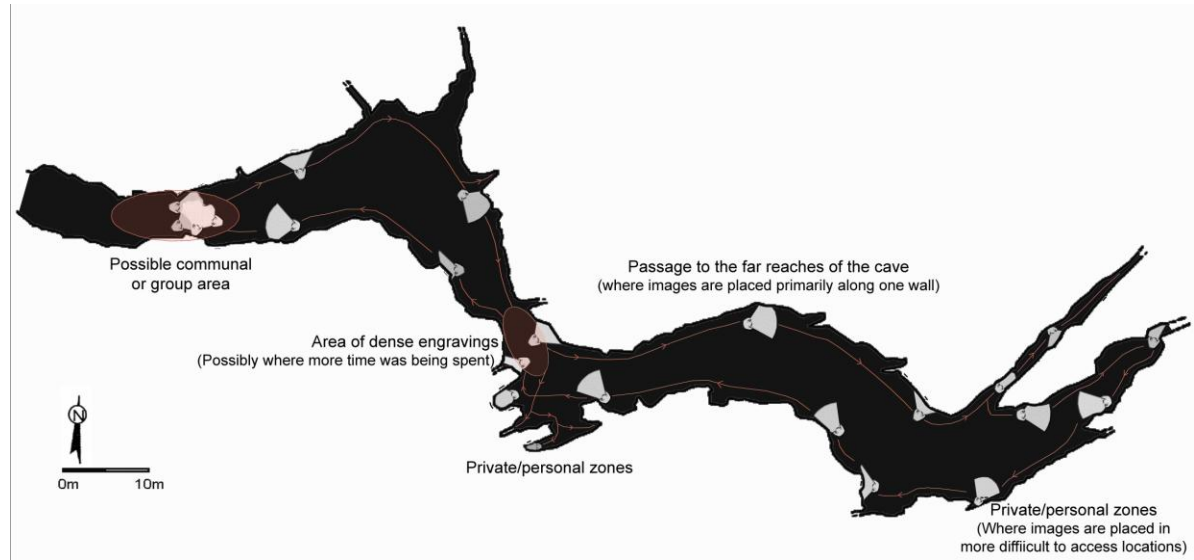area and to the back of the cave, images were occasionally placed.

Figure 6.6: Diagrammatic of the potential organization of activity in Bernifal. The cave is shown as a dark place, with individuals passing though with a light source. The line indicates the possible direction of movement (i.e. the possible "ritual pathway" after Moyes 2004), and the highlighted circles indicate areas where more time was perhaps spent.

Although the entry area may reflect communal or group activity, it was possibly not a display type context similar to the large, "elaborate" panels in Lasacaux and Font-de-Gaume that have excellent visibility conditions. In the case of Bernifal (and Villars), although images cluster toward the entry area (and therefore suggest some type of organized activity), and their overall technical and qualitative attributes differ from other areas suggesting slightly greater investment in image making, they differ significantly from images classified as extreme "display" type images. In addition, although this area has better visibility relative to the rest of the cave, the images do not appear to have been placed in a way that suggests viewing by large groups or viewing all at one time. Thus, although the clustering of images and their overall differences and visibility conditions suggest a potential group-oriented zone, the activity (or perhaps the size or composition of social groups) associated with them was probably very different than in more elaborately painted caves.

Figure 6.7 below attempts to illustrate this point. In the close up of Area 1 (left) and 1.2 (right) in Bernifal, individuals are placed within the estimated optimal viewing areas (in squatting positions). On the right, images are more dispersed and difficult to view, and are generally optimally viewed by only one or two individuals at a time. On the left, near the entrance where images cluster, the viewing areas of the images sampled are shown. Although more individuals could fit into the boundaries of the optimal viewing areas, only six are illustrated in an attempt estimate the maximum number of individuals that may comfortably fit in the viewing area boundaries within the context of an activity (in this case squatting, or sitting). In addition, an overhang occurs in front of the northern wall with images, restricting visibility and seating room. The individuals' lines of sight are drawn (dotted lines) to show that very few of the images would be possible to view by any one individual at a time, even under good lighting conditions. Figure 6.8 provides a map of the entire cave with the same information, which helps to illustrate how most of the images may relate to more individual type of activity/contexts.

Figure 6.7: Diagrammatic of Area 1 (and 1.2) in Bernifal. Viewing areas are shown in grey (total visible viewing area) and black (optimal viewing area). Individuals are shown in white, plan view in a squatting position. Lines of sight are shown with arrows)
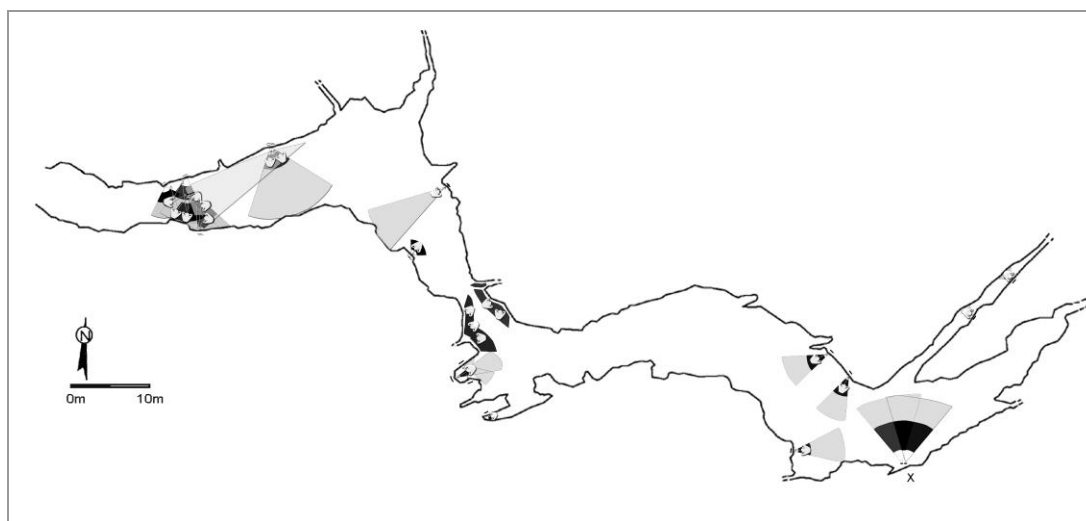
Figure 6.8: Diagrammatic of Bernifal displaying the same information. In the case of the images on the far right with large viewing areas (marked by an X), they occur on an over 5m high ceiling which is not visible without a good lighting source. In the case of Area 2, the passage way with dense engravings, a visible viewing area range is not provided since the engravings are very difficult to view outside of the optimal viewing area.

If lighting conditions were poor, this would further reduce the number of images one individual could view at a time. Figure 6.9 below attempts to integrate lighting conditions into visibility considerations of Area 1 in Bernifal. This is perhaps a better way to illustrate how images may have been viewed. In most visibility analyses (i.e. as discussed in Chapter 4) lighting is assumed constant, although most visibility analyses in archaeology have been applied to landscape or external contexts. In caves, lighting would be critical in some cases. Depending on the intensity of the lighting source, image visibility can be significantly reduced or enhanced. Some efforts were initially made to integrate this variable into the data collection, however, it required more sophisticated devices and method of measuring and recording than was possible to encompass in this thesis. Future work may attempt to integrate this element either in computer modeling or in the actual cave environment.

Figure 6.9: Diagrammatic of Area 1 (and 1.2) in Bernifal, similar to Figure 6.7. An attempt is made to incorporate lighting area or ranges based on one candle power, within the estimated optimal viewing areas. Lighting areas are shown in grey. Individuals are shown in white, plan view in a squatting position. Lines of sight are shown with arrows (dotted lines).

In Villars, the situation is different since all of the images occur tightly clustered on the same, flat and visible, portion of the wall. Thus, although this area may suggest a more group oriented type of activity, or some type of organized behavior that resulted in greater clustering of characteristically different images with overall better visibility, there is perhaps less investment in this portion of cave use in the case of Bernifal and Villars (and perhaps Le Gabillou) than in Lascaux , Altamira or other caves for example.

What these observations suggest, is that if viewed from an "activity area" or social context perspective, with attention to physical contexts and visibility when examining image distributions within caves, that a similar organizational structure to cave use seems to emerge, different from past explanations and something that would perhaps not emerge when focusing on the symbolic content of the images themselves. If there is a similar organizational structure to the use of some caves, symbolic content of the images might more profitably be examined within this context, at least at the level of animals, anthropomorphs, dots, lines and geometric shapes (as discussed in the Chapter 5 analyses). Thus, the first approach should perhaps be to attempt to understand the physical use of the space (in which visibility analyses can assist), and then attempt to understand the patterning, distribution, transformation and changes in the symbolic content of the images within these different places of social action, and how these may reflect transformations or maintenance of Upper Paleolithic cosmology or ideology. The transformations or maintenance in Upper Paleolithic beliefs are undoubtedly reflected in some way in the caves, perhaps in terms of transformations in social contexts or the elaboration of images. The painted caves may in fact be an ideal place from which to better understand the development of complexity during the Upper Paleolithic, and the emergence of inequalities, *if* examined in terms of a social context perspective in a dynamic temporal and regional model.

6.4. SOME FINAL SPECULATIVE THOUGHTS ON VARIATION AND CHANGES

6.4.1. *Changes* in cave use throughout the Upper Paleolithic

Cave use occurs throughout the Upper Paleolithic, in which minimal elaboration of cave activities seems to occur (Clottes 2005). Caves were periodically used perhaps more in "ad hoc" rituals, rather than on specific seasonal events or celestial dates (e.g., Marcus and Flannery 2004). During this period we see variations in caves which perhaps result from both cultural differences in artistic traditions, variations in the skill or investment of individual artists (Chauvet for example), variations in preferences for locations of image making, and variation in cave use with some caves perhaps not being used for ritual at all (yet in which there are random occurrences of images). We perhaps see hints of a development of routine practices in the use of some caves occurring during this period, involving two or possibly three types of uses in particular:

Beginning perhaps in the Aurignacian, some caves may have been used by shamans, or "cave ritual specialists," perhaps as part of seasonal rituals (i.e. visited once by a shaman at the beginning of their stay in the area during the winter for blessing, fertility or other rituals related to food gathering or safe passage for the winter). Perhaps caves were also used as part of healing ceremonies (which shamans cross culturally practice). If population densities were low (i.e. 25-30 per group) and population density was low (c. 0.1 individual per square kilometer, Owens and Hayden 1997:125,130), and a cave was used by only one individual (the shaman, or "cave ritual specialist") at the beginning of each winter season, or for special healing purposes (which may not have occurred), and relatively little image making occurred during each visit yet perhaps offerings were made, then this should have resulted in a much more random and sporadic type of pattern which Clottes and others have referred to;

> Only a few deep caves, approximately 150, bear evidence of wall art. Given the extremely long duration of the Upper Paleolithic, this suggests only sporadic usage. On average, for the whole of Europe, there was one painted cave for every five generations of people. Furthermore, even the most-utilized caves seem to have been in use for only a restricted time by a limited number of people. Despite the relative scarcity of such occurrences, similar sophisticated forms of art can be found in the deepest parts of caves all over Europe, from Gibraltar to the Ural Mountains (Clottes 2005).

Within this context, variation in individual's artistic skill would be expected to occur, creating variations in the quality or refinement of the art. Also, differences in the beliefs of groups might be reflected in the art, resulting in differences in animals represented, motifs, or designs. Economic dynamics might have also influenced the image making in terms of the access to different raw materials for pigments. In addition, economics possibly influenced beliefs and values surrounding the importance of different animals. A number of possibilities may be considered in the context of the individual use of caves. A study of regional differences in shaman's artistic skill, symbolic media, and material expressions along the Northwest Coast or Interior for example, could reveal a great deal of variation in these domains, yet there would perhaps also be similar structuring elements (i.e. a shared belief and practice) which would presumably be reflected on some level. If early Aurignacian cave use involved only individual shamans, activities may have concentrated in certain areas of the cave in which the shaman spent time, creating images, leaving offerings or engaged in other activities.

On the other hand, we may also see a more communal level of cave use beginning in the Gravettian or later periods, which components of Bernifal, Villars and Le Gabillou (Lewis-Williams 2002) may reflect. In these developments, portions of the community (e.g., groups of 3-4 individuals) would enter the cave, perhaps first gathering toward the entrance (Areas 1) in a communal, group activity to receive or impart instruction, guidance, knowledge or information, or conduct rituals. One individual at a time could then proceed to

the further reaches of the cave (Areas 3 and 4), passing the area used during the shaman's individual visits (Areas 2), in a vision quest manner (as suggested by Lewis-Williams and many others as one use of the caves).

Group oriented rituals which involved restricted spaces and which were exclusive to certain members of the community arguably reflects a reorganization of social structures, socioeconomic dynamics, and beliefs surrounding ritual and individual positions in society. Such a transformation in ritual practices would perhaps reflect a fundamental shift (even if slight) in social complexity which would also be reflected in other domains of Upper Paleolithic life, in which greater distinction in social positions would be visible and greater investment would be made in group and status identity (among other things). Such a transformation is perhaps most strongly reflected in the Aurignacian to Gravettian transition, in which a shift in burial traditions and the production of symbolic media are visible. For example, in the Aurignacian there is little to no structured burial customs (White, personal communication 2006, 2007). In the Gravettian, significant wealth investment in adolescents burials occur (e.g, Sungir), caves are used for burial (e.g., Cussac) reflecting a greater investment in children, a significant change in beliefs and practices, a more structured ideology around death and burial, symbolic expression, displays of prestige, status and social identity.

What caused this shift most likely has a strong economic and ecological basis, yet it clearly also involved a restructuring of concepts and beliefs behind these characteristics, and a shift to more authority-driven systems. These shifts should also be expressed in ritual contexts, perhaps more strongly than in other contexts and in a much more structured form. With the Gravettian we may continue to see individual shamans using caves, but perhaps also an initial transition to more group types of cave ritual, exclusive to certain members of

the community. A transformation in concepts and beliefs as reflected in burial practices and the elaboration in the production of various symbolic media (in terms of portable art and personal adornment for example), may have depended on a shift in the acquisition of economic resources. Such a system would require social positions and ritual specialists to maintain. We would also expect to see an elaboration of these social positions, especially those involving ritual specialization – i.e., individuals who have claims to supernatural knowledge and who would be guiding or helping to maintain transformations in beliefs surrounding death, burials and rituals.

In order to maintain their positions of increasing social, political and economic power and influence (which arguably provided various practical benefits for them and their kin) and in order to maintain belief structures that reinforced their positions, they would require alliances involving exchanges for support (in the process of maintaining, and creating, these belief systems which encompassed social systems and economic exchanges). Exclusive cave rituals involving ritual specialists from surrounding communities, and other influential community members, may have provided a means of creating, maintaining, reinforcing and strengthening relationships and such alliances.

Thus, cave rituals during this period (Gravettian to more recent periods) perhaps experienced a transformation and elaboration surrounding ritual alliances which were required to maintain transformations in belief systems that encompassed the exploitation of new economic and adaptive niches. In the Aurignacian then, social and ideological systems appear less "complex," and cave rituals perhaps only involved individual shamans and those being trained in those roles (e.g., a young male in the hereditary line).

The exclusive rituals that may have begun to form in the Gravettian and later periods could have helped to reinforce relationships in other domains, creating a stronger social

network that would provide advantages in terms of economics, trade, marriages and other exchanges. These alliances, which rituals would help to maintain and reinforce, would also presumably help to provide adaptive advantages in terms of competition with surrounding cultural groups. An increase in wealth and status competition is visible in terms of the greater investment in adolescent burials, but also in other contexts of artifact production. The elaboration of belief systems, ideology and ritual practices surrounding these economic and adaptive shifts are visible in various domains of symbolism and burial practices, yet also presumably cave rituals which would help to maintain hierarchical and alliance relationships surrounding the access to and control of ritual knowledge. Such ritual knowledge could be used to structure and reinforce political power and economic relationships within and between communities.

During the early period of cave use, although economic, ideological and social transformations may have occurred, an elaboration or structured use of caves may remain relatively difficult to detect. Within transegalitarians societies for example,

> "A striking irony … is that in the midst of substantial transformation towards greater levels of hierarchical differentiation there remains a heavy reliance on traditional roles, processes and symbols." (Rick 2008:1)

Thus, although caves use may begin to include subcomponents of activities in the Gravettian (e.g., entry chambers where cave specialists would gather [i.e., Areas 1], deep areas of the caves in which 'spirit helpers' might be sought [i.e., Areas 4], and waiting areas in between or places reserved for individual shaman's use [i.e., Areas 5 and 2]), the symbolic media and content involved and the structuring of space might be relatively subtle.

Nonetheless, the changes seen within the Gravettian at least reflect greater time investment in the production of symbolic media which may also result in a refinement of artistic depictions of various subject matter and changes in artistic style. However, during

this period, the art was still possibly largely produced by individual shamans who would have varying levels of skill, and who might produce art or 'practice' art making on a regular basis outside of cave contexts, or who might have different specializations and motivations with varying 'talent' or skill in image making (however, generally resulting in better average quality of images than those of the general populace). Thus, an increase in the elaboration of images could begin to occur, but perhaps on a very sporadic basis and of unskilled appearance compared to specialized artists. In addition, regional differences in belief systems (which become more complex during the Gravettian) would presumably also be reflected at some level in changes in style, content and perhaps location of cave images. The placement of images within the caves could presumably also experience a shift resulting from the transformation or elaboration of cave rituals. On the other hand, it is quite possible that cave rituals may have largely remained the same during the Gravettian period as in the Aurignacian, which is yet to be determined.

During the Solutrean and Magdalenian, an increase in complexity of cave use is seen, both in terms of the elaboration of images (in size, technique, pigment, and artistic detail) their density (i.e., a greater amount being painted), and in what appears to be a significant structuring of the activities occurring within the caves (in the case of Lascaux, Font-de-Gaume and Altamira). The caves also appear to be used more frequently, or greater numbers of individuals may be using them (i.e., there appears to be an increase in group sizes involved in the activities occurring within the most highly decorated caves). Many of the images in the deep reaches can be considered to have been created by different individuals or during different visits, in contrast with the elaborate panels which may have been created in a shorter period of time by a single artist or artist groups (Aujoulat 2004), although they may have been used/viewed frequently in the context of cave use.

Overall, there were radical transformations in all domains of Paleolithic lifeways during the Solutrean to the Magdalenian. Some of the important and archaeologically visible social transformations that occur include greater economic niches being exploited and the elaboration of symbolic systems. Ritual and ritual practices, which appear to take on increasing importance in the maintenance (and creation) of these new ideological systems, would presumably also experience a restructuring and an increase in structuring. Perhaps rituals, at least key rituals related to key seasonal and economic resources, community gatherings, and maintenance of networks or alliances of ritual specialists possibly begin to be planned according to celestial events which could act as a calendar that would help to reinforce and maintain elaborate ritual structures such as that documented elsewhere in the world (i.e. Marcus and Flannery 2004). Caves such as Lascaux and Altamira may reflect "regional centers" as Conkey (1981) and others have suggested. In which elite or inter-community rituals may have been performed. Ritual practices surrounding caves during this period potentially involved components of: 1) individual shaman activity; 2) exclusive small group rituals; 3) larger group communal rituals which possibly featured representations of economically and symbolically important resources; 3) perhaps initiations or rites of passage of adolescents, and other forms of ritual activities performed in transegalitatian societies which involve both aspects of rock art and restricted spaces. Greater elaboration of rituals may have especially occurred along the along the resource rich areas of the Vézère Valley, where social competition may have been heightened or concentrated.

6.4.2. V*ariation* in cave use throughout the Upper Paleolithic

Caves, like other archaeological sites, should be viewed as dynamic places of formation and transformation. No two caves are alike in their interior physical space or their

artistic qualities, yet patterns in the organization according to their internal physical topography may occur. Each cave has its own individual history, although some cave histories may be linked. The clustering of caves shown on a distribution map should not be viewed "as if" they were prehistoric regional settlements. Instead we need to appreciate the processes that have gone into the creation of each cave over time and its use in order to understand more accurately what these "clusters" actually represent.

Explanations for the "emergence" of Upper Paleolithic cave art and the function of the caves could perhaps begin to encompass more dynamic models of cave use and transformation, regionally, temporally and within individual caves. For example, caves, like other sites, can be experienced and influenced by various social actors. They can be abandoned or access to them may cease causing a disruption, or they can be revisited for thousands of years, experiencing continuity or transformations. Although access to and use of certain caves may have been more restricted at certain times, some caves may not have been subjected to such control.

Thomas (1993) argues that Neolithic monuments for example, are not simply dots on a simply dots on a distribution map. Instead he places humans within them involving restricted access to certain groups within society, secluded and restricted space, both public and private, transformations, and the reproduction of secret knowledge, to which resistance would also take place as a dynamic in the creation and use of such places. When viewed in a similar perspective, painted caves may have been transformed in their use over time and across geographic space; from places of private ritual to groups rituals, from sacred places to locations where adolescents painted the profane. Such processes most likely occurred to some degree and have not been encompassed by past explanatory models. It is possible to

consider multiple lines of influence on the caves. Figure 6.5 below suggests some of the potential sources of variability that could be considered:
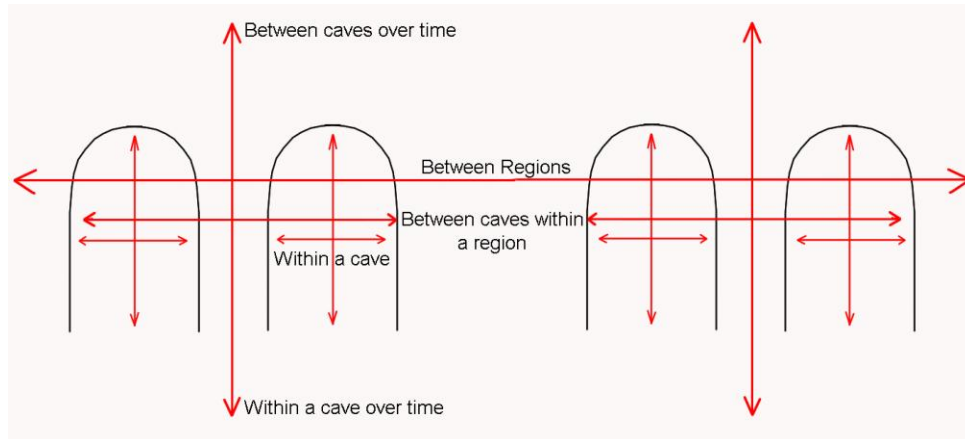

Figure 6.10: Schematic of potential lines of variation within and between caves.

It is possible that the art contained in one cave today is an accumulation of art produced by different individuals within the community during a short span of time, involving on a few generations or less. However, it is also possible that the art contained in one cave may be the product of a series of events over a long period of time, in which caves were used very infrequently. Thus, the caves within a given region may differ in many ways, and may have been painted by different individuals with different intentions, at similar or different times. Some researchers have attempted to find ways to determine how many individuals were involved in the production of the images, and if the images were products of a single event or multiple events (i.e. Aujoulat 2004; Plassard 2000). Since direct dating of the art is not always an option, another way of addressing potential episodes of cave use could be through understanding how many events are represented such as the seasonal reconstructions presented by Aujoulat (2004) and how may different individuals created the art (although multiple artists may also be responsible for a single image-making event).

In order to move further in this direction in our future understandings of the role of the painted caves in Upper Paleolithic societies, I discuss here a 'model' of a very exploratory nature, which is one of transformation and maintenance of ritual practices that surrounded some of the caves that form the dots on a map. The elaboration and structuring of cave ritual during its peak, was possibly relatively short-lived period relative to the entire span of cave use. Cave use clearly played an important role in Upper Palaeolithic societies, and there was obviously much variation in cave use from habitation, to burial places, to individual questing, and perhaps other roles. However, it seems that archaeologists would like to find "the" cave use which is reflected in the patterning that over a century of theory, speculation, and data collection they have attempted to understand. I would argue that these caves potentially comprise only a small percent of the entire number of caves used. That, if we consider this more dynamic regional model when examining and comparing distribution patterns (in subject matter, technique, use of space, and much more), we may begin to better recognize patterns that are meaningful in terms of one particular facet of cave use. In terms of other types of archaeological sites, we may first subgroup caves (reducing the scale of analysis) before beginning to examine and understand certain patterns which may help to tell us about the activities which took place within.

If we examine cave use from the perspective of how ritual was formed and transformed with increasing complexity (such as that widely seen in the Upper Paleolithic), and how ritual functioned within society and under what conditions it was maintained (e.g., showing continuity in cave use) or transformed (e.g., a shift to more elaborate and structured cave use), then we may begin to develop new testable models for understanding patterns and variation in the painted caves across the Upper Paleolithic. Ultimately, we may begin to better understand the role that the painted caves, or at least some of them, could have played

within the societies that created and used them, and perhaps also the symbols and belief

systems behind the images used in the caves.

CHAPTER 7 ~ CONCLUSIONS

7.1. INTRODUCTION

The basic research problem that I address in this thesis is whether any of the decorated Upper Paleolithic caves in the same from the Les Eyzies region of Southwest France were used for group rituals? If so, what was the nature of the group activity (at least in general size of groups), and what types of social groups might have been involved? There are many theories that purport to explain why caves in this region were decorated. For my purposes (and leaving aside the issue of symbolic meanings), these can be grouped into two basic categories: group versus individual activities. Within the "group" category it is possible to envision large group activities (tribal initiations, or social solidarity rituals) versus small group activities (e.g., shamanic or secret society rituals). Recent publications have suggested both group and individual activities taking place in decorated caves (i.e. Clottes 1997; Baffier and Girard 1998; Lorblanchet 2001; Lewis-Williams 2002; Bahn 2003). If this is so, the main problem is how to distinguish such activities in a systematic fashion.

7.2. SIGNIFICANCE AND THEORY

The development of individual and/or group rituals in the decorated caves of Southwest France has important implications in terms of the social dynamics of Upper Paleolithic communities. At the level of individual rituals, it will be important to determine whether all members of society entered caves to leave images on individual quests, much like the vision quests of North America, or whether only certain individuals undertook such quests (determined either by gender, socioeconomic status, or some other criteria).

At the level of group activities, it will be important to determine whether large or small groups were involved and what the nature of these groups was. It will also able important to determine how some of these aspects may have changed over time.

Impressionistically, it may be the case that socioeconomic inequalities were poorly developed during the early part of the Upper Paleolithic, becoming more pronounced during the Gravettian with a number of rich burials, and only becoming expressed in terms of group activities in decorated caves during the latter part of the Upper Paleolithic as exemplified by such spectacular caves as Lascaux. This thesis has only taken a few initial steps toward addressing such larger questions, but they are important steps and the ultimate questions are important ones since the role of ritual in the development and transformation of inequalities and complex societies is a topic that has been receiving increasing attention in recent years. If image making in the Upper Paleolithic caves of Southwest France can be linked to such things as shamanic fraternities, specially trained artists, vision quests undertaken by priviledged members of communities, secret society initiations or rituals, these have important implications for understanding the nature of Upper Paleolithic societies, their dynamics, and the level of socioeconomic complexity that they exhibited. Randy White and others have postulated that at least in some areas, Upper Paleolithic society exhibited characteristics of complex hunters and gatherers with socioeconomic inequalities. If this was the case, it may be expected that caves and rituals played significant roles in terms of the creation and maintenance of inequalities, especially in the domains of restricted access, hierarchies, and the transformation of ideologies.

7.3. Objectives and Study Area

Thus, the specific objectives of this research were to identify areas of probable group versus individual activities and to attempt to determine at least some of the characteristics of

the groups that made the images in the caves, e.g., the size of the groups, the relative level of artistic skill exhibited by the images that they left, the intensity of activities in various physical contexts of the caves, the nature of expected viewing of images (private vs. group). These are only initial exploratory distinctions and it is hoped that future work along these lines will be able to examine more complex issues such as the gender of the participants, more specific determination of the nature of the activities (on the basis of physical context and distribution of images in caves as well as artifactual and feature remains), and the relative social ranks of participants, among other interesting questions.

In Europe, there are two primary regional clusters of cave art: the Franco-Cantabrian area around the Pyrenee Mountains and the Southwest of France, particularly the Perigord. I chose to examine a sample of caves from the Perigord since caves with manageable numbers of images had been well documented and studied in this region. In the Perigord there are over 60 decorated caves and rockshelters, among them is Lascaux. The sample chosen consisted of four caves in this region: Les Combarelles, Bernifal, Font-de-Gaume, and Villars. Originally, Rouffignac was also included, but after preliminary work there, it was appaarent that it was too large and complex to include in an initial study of this nature.

7.4. METHODOLOGY, ANALYSIS, RESULTS

In order to deal with the issues raised above, it became evident that information on the physical context of images and on the characteristics of images would be required. While some of this information was available in the extant literature, much of it was unsystematic or impresssionistic. Moreover, there were generally good reproductions of the images themselves, but almost no information on their physical contexts. Thus, a number of variables related to images were recorded in as systematic a fashion as possible. These attempted to determine the "viewshed" of each image (the areas from which it could be

easily seen), the most optimal position for viewing each image (standing, squatting, lying down), the optimal distance for viewing images, detailed aspects of the physical context (using plans, cross sections, and photographs), and similar observations. Image sizes, heights above floors, painting vs. engraving techniques used, general subject matter, and relative image quality were also recorded as consistently as possible.

The results showed bimodal distributions of images in size and viewshed areas, plausibly relating to individual versus group activities. Moreover, over 70 percent of the images recorded fell into what could be inferred to be "individual" types of activities. While both individual and group activities occurred in several caves, most images in these caves seemed to be individual productions.

Within the individual image category, most images could be considered "expedient," and not intended for subsequent viewing. However, in a few cases, the context and quality of images were distinctive enough to suggest that at least some of the images in restricted spaces were meant for subsequent viewing by individuals returning to the same special locations.

In the more open spaces, there were contexts with poor visibility of images (often high on the walls or ceilings or in other locations difficult to see) and physical contexts that had good visibility of images. Not surprisingly, the low visibility context exhibited many characteristics of images in restricted spaces. Good visibility contexts were the ones with characteristics expected to be associated with group activities (larger sizes, higher quality, and more use of red pigments and polychrome images), although some images in these locations were more similar to the types of images in restricted contexts. Of special interest was the tendency for both individual and "group" types of images to concentrate in certain regions of the caves such as entrances or narrow diverticules. On the basis of this preliminary

analysis, further study of the spatial patterning within caves of these different types of images appears to have considerable potential for understanding how the caves were used and the organization of activities that took place within them.

In summary, the subgroups: 1) were determined by differences in visibility conditions; 2) showed strong association with different image characteristics, and; 3) related to similar or comparable areas of the caves. The subgroups identified potentially reflect subcomponents of activity or cave use, and their distribution appears to hold potential in gaining insight into the organization of activity within and between some caves. These results take into consideration the: 1) size of the physical space, wall topography and visibility conditions to understand possible group sizes; 2) clustering or distribution of images to understand where activities may have concentrated and what type of movement may have been involved, and 3) image characteristics within this context, although further effort is required when attempting to interpret intentionality in terms of audience(s).

7.5. FUTURE WORK

It is apparent that a number of refinements to the methodology can be made in future applications. In particular, laser equipment and scanners can be used profitably to determine cave cross sections or map out physical spaces as well as record image viewsheds. More work ideally might be undertaken to determine the floor levels of the caves at the time the images were made. Research might also be undertaken in order to establish a more objective system for determining image quality. The use of higher level statistical techniques could also be usefully explored (especially the use of K-means cluster analysis), and more detailed analysis of the distribution of different types of images in different parts of caves (and along different sides of passageways).

On a broader level, future work might attempt to explore the gender and age of the image makers, their likely socioeconomic status, the degree of artistic training, changes in socioeconomic complexity and image making from early to late Upper Paleolithic, and regional variation in the use of caves (plotting out the different types of uses of caves within regions by time periods). These are all major research initiatives, but ones that seem achievable given enough dedication and resources to addressing them. The prospects are exciting, but the implementing such a broad research agenda is daunting.

REFERENCES CITED

Alexander, Diana
n.d.   Report on Potatoe Mountain Ethnography, Chilcotin, B.C. Report on File with
        the B.C. Provincial Archaeological Branch, Victoria, B.C.

Archambeau, M., and C. Archambeau.
1989   *Les Combarelles.* Editions Pierre Fanlac, Périgueux.
1987a   Information chronologique nouvelle aux Combarelles. *Bulletin de la Société
        Préhistorique Française* 84(2)45-46.

Aujoulat, N.
2004   *Lascaux : le geste, l'espace et le temps.* Seuil, Paris.
1984   Grotte des Combarelles II. In : *L'art des cavernes. Atlas des grottes ornées paléolithiques
        françaises.* Ministère de la culture. Imprimerie nationale. Pp. 129-134.
1979   Les Combarelles. *Spéléo-Dordogne* 73(4)12-20.

Baffier, Dominique and Michel Girard
1998   *Les Cavernes d'Arcy-Sur-Cure.* La maison des roches, France.

Bahn, Paul
2003   Location, location: what can the positioning of cave and rock art reveal about Ice
        Age motivations? In Pastoors, Andreas and Gerd-C. Weniger (editors) *Cave Art and
        Space: Archaeological and Architectural Perspectives.* Neanderthal   Museum, pp. 11-20.
1997   Membrane and Numb Brain: A Close Look at a Recent Claim for Shamanism in
        Paleolithic Art. *Rock Art Research* 14(1):62-68.

Bahn, Paul, and Jean Vertut
1988   *Images of the Ice Age.* Windward, Leicester.

Barham, L. S.
2002   Systematic pigment use in the Middle Pleistocene of South-Central Africa. *Current
        Anthropology* 43:181-190.

Barriére, C.
1969   Une scène anthropomorphique à Font-de-Gaume. *Bulletin de la société préhistoriqu
        ariégeoise* 24 :39-53.
1997   *L'art pariétal des grottes des Combarelles.* Paléo Hors-série, les Eyzies.

Bar-Yosef, Ofer
1997   Symbolic expressions in later prehistory of the Levant: Why are they so few? In M.
        Conkey, Olga Soffer, D. Stratmann, and N. Jablonski (editors), *Beyond Art: Pleistocene
        Image and Symbol.* University of California Berkeley Press, Los Angelas.

Bender, Barbara
1989   The roots of inequality. In D. Miller, M. Rowlands, and C. Tilley (eds.), *Dominations
        and Resistance*: 83-93. Unwin and Hyman, London.

Boivin, Nicole, Adam Brumm, Helen Lewis, Dave Robinson and Ravi Korisettar
2007   Sensual, material, and technological understanding: exploring prehistoric
        soundscapes in south India. *Journal of the Royal Anthropological Institute* 13(2):267-294.

Bradley, Richard
1991   Rock art and the perception of landscape. *Cambridge Archaeology Journal* 1(1):77-
        101.
1995   Making sense of prehistoric rock art. *British Archaeological* (November 1995), p.8.
2002   Access, style and imagery: the audience for prehistoric rock art in Atlantic Spain
        and Portugal, 4000-2000 BC. *Oxford Journal of Archaeology* 21(3):231-247.

Breuil, Henri
1952   *Quatre Cents Siècles d'Art Parièthal. Centre d'Études et de Documentation préhistoriques.*
        Montignac, France.

Capitan, L., H. Breuil, and D. Peyrony
1903   Les figures gravées à l'époque du paléolithique sur les parois de la grotte de
        Bernifal. *Compte rendus des séances de l'Académie des Inscriptions et Belles Lettres.*
1910   *La caverne de Font-de-Gaume, aux Eyzies, (Dordogne).* Imprimerie Veuve A. Chêne,
        Monaco.
1924   *Les Combarelles aux Eyzies (Dordogne).* Masson, Paris.

Chase, P. and H. Dibble
1987   Middle Paleolithic symbolism: a review of current evidence and interpretations.
        Journal of Anthropological Archaeology 6:263-296.

Clottes, Jean
2005   What Did Ice Age People Do in the Deep Caves? *Expedition Magazine* 47(3):20-24.
1997   Art of the Light and Art of the Depths. In Margaret W. Conkey, Olga Soffer,
        Deborah Stratmann, and Nina G. Jablonski (eds.), *Beyond Art: Pleistocene Image and
        Symbol.* Memoirs of the California Academy of Sciences, No. 23. San Francisco,
        California. 203-216.
Clottes, Jean and David Lewis-Williams
1998   *The Shamans of Prehistory, Trance and Magic in the Painted Caves.* Harry N. Abrams Inc.,
        New York.

Conkey, Margaret
1997   Beyond Art and Between the Caves: Thinking About Context in the Interpretive
        Process. . In Margaret W. Conkey, Olga Soffer, Deborah Stratmann, and Nina G.
        Jablonski (eds.), *Beyond Art: Pleistocene Image and Symbol.* Memoirs of the California
        Academy of Sciences, No. 23. San Francisco, California. Pp. 343-368.
1987   New approacheso in the search for meaning? A review of research in 'Palaeolithic
        art'. *Journal of Field Archaeology* 14:413-430.
1980   The Identification of Prehistoric Hunter-Gatherer Aggregation Site: The Case of
        Altamira. *Current Anthropology* 21(5):609-630.

Crumley, C. L.
1979   Three locational models: an epistemological assessment for anthropology and
        archaeology. *Advances in Archaeological Method and Theory* 2: 141-173.

Daly, Richard
1993   Writing on the landscape: protolieracy and psychic travel in oral culture. In *They
         Write Their Dream on the Rock Forever.* Talonbooks, Vancouver. Pp.223-260.

Davidson, Ian and William Noble
2003   The archaeology of perception: Trances of depiction and language. *Current
         Anthropology* 30(2):125-155.

Davis, Whitney
1986   The origins of image making. *Current Anthropology* 27(3):193-221.

Deacon, T.
1998   *The Symbolic Species: the Co-Evolution of Language and the Human Brian.* Penguin,
        Harmondsworth.

DeBeaune, Sophie de
1993   Non flint stone tools of the Early Upper Paleolithic. In Knecht, Pike-tay and White
         (eds.), *Before Lascaux: the complex record of the Early Upper Palaeolithic.* CRC Press.
1995   *Les hommes au temps de Lascaux 40,000 – 10,000 avant J.-C.* La Vie Quotidienne, Paris.

Delluc, B., and G. Delluc
1974   La Grotte de Villars (Dordogne), *Gallia Préhistoire* 17 (1974), pp. 1–67.
1994   Un masque caché dans la grotte de Bernifal. *Bulletin de la société historique et
        archéologique du Périgord* 121 : 469-474

Delluc, B., G. Delluc, and D. Vialou
1994   Une étude de l'Abbé Henri Breuil sur la grotte de Combarelles II (Les Eyzies).
        Bulletin de la société Historique et Archéologique du Périgord 121 :285-289.
1995   Une étude de l'Abbé Henri Breuil sur la grotte de Bernifal (Meyrals). *Bulletin de
        la société Historique et Archéologique du Périgord* 122 :21-37

D'Errico, Fancesco and April Nowell
2000   A new look at the Berekhat Ram Figurine: Implications for the origins of symbolism.
        Cambridge Archaeological Journal 10(1):123-167.

D'Errico, Francesco, Christopher Henshilwood, Graeme Lawson, Marian Venhaeren, Anne-
Marie Tiller, Marie Soressi, Frederique Bresson, Bruno Maureille, April Nowell, Joseba
Lakarra, Lucinda Backwell and Michele Julien
2003   Archaeological Evidence for the Emergence of Language, Symbolism, and Music:
        An Alternative Multidisciplinary Perspective. Journal of World Prehistory 17(1):1-70.

Devereux, Paul
1991   Three-dimensional aspects of apparent relationships between selected natural and artificial features within the topography of the Avebury complex. *Antiquity* 65:894-898.
2001   Stone Age soundtracks: the acoustic archaeology of ancient sites. Sterling Publishing, Ltd., New York.

Devereux, P. and R. Jahn
1996   Preliminary invesitgations and cognitive considerations of the acoustical resonances of selected archaeological sites. *Antiquity* 70:665-6.

Dickson, Bruce D.
1990   *The Dawn of Belief*. University of Arizona Press, Tucson.

Dissanayake, Ellen
1992   *Homo Aestheticus: Where art comes from and why*. Maxwell Macmillan, New York.
1995   Chimera, spandrel, or adaptation: Conceptualizing art in human evolution. *Human Nature* 6(2):99-117.

Dowson, Thomas A.
2000   Painting as politics: Exposing historical processes in hunter-gatherer rock art. In P. Schweitzer, M. Biesele, and R. Hitchcock (editors), *Hunter and Gatherers in the Modern World: Conflict, Resistances and Self-Determination*. Berghahn, Oxford.
1998   Rock Art: Handmaiden to Studies of Cognitive Evolution. In C. Renfrew, and C. Scarre (eds.), *Cognition and Material Culture: the Archaeology of Symbolic Storage*. McDonald Institute Monographs, pp. 67-76.

Fraser, D.
1983   *Land and Society in Neolithic Orkney*. British Archaeological Reports, London.

Gamble, Clive
1982   Interaction and alliance in Palaeolithic society. *Man* 17:92-107.

Goldhahn, Joakim
2002   Roaring rocks: An audio-visual perspective on hunter-gatherer engravings in northern Sweden and Scandinavia. *Norwegian Archaeological Review* 35(1):29–61.

Gosden, Chris.
1994   *Social being and time*. Blackwell, Oxford.

Halverson, John
1987   Art for art's sake in the Palaeolithic. *Current Anthropology* 28(1):63-89.

Hayden, Brian D.
2003   *The Prehistory of Religion: Shamans, Sorcerers, and Saints*. Smithsonian Institution Press, Washington.
1995   *Pathways to power: Principles for creating socioeconomic inequalities*. In T. Douglas Price and Gary M. Feinman (eds.), *Foundations of Social Inequality*. Plenum Press, New York.

1998.   Practical and Prestige Technologies. *Journal of Archaeological Method and Theory* 5:1-55.

Hodgson, Derek
2003   The biological foundations of Upper Palaeolithic art: Stimulus, percept and representational imperatives. *Rock Art Research* 20(1):3-22.

Hovers, Erella
1990   Art in the Levantine Epi-Palaeolithic: An engraved pebble from a Kebaran site in the Lower Jordan Valley. *Current Anthropology* 31:317-322.

Hovers, Erella, Shimon Ilani, Ofer Bar-Yosef, and Bernard Vandermeersch
2003   An early case of color symbolism: Ochre use by modern humans in Qafzeh cave. *Current Anthropology* 44(4):491-522.

Hudson, Travis, and Ernest Underhay
1978   *Crystals in the Sky: An Intellectual Odyssey Involving Chumash Astronomy, Cosmology and Rock Art.* Ballena Press, Santa Barbara.

Huelsbeck, D.
1994   Mammals and fish in the subsistence economy of Ozette. In S. Samuels (ed.) *Ozette Archaeological Project research report, 2: Fauna* (pp.17-92). Reports of investigations, 66: Pullman and National Park Service. Seattle, Washington State University Anthropology Department.

Igarashi, J.
2003   *Relations entre les représentations figuratives et les signes dans l'art pariétal   magdalénien franco-cantabrique.* Thèse de Doctorat du Muséum National   d'Histoire Naturelle.

Jochim, Michael
1987   Late Pleistocene refugia in Europe. In O. Soffer (editor), *The Pleistocene Old World.* Plenum Press, New York.
1983   Palaeolithic cave art in ecological perspective. In G. Bailey (editor), *Hunter-Gatherer Economy in Prehistory.* Cambridge University Press, Cambridge.

Jordan, Peter
2003   *Material Culture and Sacred Lanscape: The anthropology of the Siberian Khanty.* AltaMira Press, Walnut Creek, CA

Lakarra, Lucinda Backwell, Michelle Julien
2003   Archaeological evidence for the emergence of language, symbolism, and music – An alternative perspective. *Journal of World Prehistory* 17(1):1-70.

Laming-Emperaire, Anette
1962   *La Signification de L'Art Rupestre Paleolithique.* Picard, Paris.
1959   Lascaux. *Paintings and Engravings.* Pelican, Harmondsworth.

Laville, Henri, J-P. Rigaud, and J. Sackett
1980.   *Rock Shelters of the Perigord.* Academic Press, New York.

Lepofsky Dana, Karla Kusmer, Brian Hayden and Ken Lertzman
1995   Reconstructing prehistoric socioeconomies from paleoethnobotanical and
        zooarchaeological data: An example from the British Columbia Plateau. *Journal of
        Ethnobiology* 16:31-62.

Leroi-Gourhan, Henri
1968   *The Art of Prehistoric Man in Western Europe.* Thames and Hudson, London.
1985   Grotte de Lascaux. In *L'art des cavernes. Atlas des grottes ornées   paléolithiques françaises.*
        Ministère de la culture - Imprimerie nationale. Pp. 180-200.

Lewis-Williams, David
2002   *The Mind in the Cave: Consciousness and the Origins of Art.* Thames and Hudson, London.
1998   Agency, art and altered consciousness: A motif in French (Quercy) Upper
        Palaeolithic parietal art. *Antiquity* 71:810-30.
1997a   Harnessing the Brain: Shamanism in Upper Paleolithic Europe. In M. Conkey, Olga
        Soffer, D. Stratmann, and N. Jablonski (editors), *Beyond Art: Pleistocene Image and
        Symbol.* University of California Berkeley Press, Los Angeles. Pp. 321-342.
1997b   Agency, art and altered consciousness: A motif in French (Quercy) Upper
        Palaeolithic parietal art. *Antiquity* 71:810-30.
1995   Modeling the production and consumption of rock art. South African Archaeological Bulletin
        50:143-154.

Lewis-Williams, David and Thomas Dowson
1993   On vision and power in the Neolithic: evidence from the decorated monuments.
        Current Anthropology 34:55-65.

Lorblanchet, Michel.
2001   La *Grotte Ornee de Pergouset (Siant-Gery, Lot).* Editions de la Maison des   Sciences de
        L'Homme, Paris.
1999   *La Naissance de L'Art.* Editions Errance, Paris.
1995   *Les Grottes Ornées de la Préhistoire.* Editions Errance, Paris.

Loubser, Jannie
2008   Seeing but not seen: ethnographic illumination of open art and cave art. Abstract
        for the Annual Meetings of the Society for American Archaeology, Vancouver,
        B.C.
2006   Rock Art, Physical Setting, and Ethnographic Context: A Comparative
        Perspective. In J. Keyser, G. Poetschat, and M. Taylor (Eds.), Talking with the
        Past: *The Ethnography of   Rock Art.* Oregon Archaeological Society
        Publications, Portland. Pp. 225-247.
2002   *Tripping on the Snake, or, On a Quest for Visions Forgeotten: An Assessment of   Selected
        Rock Art Sites in the Hells Canyon National Recreation Area.* New South Associates
        Technical Report, Stone Mountain, GA.

Marcus, Joyce and Kent Flannery
2004   The Coevolution of Ritual and Society: New 14C dates from ancient Mexico. *PNAS*
        101(52): 18257-18261.

Maringer, Johannes, and Hans-Georg Bandi
1953   *Art in the Ice Age.* Praeger, New York.

Marquardt, W. H.
1985   Complexity and scale in the study of fisher-gatherer-hunters: an example from the eastern United States. In, T.D. Price and J. A. Brown (ed.), Prehistoric Hunter-Gatherers: the emergence of complexity: 59-99. Academic Press, Orlando Florida.

Mellars, Paul
1989   Technological changes across the Middle to Upper Palaeolithic transition: economic, social and cognitive perspectives. In Mellars (editor), *The Emergence of Modern Humans.* Cambridge University Press.

Miller, Geoffrey
2000   *The Mating Mind.* DoubleDay, New York.

Mils, Steve
2005   *Applying Auditory Archaeology to Historic Landscape Characterization: A pilot project in the former mining landscape of Geevor and Levant Mines, West Penwith Cornwall.* Report on file with the Cardiff School of History and Archaeology, Cardiff   University.

Mithen, Steven
1991   Ecological interpretations of Palaeolithic art. *Proceedings of the Prehistoric Society* 57(1):103-114.
1989   To hunt or paint: animals and art in the Upper Palaeolithic. *Man* 23:671-95.
1988   Looking and learning: Upper Paleolithic art and information gathering. World Archaeology 19(3):297-327.

Morris, Desmond
1962   *The Biology of Art.* Methuen & Company, London.

Owens, d'Anne and Brian Hayden
1997   Prehistoric rites of passage: a comparative study of transegalitarian hunter-gatherers. *Journal of Anthropological Archaeology* 16:121-161.

Penvern, I
1997   *La représentation du mammouth dans l'art pariétal en Périgord: Cas particulier de la grotte de Font de Gaume aux Eyzies (Dordogne).* Mémoire de DEA. Muséum national d'histoire naturelle, Institut de Paléontologie Humaine.

Peyrony, D.
1948   Fouille de la grotte de Bernifal. *L'Anthropologie* 52 :359-361.

Peyrony, D., and E. Peyrony
1936   Gravures pariétales de la galerie droite des Combarelles. *Congrès préhistorique de France.* 12ème session. pp.736-739

Plasssard, F.
2000   *Les tectiformes et les mammouths de Rouffignac et de Font-de-Gaume.* Mémoire de DEA.
        Université Bordeaux 1.
2004   *Grotte de Rouffignac. Fouille au pied d'une paroi ornée.* Rapport de fouille sur la
        campagne 2003. Diffusion restreinte.

Prat, F., and D. de Sonneville-Bordes
1969   Découvertes récentes de paléolithique supérieur à la grotte de Font-de-Gaume
        (Dordogne). *Quaternaria* 11:115-132.

Raphael, Max
1945   *Prehistoric Cave Paintings.* Pantheon Books, New York.
1986   *L'art pariétal paléolithique et autres essais.* Le couteau dans la plaie. Edition
        Kronos.

Reinach, Salomon
1903   L'Art et la magie a propos des peintures et des gravures de l'age du Renne.
        Anthropologie Tome XIV:258-266.

Renfrew, Colin
1979   *Investigations in Orkney.* Society of Antiquaries, London.

Reynolds, T.
1990   The Middle-Upper Palaeolithic Transition in Southwestern France: Interpreting the
        Lithic Evidence. In P. Mellars (editor), *The Emergence of Modern Humans.* Edinburgh
        University Press, Scotland.

Rick, John
2008   *Tradition and Transformation in Ritual-Based Emerging Heirarchical Societies of the Peruvian
        Formative.* Paper prepared for a workshop on Ritual Spaces and Places, March 2008.
        Simon Fraser University, Burnaby BC.

Rivière, E.
1906   Trente-sept années de fouilles préhistoriques en France et en Italie. *Association
        française pour l'avancement des sciences,* 35ème congrès, Lyon. Pp. 772-798.
1894   Nouvelles recherches anthropologiques et paléontologiques dans la Dordogne.
        Association française pour l'avancement des sciences, 23ème session, Caen. Pp.709-722.

Roussot, A.
1984a   Grotte de Font-de-Gaume. In *L'art des cavernes. Atlas des grottes ornées   paléolithiques
        françaises.* Ministère de la culture - Imprimerie nationale. Pp. 129-134.
1984b   Grotte de Bernifal. In *L'art des cavernes. Atlas des grottes ornées paléolithiques
        françaises.* Ministère de la culture - Imprimerie nationale. Pp. 170-174
1978   Meyrals, grotte de Bernifal. *Gallia Préhistoire* 20 :635-637.

Roussot, A., N. Aujoulat, and P. Daubisse.
1983   Grotte de Font-de-Gaume. Les peintures de la galerie d'accès. *Bulletin de la société
        préhistorique de l'Ariège* 38 :151-163.

Roussot, A., and J. LaRoque
1969   Vestiges de l'Age du bronze dans la grotte de Font-de-gaume (Dordogne).
        Quaternaria 11 :133-140.

Schmidt, Roger
1998   *Exploring Religion*. Wadsworth Publishing Company. Los Angeles.

Spafford, Jim
1991   *Artifact distributions on floors and social organization in housepits at the Keatley Creek site.*
        Unpublished master's thesis, Archaeology Department Simon Fraser University,
        Burnaby BC.

Soffer, Olga
1994   Ancestral lifeways in Eurasia: the Middle and Upper Palaeolithic record. In Mathews,
        et al. (eds), *Origins of Anatomically Modern Humans*. Plenum Press, NY.

Sonneville-Bordes, D. de
1960   *Le Paléolithique supérieur en Périgord.* Imprimerie Delmas, Bordeaux.

Spencer, W. and f. Gillen.
1899   *The native tribes of Central Australia.* Macmillan: London.

Thomas, J.
1993   The politics of vision and the archaeologies of landscape. In B. Bender (ed.),
        Landscape, politics and perspectives. Berg, Oxford.

Tilley, Christopher
1994   *A phenomenology of landscape: places, paths and monuments,* first edition. Berg,
        Oxford/Providence.

Ucko, Peter, and Andrée Rosenfeld
1967   *Paleolithic cave art.* Weidenfeld and Nicolson, London.

Valladas, H.
2003   Direct radiocarbon dating of prehistoric cave paintings by accelerator mass
        spectrometry. *Measurement Science and Technology* 14:1487-1492.

Valladas, H., H. Cachier, P. Maurice, F. Bernaldo de Quirost, J. Clottes, V. Cabrera Valdes,
P. Uzquiano and M. Arnold.
1992   Direct radiocarbon dates for prehistoric paintings at the Altamira, El Castillo and
        Niaux caves. *Nature* 357:68-70.

Vialou, D.
1987   D'un tectiforme à l'autre. Acte du XXXIX congrès d'études régionales, 26-27
        avril 1987. Supplément au Bulletin de la Société historique et archéologique du
        Périgord. CXIV:307-317.

1986   *L'art des grottes en Ariège magdalénienne.* XXIIème Supplément à Gallia Préhistoire. CNRS Editions, Paris.

Villeneuve, Suzanne
2003   *A New Perspective on Old Art: The Social Context of Upper Palaeolithic Cave Art*. B.A. Honours Thesis, Simon Fraser University.

Waller, Steven
1993   Sound and Rock Art. *Nature* 363:501.

Wheatley, David and Mark Gillings
2002   *Spatial Technology and Archaeology: The archaeological application of GIS*. Taylor and Francis, London.

White, R.
2007   Systems of Personal Ornamentation in the Early Upper Palaeolithic: Methodological Challenges and New Observations. In, Mellars, Paul, Boyle, Katie, Bar-Yosef, Ofer and Stringer, Chris (eds.) *Rethinking the Human Revolution: New Behavioural and Biological Perspectives on the Origin and Dispersal of Modern Humans*. Cambridge, UK, McDonald Institute for Archaeological Research, 287-302. (McDonald Institute Monographs).
1993   Technological and social dimensions of 'Aurignacian Age' body ornaments across Europe. In Knecht, Pike-tay and White (eds.), Before Lascaux: the complex record of the *Early Upper Palaeolithic*. CRC Press.
1992   Beyond art: Toward an understanding of the origins of material representation in Europe. *Annual Review of Anthropology* 21:537-564.

Whitley, D.
2000   *The Art of the Shaman: Rock Art of California.* University of Utah Press, Salt Lake city.

APPENDIX A

Table summarizing various expectations and descriptions from recent literature concerning images characteristics, physical spaces and associated social contexts

Reference	Cave	Area	Inferred intention/use	Physical space/ group size	Image characteristics
Lewis-Williams (1997:335-336) (2002:232)	Le Gabillou	Entrance chamber	"communal" or "preparatory rituals" (2002) [Group]	Enough room for a number of people (2002)	-Carefully painted images with some simpler engravings (1997) -Images only fragmentarily preserved with remains of "simpler" engraved images showing that the area was not exclusively reserved for one kind of activity (2002)
Lewis-Williams (1997:335-336) (2002:233-235)	Le Gabillou	Tunnel	"individual vision questers" (2002) [Individual /private]	Restricted (2002)	-No elaborately painted images (aside from some patches of ochre that may be paint remains). All are engravings (made with only a "few sure strokes"), simpler ("implying less time was spent"). (1997) -Swiftly executed engravings, with no crowding or superimposing images or dense clusters (2002)
Lewis-Williams (1997:335-336) (2002:250)	Lascaux	Hall of Bulls [Large entrance chamber]	"communal rituals" (1997) or places where rites were performed involving "dancing, music, chanting" (2002) [Group]	The chamber would permit a large number of people (2002)	-Elaborately painted images (1997)
Lewis-Williams (1997:335-336) (2002:255)	Lascaux	Apse [Central area of the cave]	"rarely traversed" [Individual /private]	--	-Mainly engraved with complex superpositioning -Walls and ceilings dense with engravings and difficult to decipher (2002)
Clottes (1997:212-213)	Niax	Salon Noir	"sanctuaries" or places that were frequented [Group]	[Large chamber. No description of space]	-Time was taken when painting a large collection of detail animals

Clottes (1997:212-213)	--	"Other areas"	--	--	-"Dispersed all along" -Drawn more quickly with far less detail
Clottes (1997:212-213)	--	"Far away galleries"	Images are "not meant to be seen" [Individual /private]	-Location was chosen in relation to topographic peculiarities -Difficult to access where only one or two people can see the images at a time	
de Beaune (1995:201-202)	--	--	"domestic/daily" [Group]	--	Spectacular and very visible
de Beaune (1995:201-202)	--	--	"reserved for a few people" [Individual /private]	--	Hidden and almost undecipherable
Bahn (2003:17)	Lascaux	Hall of Bulls [Large entrance chamber]	"public" or "display" [Group]	--	--
Bahn (2003:17)	Peche Merle	Spotted Horse [Large chamber]	"public" or "display" [Group]	--	--
Baffier and Girard (1998:109-110)	--	Salles des Vague, Salon Noir, Rotunda in	"Large numbers of people or group meetings with chants, dancing and ceremonies" [Group]	-Large spaces with monumental [cave] architecture	--

Baffier and Girard (1998:109-110)	Grotte de Cheval	--	"small groups, not exceeding 4-5 individuals … a few initiates" [Small group / private]	-Narrow	--
Baffier and Girard (1998:109-110)	--	--	[Individual / private]	-Confined spaces, difficult to get to, at the bottom of wells or at the very ends of a fissure (diverticule)	-Some, often rare, images
Baffier and Girard (1998:109-110)	Le Grand Grotte	--	[Individual / private]	-Very end of a low passageway (have to crawl numerous meters) -only visible by one person	-bird
Lorblanchet (2001:149)	Peche Merle or Cougnac	--	"where groups of the faithfull could gather and undertake rituals or various actions in front on the paintings	--	--
Lorblanchet (2001:149)	Pergouset		Excludes any collective or large-scale visits	-Only modest space in its passages -The images occur on the roof and walls … engravings on the walls are more visible than those on the ceiling	-Technique used was finely engraved lines, scarcely perceptible and not the more easily visible painting -seems to confirm the desire to conceal the images. This descire seems evident not only in the lightness of the lines but also in the extreme schematic rendering of some images (while others are very realistic), as well as in the incomplete nature (or even voluntarily headless) of the sketches (rough outlines) made up of a few basic lines that neglect fleshy elements and visual appearances.

Grotte de Bernifal
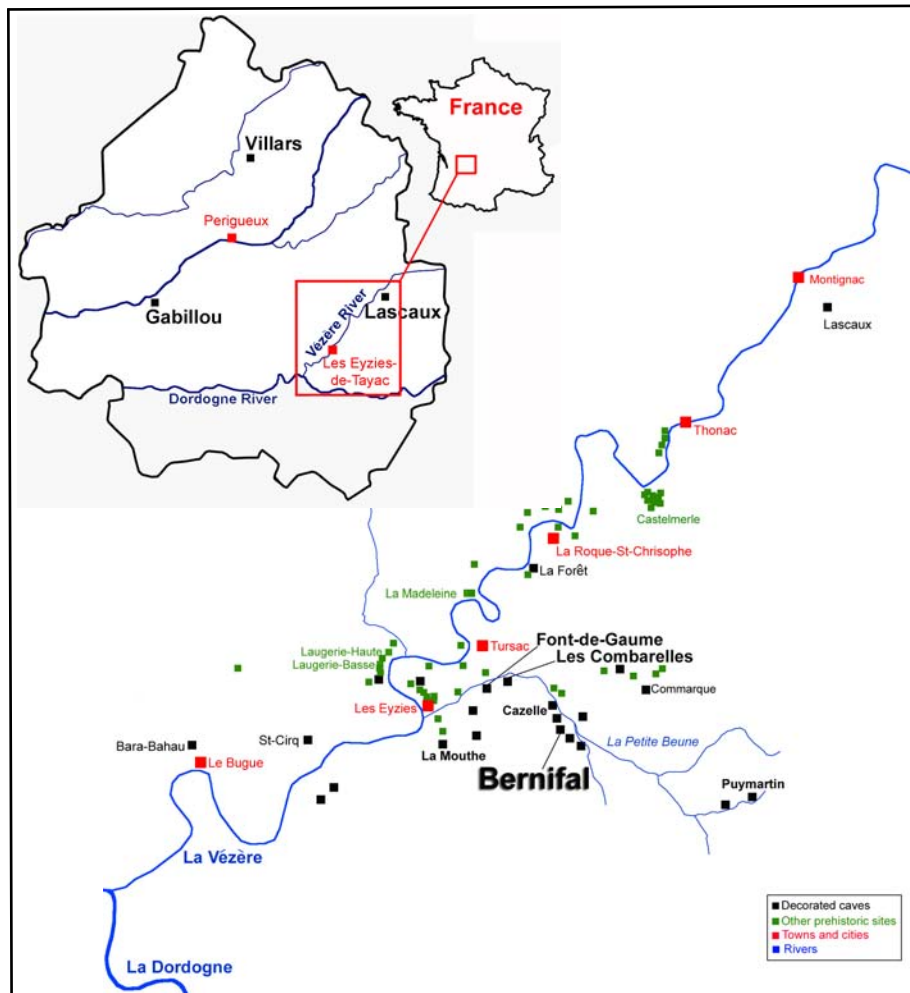
Location of Bernifal along the Beune River
in Dordogne Region of Southwest France

Entrance to Bernifal today and approximate
location of the Paleolithic entrance

Area 9
Area 8
Area 7
Area 6
Area 5
Area 3
Area 4
Area 2
Area 1

N

0   5   10m

AREA 1: Physical Context

2

Image 5.1

Image 4

3

Image 5.2

Image 3

Image 1

4

Image 5.3

Image 1

4

Image 1

Image 5.1

N

2cm

6

4

5

1

4

5

6

3

1,2

Cross Section

50cm

4

5.1   5.2
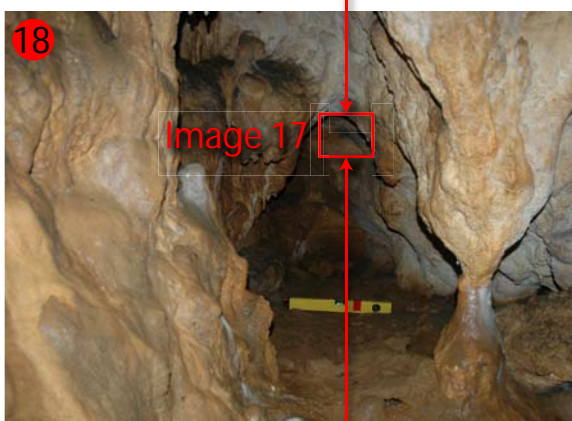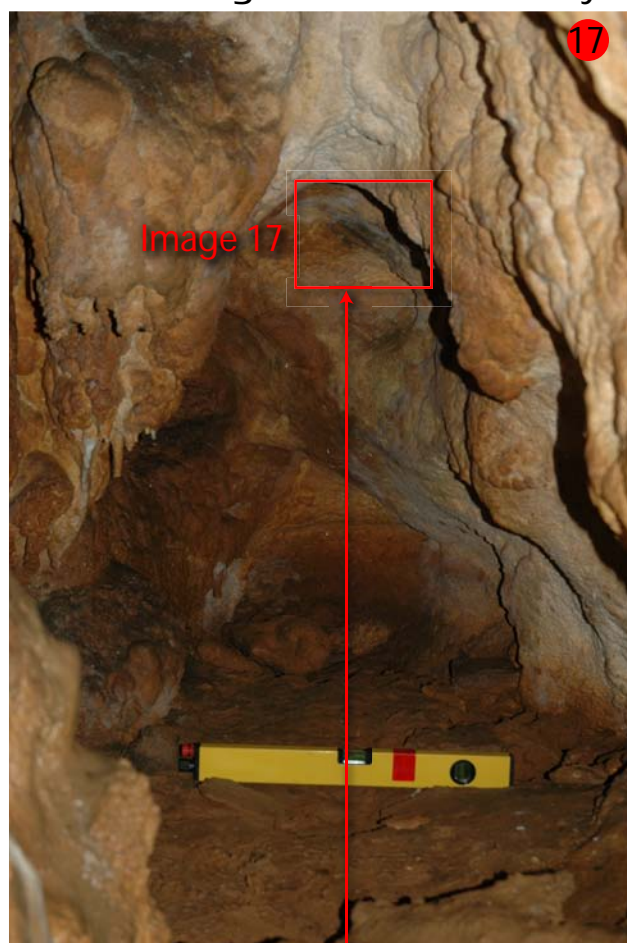
5.3

1

Original Floor Level

Legend

Photo location
and direction

Cross section
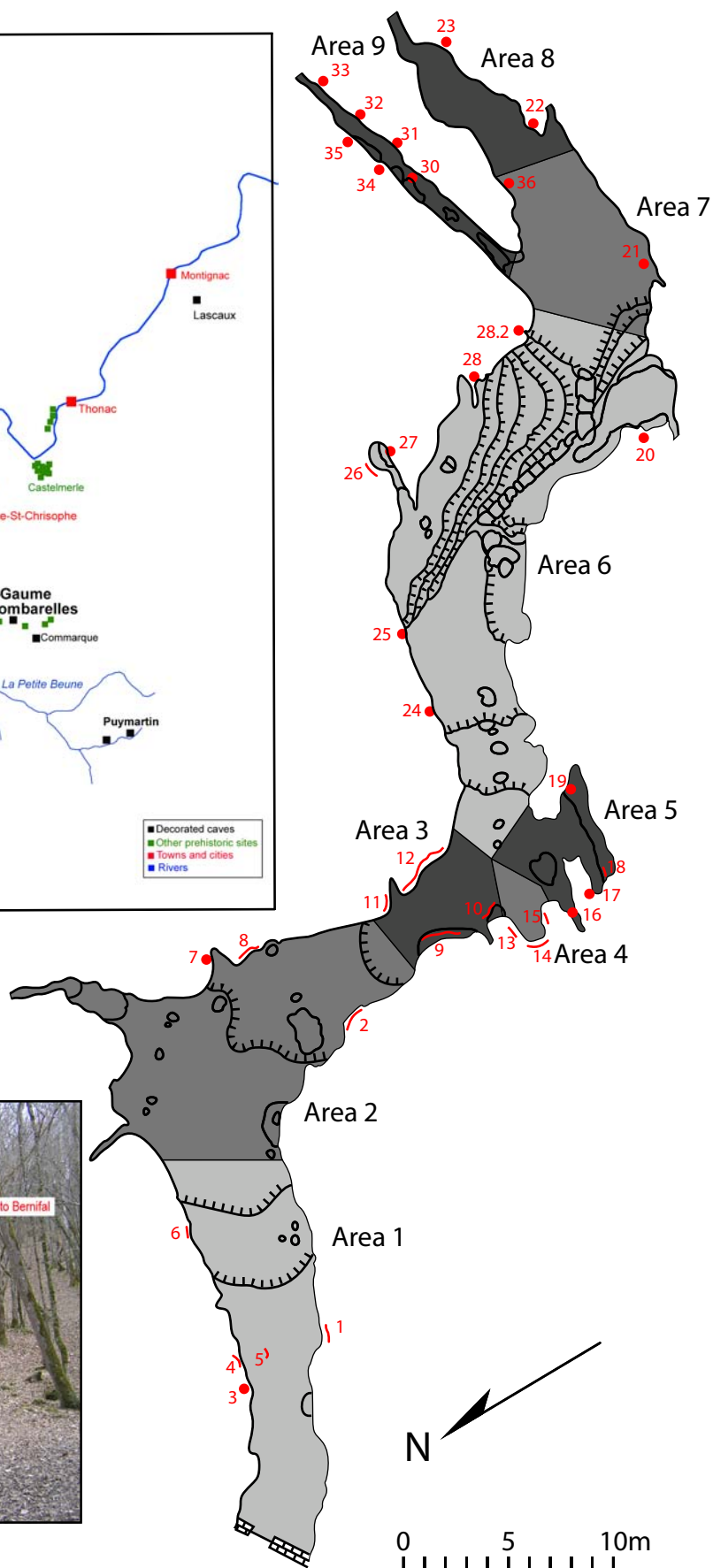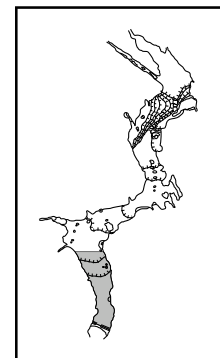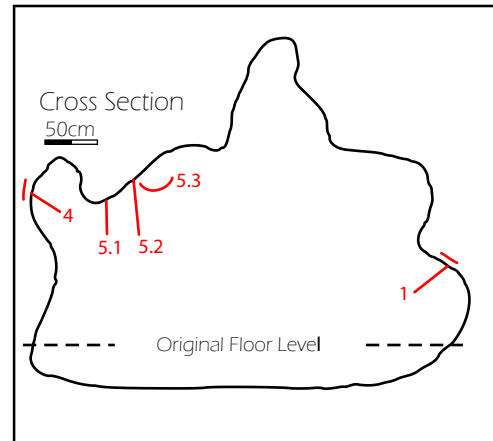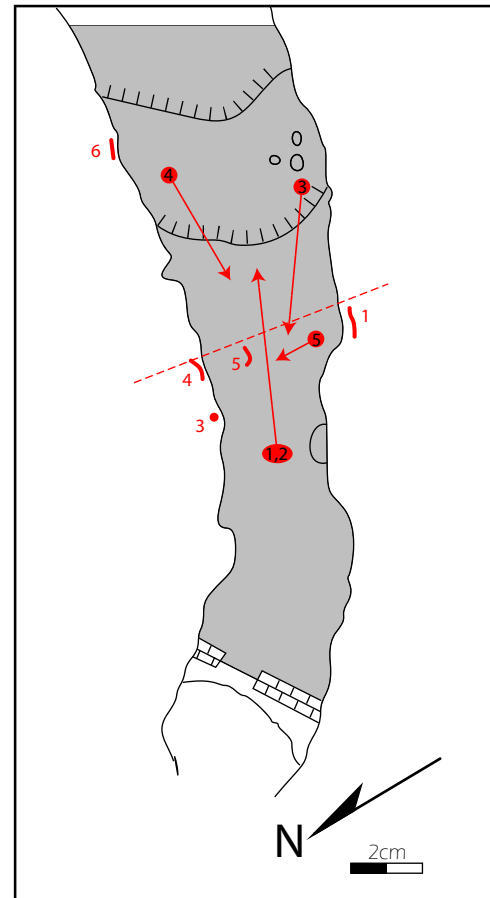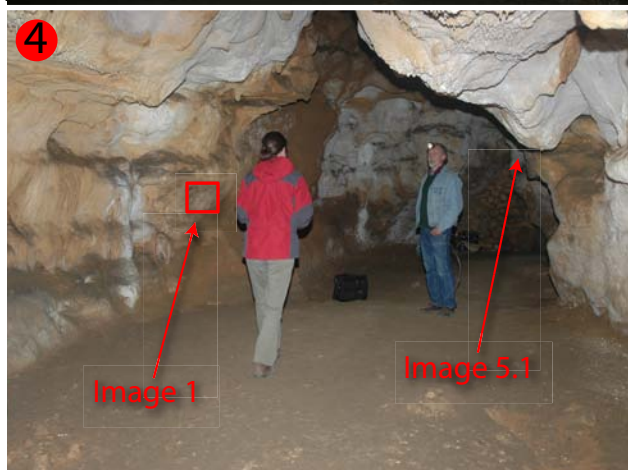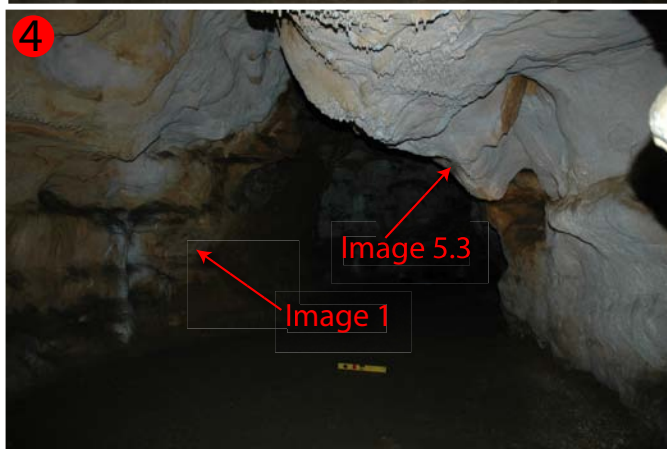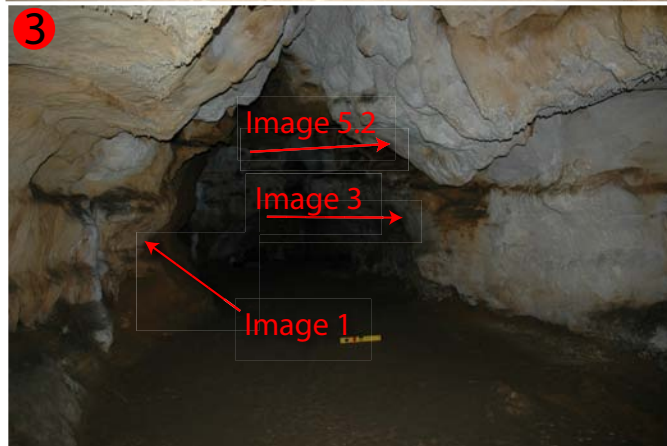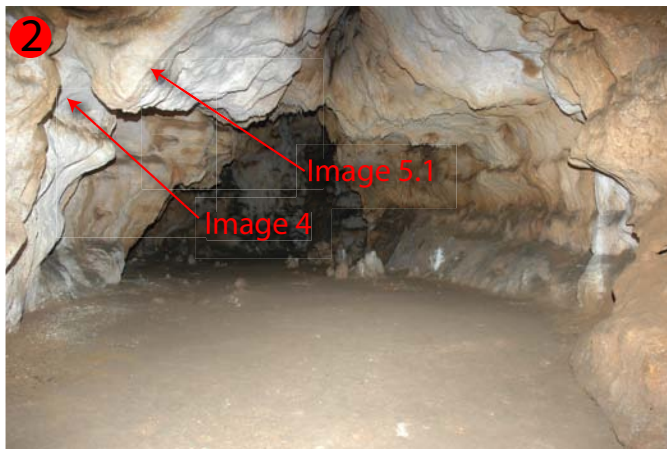
Image location

AREA 1: Image Location and Visibiltiy

Image 5.2

Image 3

Image 6

Image 1

Image 5.2

Image 4

Image 5.3

Image 5.1

5.2

5.3

5.1
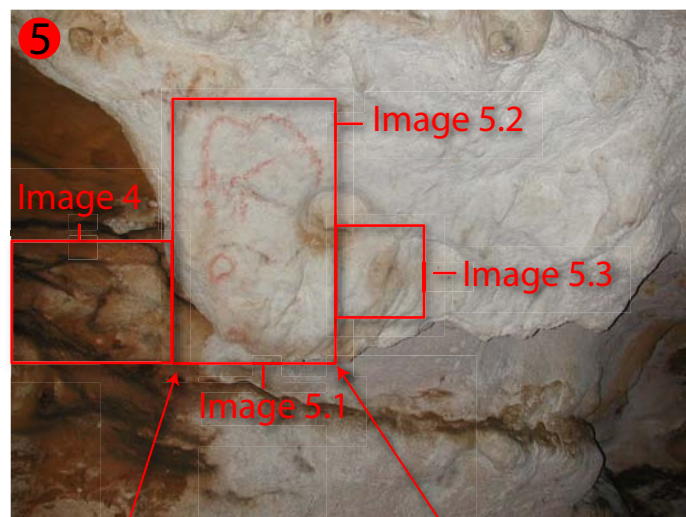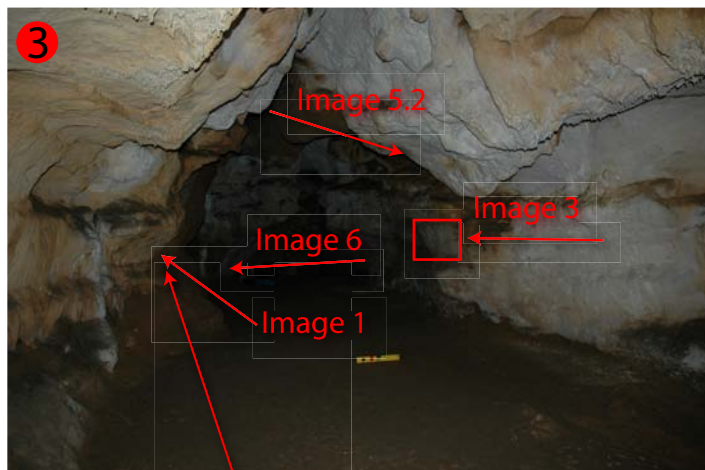
Photo 3 view (in crouched position)

Image 1

Image 5.1 and 5.2

Image 3

visible

optimal

Image 4

Image 6

N

2cm

Image 5.3

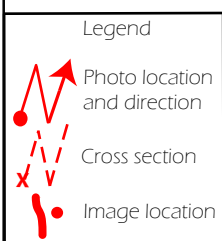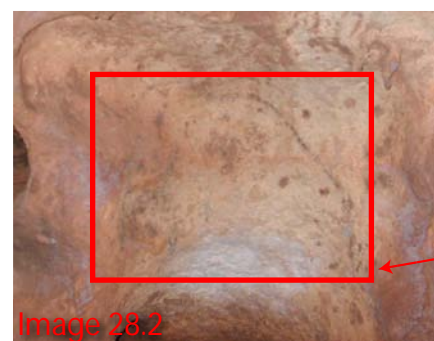# AREA 2 : Image Location, Visibility and Physical Context

Image 7

Image 8

Image 8

Image 2

Legend

Photo location
and direction

Cross section

Image location

visible

optimal

N

2m
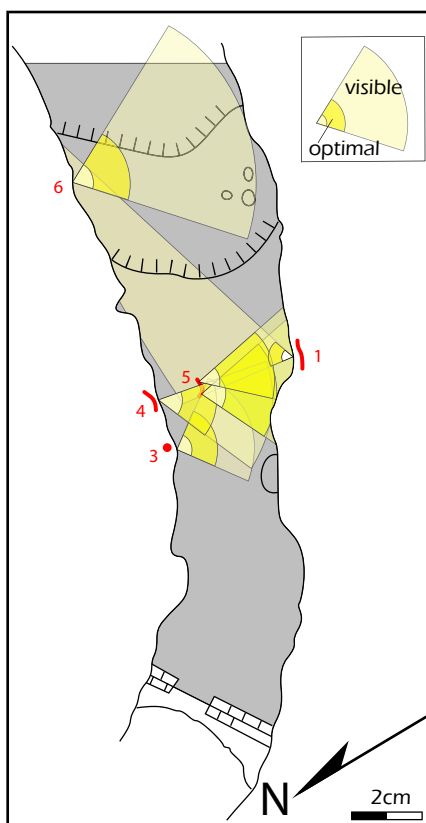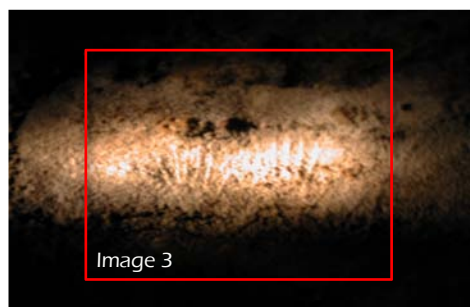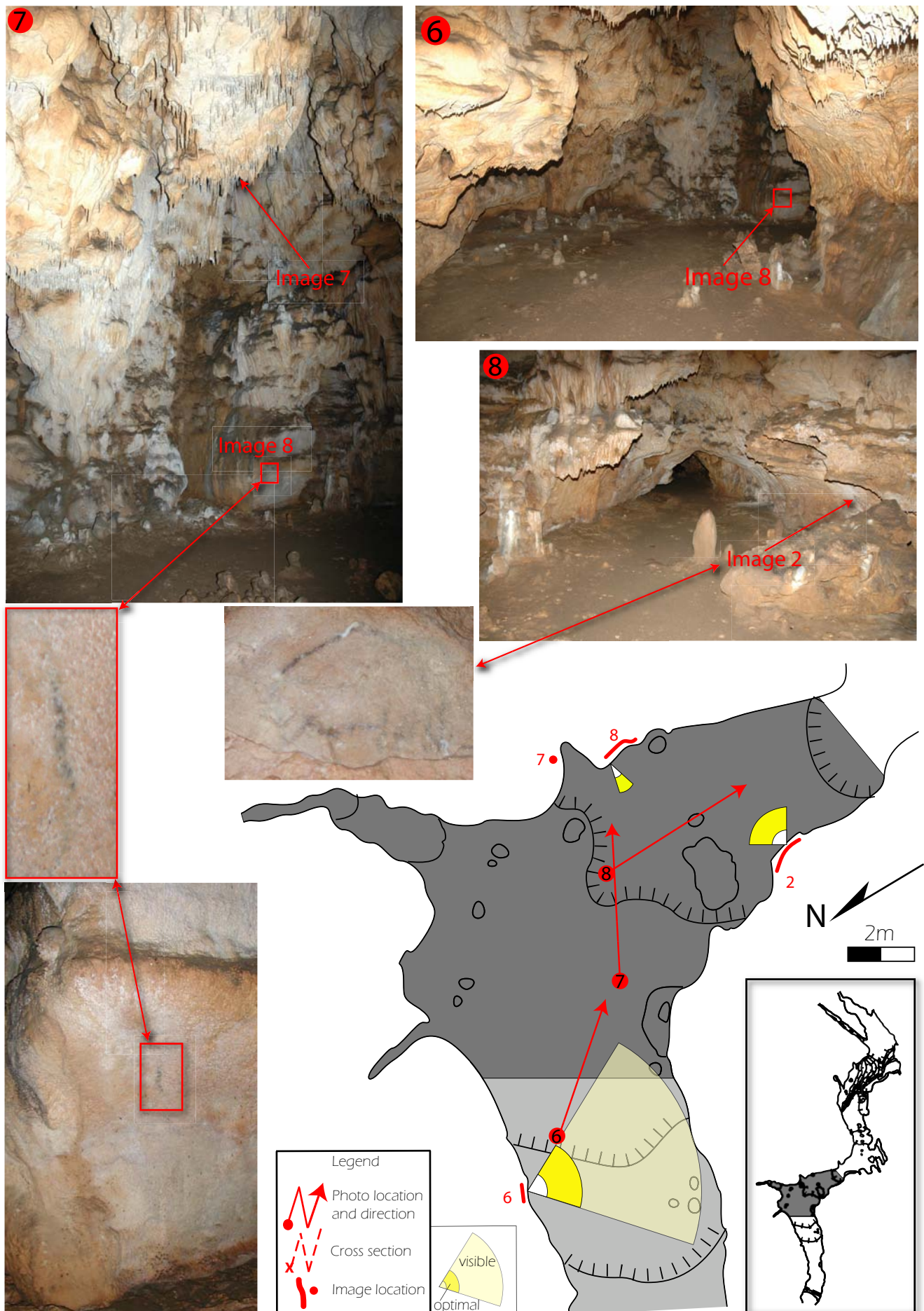
AREA 3 : Image Location and Visibitliy

Panel 9
Panel 11
Panel 12

Panel 9
Panel 12

Panel 9

Panel 10
Panel 11
Panel 9

Legend

Photo location and direction

Cross section

Image location

N

2cm

Panel 12
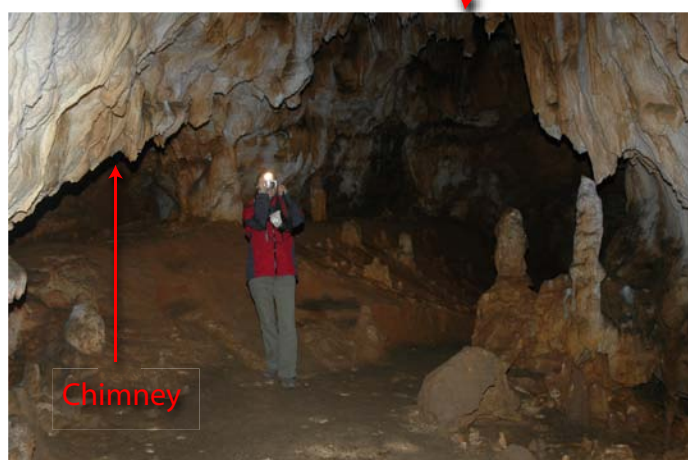Panel 9

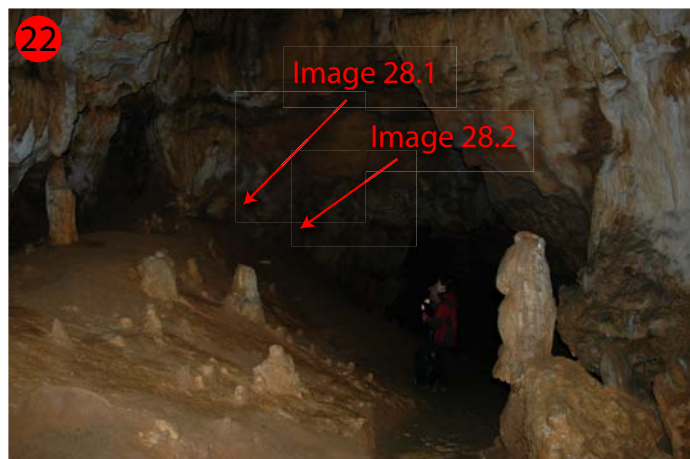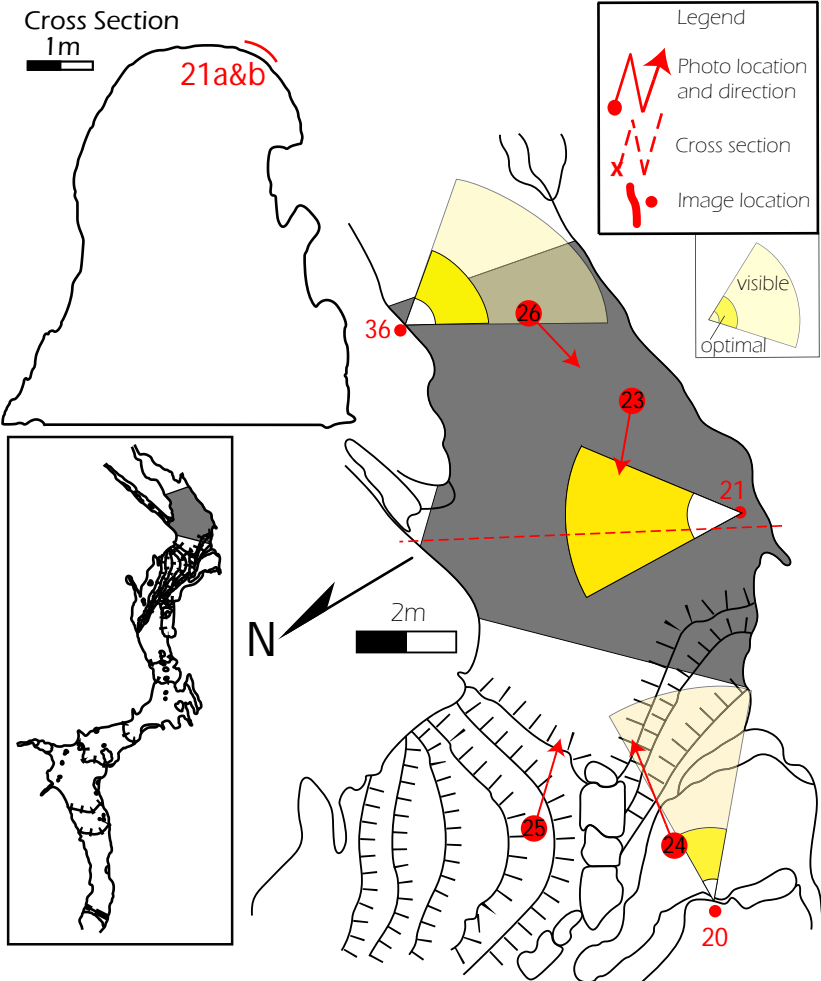Cross section   50cm

12

12

11

10,11

14

13

10

9

X

AREA 4: Image Location, Visibility and Physical Context

2m

N

Cross section
(view West)

50cm

Panel 15   Panel 14   Panel 13

15,16

13   15

14

Legend

Photo location
and direction

Cross section

Image location

visible

optimal

Image 17

Image 17

17

18

Image 17

Image 17

19

18

17

18

17

16

2m

N

Legend

Photo location and direction
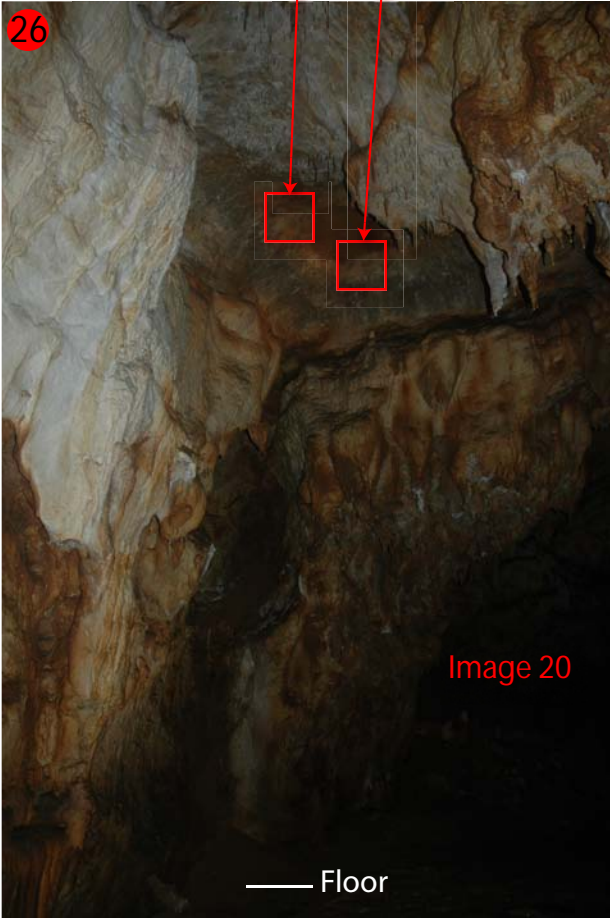
Cross section

Image location

visible

optimal

AREA 6: Image Location, Visibility and Physical Context

22 — Image 28.1 / Image 28.2

21 — Chimney

19 — Image 28.1

Chimney

Image 28.2

Image 28.1

Image 20

28.2 — 1m

28.1 — 1m

N — 2m

19
20
28.2
28
27
26
25
22
24
23
21
20

AREA 7: Image Location, Visibility and Physical Context

Image 25

Image 23
Image 20

Image 24
Image 36

21.1
21.2

Image 21.1
Image 21.2

Image 36

Cross Section
1m

21a&b

Legend

Photo location and direction

Cross section

Image location

visible

optimal

36

26

23

21

N

2m

25

24

20

Image 26

Image 20

Floor

AREA 8: Image Location and Physical Context

30

29

Image 31

Image 31

(highlighted to indicate)

31

33

29

32

35

30

31

Image 30

34

30

31

N

2m

Legend

Photo location and direction

Cross section

Image location

visible

optimal

Image 30