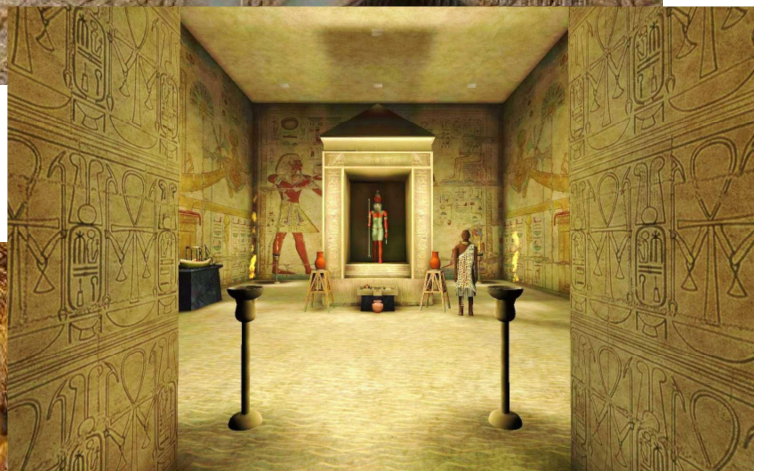
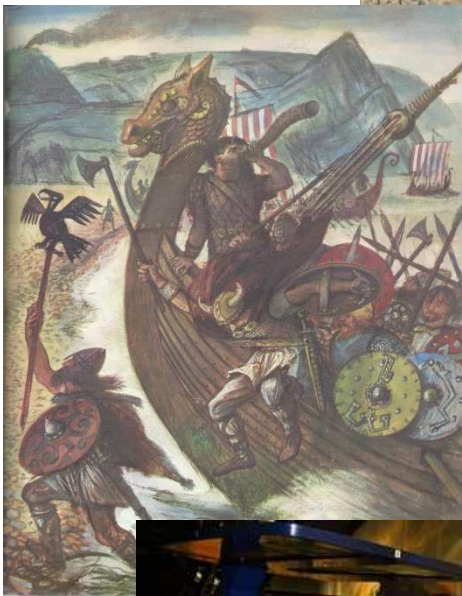


Visualisation for the public in archaeology.

Informing and entertaining the general public through illustrations, scale models, theme parks, serious games and Virtual Reality.

Geerten Jansen – BA Thesis



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Bachelor thesis.

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1. Introduction

The relationship between archaeological heritage and the general public has been a recurrent theme in the archaeological discipline. Indeed, in times when government spending has become more rather than less stringent, thus leaving archaeologists to look towards visitor revenue for finance, the public appeal of archaeological heritage sites has become increasingly important. Yet, revenue also implies competition for the visitors attention from the non-archaeological entertainment sector, leaving archaeologists to wonder how to present archaeology in an accessible, visual, and imaginative manner to the public.

Looking back, it becomes clear several media can be used to visualise archaeological content for the public. The first is by using reconstruction drawings and illustrations of archaeological sites and artefacts to supplement exhibitions and textbooks. The second is by illustrating the spatial dimensions of archaeological sites and historical architecture with scale models, mainly in exhibitions, but scale models have also been photographed and used in textbooks. The third medium of visualisation adds an element of fun and interactivity by building complete ‘experiences’ in the form of theme parks. The fourth and most recent medium is the use of digital technology, ranging from simple 3D models to highly immersive Virtual Reality systems, for visualisation.

In order to understand the complexities of the visualisation of archaeological information for the public all of these different media must be examined in an archaeological heritage context. Therefore, the objective of this paper is to trace the history of visualisations for the public in archaeology and to examine for each visualisation medium its advantages, disadvantages and its relationship with other media, making the research question as follows:

What media of visualisation have been used in the past in an archaeological heritage context, and how well do they function as a tool for the visualisation of archaeological material for the public?

To answer the research question three sub-questions will be examined:

What forms of visualisations for the public have been used in the past by archaeologists?

What were the perceived advantages and disadvantages of various media of visualisation?

How do the different media relate to each other?

Each of the four visualisation media has a chapter devoted to it, where the various attributes and workings of these media in an archaeological heritage context will be explored. Finally, the different media will be compared to see how future archaeologists can use them for creating attractive, visually appealing and imaginative heritage experiences for the general public.

2. Reconstruction drawings: a tradition.

2.1 Introduction.

Even before the advent of archaeology as a separate discipline there was a long tradition of illustrating archaeological sites, albeit not always with academic interest. The motives and conventions of this tradition proved highly influential in later academic archaeological illustrations.

First, I will offer a general overview of the history of illustrations of archaeological sites. Then, I will move on to consider archaeological drawings and establish to what extent the tendencies of the previous tradition of illustration have been influential; moreover, I will discuss the most important theoretical issues in the field. Finally, several popular archaeological publications will be discussed to illustrate and test how archaeological illustrators have dealt with to these theoretical issues.

2.2 A short history.

Archaeological reproduction illustrations are part of a longstanding tradition of the drawing of archaeological sites. In order to understand the various features of modern archaeological illustrating, one must first consider the context and history of this tradition.

While early illustrations of archaeological sites go back as far as the Middle Ages and often incorporate folkloristic elements, see for instance the medieval depiction of Stonehenge in figure 1 (Piggott



Figure 1. A medieval depiction of Stonehenge (Piggott 1987, 8).

1978, 8), the rise of the production of illustrations of archaeological sites can be

viewed in the context of early modern antiquarianism. The increasing interest in the classical world in the Renaissance led to the rise of collections of archaeological artefacts and illustrated publications about monuments from antiquity. The illustrations that originated from these interests try to give a faithful reproduction and often show a profound interest in and knowledge of the classical world.

Table 1. Recurrent motives in archaeological depictions of prehistory (Moser and Gamble 1997, 188).

Icon	Evidence		
	archaeological	anatomical	environmental
club	none		
animal skin garment	none		
stone tools	yes		
long hair		none	
hairiness		none	
docile expression		none	
thick neck		none	
stooped posture		none	
flat feet		none	
cave recess (signifying a wild place)			yes, but open sites commonly inhabited
crevasse (as a symbolic gulf between us and them)			no

Another important influence on the drawing tradition was the Romantic era. In various ways the aesthetics of Romanticism proved to be highly influential in the design and drawings styles of contemporary illustrations of the past. One can see this clearly by observing 19th century illustrations of prehistoric life. In Franz Unger's (1800-1870) *Die Urwelt in ihren verschiedenen Bildungsperioden* (1851) where prehistoric people are depicted as modern Europeans living in a peaceful Edenic environment, while the romantic motive of the noble barbarian, which has its roots in classical images of and writings on archaic ancestors and barbarians, is also present: the prehistoric characters are depicted naked, and the man has a beard and is carrying a stick (Moser and Gamble 1997, 191, 207). See appendices 1 and 2 for two examples.

As archaeological evidence on prehistory started to be incorporated in historic drawings the biblical environment in illustrations of prehistory diminished according to the evidence. The noble barbarian motive (see appendices 3 and 4) remained however, but was given a more brutal image: clubs, animal skin dress, hairiness, long hair, a stooped posture etc. (see table 1 from Moser and Gamble 1997, 188) which proved to be a returning theme in subsequent archaeological illustrations of prehistory (Moser and Gamble 1997, 188, 191-203, 207, also see the illustrations of Czech illustrator Zdenek Burian (1905-1981), for example in Beaumont 1990).

Another example is the depiction of ancient Gallic heroes in 19th century France, which was highly influenced by nationalist ideology. It was in this century that a prototype of the 'Gaul' was developed and copied through numerous statues and illustrations, and that

would last well into 20th century setting a standard for depicting pre-roman warriors. The most famous example is the statue of Vercingétorix at Alesia, a symbol of French independence: while the artists tried to adhere to historical realism, it is now known that the statue wears anachronistic bronze age armour and weapons originating from a wide geographical range. Yet in future illustrations these anachronistic elements, along with fantastical ones such as the winged helmet, continued to be used, see figure 2 (Champion 1997, 226-228).



Figure 2. The statue of Vercingetorix at Alesia, drawn by François Guizot (1787-1874) (Champion 1997, 226).

2.3 Archaeological illustrations.

From the outset, proponents of archaeology have claimed to get rid of earlier romanticist interpretations of the past and replace them with a scientific approach. In hindsight, however, it seems that archaeologists, without realizing, preserved many romanticist motives¹. The stereotypical 19th century image of the Gallic warriors, for example, has been spotted in archaeological illustrations as late as 1995 (Champion 1997, 226-228). Similarly the 19th century elements of prehistoric mankind (club, hairiness, animal garb etc.) are still being reproduced in children's books and, on a more general level, have taken a lasting precedence in the mind of the public (Burt 1987). The fact that archaeologists haven't succeeded in changing this popular image of prehistory attests to the lasting impression illustrations can make on the collective memory.

Even though illustrations are considered an important element in presenting archaeology to the general public, archaeologists have been remarkably uninterested in the dynamics of picture-audience interaction, even to such an extent that one can speak of iconophobia (James 1997, 24). This neglect of the visual is thought to stem from a fundamental believe in the superiority of text over image, and a fear that the viewer might focus more on the pictures than the text when both are presented in a museum (James 1997, 24). Perhaps this stems from the pervasive influence the study of history, with its emphasis on

¹ One could argue that the romanticist motives were also preserved in popular archaeological book series published by Time Life (1961-2003) and National Geographic.

textual sources, has had on the development of archaeology. It seems that the same archaeologists who claim to be able to analyse and interpret visual elements from the past, pictures like the imagery on classical ceramics, choose not to acknowledge the potential of pictures when it comes to communicating with the general public (archaeologists use drawings aplenty during research, see for example Gerster 1994).

As mentioned before, images tend to leave a lasting impression in the mind of the public, but by ignoring the increasing prominence of the visual in 20th and 21st century society one risks to be oblivious to this intrinsic quality of illustrations. This is a vital point since it can lead archaeologists' endeavours to inform the audience to failure: no matter how much archaeologists try to give the public an archaeologically 'correct' interpretation by a combination of text and images, the very nature of illustrations makes sure that they are highly persistent in the mind of the public and in many cases take precedence over the accompanying text. This is even true when images lose their original context, such as with reproductions, when they still prove capable to be highly influential and convey meaning, albeit an entirely different one than the illustrator had originally intended. Thus pictures create their own realities which can be entirely disconnected from the nuances of the archaeological discussion. This effect is also referred to as the 'inertia' of images (Molyneaux 1997, 6).

The enduring influence of romantic imagery of the past and the matter of inertia raises the question whether true, 'factual' reproduction or representation is possible at all.

2.4.1 Theoretical issues: the question of reproduction.

The term 'reproduction' is believed to be debatable since an illustration can never be a copy of its archaeological subject. Rather, it is an interpretation made by the draughtsman on the basis of fragmentary archaeological evidence, making the illustration an outcome of a discussion, a conclusion where it is unclear to the public how the draughtsman reached this conclusion (Molyneaux 1999, 134). It has been suggested that the term 'simulation' should be used to refer to archaeological drawings instead of 'reconstruction' to emphasize this point (James 1997, 22).

The relationship between archaeological illustrations and the general public is problematic, since most people instinctively regard drawings as a source of authority on its own and expect them to show 'how it really was back then' (compare with Leopold von Ranke (1795-1886): 'wie es eigentlich gewesen' (Ranke 1824, VI)). It has been remarked that the more impressive and naturalistic a drawing is made, the more authority it has in the eyes of the general public (James 1997, 26). These are unrealistic expectations however: unless one uses an outspoken

style or, like Alan Sorrell, uses strategic shadows to cover speculative architecture and other features (see for example Jessup 1967), one is always forced to make explicit decisions regarding colour and style of clothing, hairstyles and architecture. Therefore, many archaeological reconstruction drawings typically contain ‘unflagged guesses’ i.e. the choices the draughtsman had to make in order to make a good illustration, thus cancelling out many alternative reconstructions of the archaeological material. As a consequence the general public is unaware of the degree of uncertainty and complexity, or of possible alternatives to the archaeological ‘reality’ presented in an illustration (James 1997, 26).

2.4.2 Theoretical issues: illustrations as art?

According to the British illustrator Alan Sorrell (1904-1974), drawing archaeological illustrations can be considered a form of art. In Sorrell’s view, the central consideration in creating any drawing is the creation of an enduring atmosphere (Sorrell 1981, 21). Yet, others consider archaeological illustrations primarily a way to communicate archaeological information to the viewer, which allows little room for artistic considerations (James 1997, 23).

Of course archaeological illustrations need to adhere to the archaeological evidence, but since a drawing is the outcome of an artist’s creative process, and considering the ambiguity of archaeological data and the issue of reproduction, it would seem rather pointless to ignore the effect of atmosphere.

But this would seem even more so when one remembers the main objective when creating archaeological illustrations: enticing an audience and inform them about archaeology. To further this objective, archaeological information must be communicated to the general public by use of illustrations, but these can only communicate when they are able to get the attention of the public in the first place. Similarly, would one go and see an uninteresting film? In this way, archaeological illustration can be considered a form of art, in captivating the general public with a balance of atmosphere and archaeological information. When trying to gain the attention of the audience, a drawing’s quality can only be measured by the effect it has on the emotions of the audience: does it cater to public’s innate curiosity for the past (Bintliff 2011, 19-20)?

2.5 Visualisation in archaeological publications for the public.

The Dawn of Civilization (1962), edited by Stuart Piggott and with contributions by fourteen authors, aims to provide its readers with ‘a connected visual story of the ancient past’

according to its blurb. It features 940 illustrations of which 172 are colour plates, 110 'original reconstructions' and 645 photographs and drawings. In addition, the foreword mentions that it has been the authors purpose 'throughout not only to interest but to excite' (Piggott 1962, 5).

Clearly, the visual element has been given a central role in this publication. The introduction features a list of ancient technologies (page 16, see appendix 5), arranged from earliest to late, and each technology is depicted by a small illustration. The accompanying text explains that the illustrations are mostly based on actual objects, though due to their size and prominent inking which tends to stylize the drawings, they seem to have a more iconic quality. These illustrations don't focus on details, rather, they are more focused on communicating an idea, like illustrations found in comic books. Finally the list is supplemented by a graph on the opposite page which shows the first appearance of each technology (x-axis from 1000 B.C. to 500.000 B.C.).

The authors could have simply given a date to each technology presented in the list, but by using the graph they make it easy for the reader to compare the technologies on a temporal basis. It helps the reader visualize the timescale of human technological development while keeping this a light endeavour by preventing the reader from having to read through a lengthy text. Therefore the iconic quality of the illustrations is effective.

Every chapter consists of a section with text, black-and-white illustrations and graphs, mostly originals taken from archaeological publications, followed by a section of colour illustrations and photos. The colour illustrations by Gaynor Chapman (1935-2000) stand out by virtue of their style and outspoken colour palette which reminds one of art deco illustrations. Clearly, the illustrator did not intend to present the viewer with a naturalistic reconstruction. Rather, there seems to be a symbiosis between conveying detailed archaeological information through fine line drawings on the one hand, and creating a warm atmosphere on the other, since the illustrator prefers unnaturally bright colours. Exaggerated colours are applied regularly, as in the night sky in an illustration of a ziggurat (figure 3) on page 78, or in an illustration of ancient Egypt (see appendix 6) on page 101, which makes these illustrations look like frescos.

By choosing Chapman's stylized, artistic designs for the illustrations it seems the editor made a conscious decision to emphasise the speculative nature of archaeological illustrations. The illustrations make clear to the viewer that there is a difference between illustrations ('reconstructions') and photographic material which is supposedly less speculative than the former (Daston and Galison 1992, 120). This difference is expanded upon



Figure 3. Illustration of a Ziggurat by Gaynor Chapman. Note the stylized colouring of the night sky (Piggott 1962, 78).

by carefully explaining the archaeological basis of each colour illustration in an accompanying text (an example is the text accompanying an illustration of the Minoan palace at Knossos, Crete, page 207). Also, the vibrant colours make for a more diverse visual experience and give the book a lively appearance.

A publication that features rather different illustrations is *Age by Age. Landmarks of British Archaeology* (1967) by Ronald Jessup. Alan Sorrell's illustrations seem less stylised than Chapman's, but on closer inspection it becomes clear that Sorrell had to make artistic choices as well: shadows are highly pronounced and humans are drawn rather vaguely, especially when it comes to their faces, leaving their features to suggestion. This seems especially true for illustrations depicting prehistoric scenes (see appendices 7 and 8 and Jessup 1967, 7, 9, 10, 14, also Atkinson 1959), while it is interesting to note that the illustrations depicting the Iron Age, the Roman period and the Dark Ages, with the exception being a depiction of a Viking raiding party (figure 4 and Jessup 1967, 65), really don't feature humans at all and seem to predominately feature large settlement vistas or detailed drawings of artefacts (see appendix 9 and Jessup 1967, 29, 31, 47). It seems Sorrell prefers to allow for a certain ambiguity in his illustrations to involve the viewer's imagination, but also to accommodate the uncertain nature of the archaeological hypothesis that is, as has been discussed before, so prevalent in reconstructions of archaeological sites.

In Sir Mortimer Wheeler's *Roman Art and Architecture* (1964) illustrations have been used sparingly and share pages with the much more numerous photographs and technical line drawings of Roman sites and artefacts. The illustrations vary widely in style: from stylish

black and white drawings by Alan Sorrell (see appendix 10 and Wheeler 1964, 86-87) to a bright colour reconstruction of Diocletian's palace by Ernest Hébard (see appendix 11 and

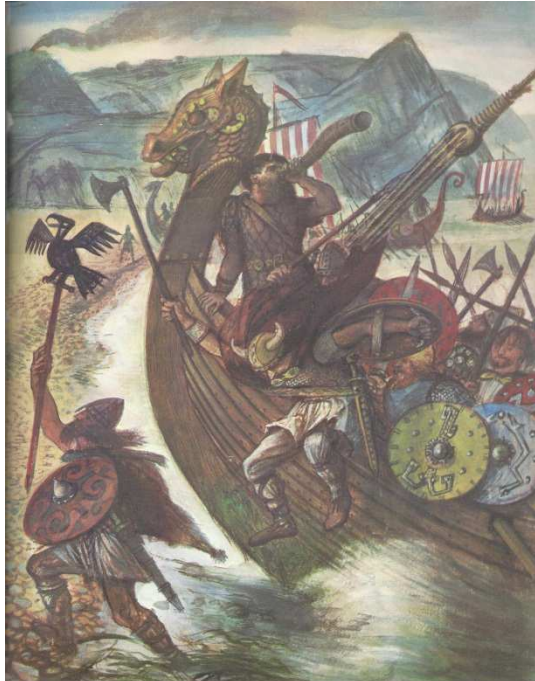


Figure 4. A Viking raiding party by Alan Sorrell (Jessup 1967, 65).

Wheeler 1964, 144) to a highly detailed interior of the temple of Baalbek by William Suddaby (figure 5 and Wheeler 1964, 98-99).

Another archaeological work that doesn't conform to one drawing style in its illustrations is *Nederland in de Prehistorie* (Louwe Kooijmans *et al.* 2009), which features a full colour portrait of a man from the prehistoric era (appendix 12) by Kelvin Wilson (Louwe Kooijmans *et al.* 2009, 557- 561, pl. 46B), a line drawing reconstruction of an iron Age farm by Martin Valkhof (see appendix 13 and Louwe Kooijmans *et al.* 2009, 598) and a coloured overview of a prehistoric hunting and gathering scene by Leo Verhart (see appendix 14 and Louwe Kooijmans *et al.* 2009, 157-161, pl. 9B).

All in all, it seems that a certain dose of artistry, such as an outspoken style or vibrant colours, can remind the public of the uncertain nature of archaeological reconstructions while at the same time communicating an image of the past. Next we will discussed how scale models, whose features have a lot in common with illustrations, function in archaeological visualisation.

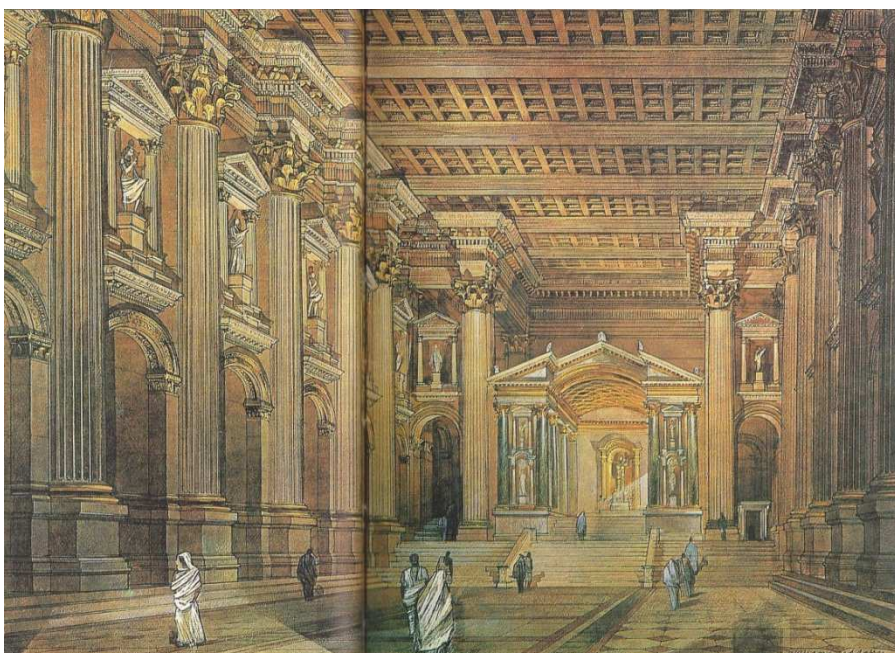


Figure 5. Temple of Baalbek by William Suddaby (Wheeler 1964, 89-99).

3. Museum models.

Another tradition in archaeological heritage visualisation is the use of scale models to illustrate the spatial dimensions of ancient architecture and interiors. Typically, these models can range from large reconstructions of ancient towns and palaces to miniature living rooms and would be incorporated in exhibitions and shown alongside archaeological material. Clearly, scale models provide a better means to create a general overview of the spatial dimensions of archaeological sites for the general public than reconstruction drawings do.



Figure 6. *Plastico di Roma Antica* (www.archart.it).

Yet, one could argue that the problem of reproduction discussed earlier also holds true for scale models, as the scale modeller is no different in his or her decision making process than the draughtsman when designing a visualisation: First, the modeller will need to make choices regarding colour. These can be either unambiguous to provide the general public with a clear visualisation of the colours used in the past, shaded colours to create a more rugged, 'realistic' look or a mix of both. Second, a scale model can accommodate only one reconstruction interpretation, which is quite problematic considering the uncertain nature of archaeological hypothesis on the one hand and the expectations of the general public to show how it really was on the other.

It seems however that scale models differ from drawings in that they are capable of capturing the audiences curiosity for a longer period of time. This is especially true for large,

complex scale models that feature a lot of ‘hidden’ corners for the viewer to investigate, thus keeping the viewer interested in the scale model for a longer period of time. A prime example of such a model would be the *Plastico di Roma Antica* (1933, Museum of Roman Civilization), a scale model of Imperial Rome (figure 6) boasting 16 x 17,5 meters and featuring very small details (Guidi *et al.* 2006, 349). The model has been digitized to support the digital Rome Reborn project, since such level of detail was considered unfeasible to recreate digitally by hand (Guidi *et al.* 2006, 249-250). Rome Reborn will be discussed further in chapter 5.

In addition to museums, pictures of scale models have also been used in popular archaeology books like in Paul MacKendrick’s ‘Stones Speak’ series. In *Greek Stones Speak* (1962) a model is used to illustrate the layout of the classical Delphi complex (see appendix 15, also Mackendrick 1980, 293) and the Roman site of Baalbek, Lebanon, (page 405) (MacKendrick 1962, 293, 405). Interestingly, the most recent publication in this series, *North African Stones Speak* (1980) features no scale models (MacKendrick 1980), probably because none are available for visualisation, since the archaeology of North Africa has never been a prominent area of research in classical archaeology. One could argue that with the rise of digital 3D models, scale models become increasingly overlooked, although the lack of archaeological literature on scale models in a heritage setting indicates that this medium was never a prominent subject for study.

Before continuing to digital 3D models, multimedia and Virtual Reality systems, we will first explore another type of models, namely those that are scaled up to real life dimensions, like theme parks. We will come back to scale models again later, when this medium will be compared with reproduction drawings, theme parks and digital visualisation in terms of interactivity and authenticity.

4. Museums and historical theme parks: authenticity and commoditization

4.1 Introduction.

Another type of visualisation of archaeological material is in the form of theme parks and heritage parks. These parks differ from museums by the use of life-size reconstructions of historic architecture, actors dressed in historical costumes and an overall approach appropriate for a broad audience. More often than not, in regard to the general public these parks feature a balance between the communication of archaeological information and entertainment. The degree of entertainment offered is related to any commercial considerations the management of an archaeological park might have (i.e. to attract revenue), although since the advent of the Viking heritage centre *Jorvik Viking Centre*, York, it seems archaeology and commerce don't necessarily have to cancel each other out. As a result, there is a wide variety of archaeological heritage parks which each features a different approach. One can look for example at the Dutch open air theme park *Archeon*, which features prehistoric, roman and medieval settings. In order to understand these complexities a closer look at the workings of tourist sites is necessary, not at the least since archaeological heritage sites in times of decreased government spending find themselves increasingly in direct competition with commercial entertainment to increase revenue (Macdonald and Alsford 1995, 131).

4.2 Types of heritage tourism.

In their research on Viking heritage tourism, Halewood and Hannam discern five types of heritage tourism, on a continuum from academic austerity to the frivolous: (1) conventional museums, (2) heritage centres, (3) theme parks, (4) village reconstructions and (5) seasonal fairs or markets which feature historic re-enactment societies (Halewood and Hannam 2001). Each type has its own way of presenting archaeology to the public and each has a different approach to commercialism and authenticity.

For instance, the museum (type 1) discussed in Halewood and Hannam, Bygdøy (Oslo) which is centred on three longboats from the Viking era, features little information on the archaeological material presented by using text cards with little description and leaves interpretation almost completely to the visitor. The architecture of the museum is described as sober, which makes it look like a temple to Norwegian nationhood (Halewood and Hannam 2001, 569).

This austere style makes for a sharp contrast with the second type of heritage tourism, exemplified and perpetrated by the *Jorvik Viking Centre* (York), founded by the York

Archaeological Trust in 1984, which aims to provide archaeological information to the public in an accessible, fun, and commercially viable way. The main attraction of the Jorvik Viking Center is its 'time car ride' (figure 7) which takes the visitor on a tour through a reconstructed Viking-era York. The time cart ride caters to all the senses by exposing visitors to Dark Age smells and bantering (in 2001 and 2010 extra investments were made to include digital animations (Koranteng, 2001)). The exhibition also



Figure 7. The time cart ride (www.jorvik-viking-centre.co.uk).

features an archaeologists at work section, presented directly after the reconstructed town and featuring a reconstructed archaeological excavation at the the Jorvik site. After the time cart ride visitors are guided though a traditional exhibition and a gift shop. The time cart ride met with great popular and commercial success. Moreover the revenue is used to fund archaeological projects in York. As a result Jorvik Viking Centre-inspired heritage centres were founded throughout the United Kingdom (Halewood and Hannam, 2001, 570-571; MacDonald and Alsford 1995, 135-136) by companies such as the now-defunct Past Forward Ltd. and the Continuum Group (www.continuum-group.com).

On the other end of the spectrum open-air parks and seasonal fairs provide visitors with archaeology-themed entertainment, although each vary in their degree of faithfulness to the archaeological material. Theme Parks (type 3), like 'Viking land' in Norway, on a more general level one can think of Disney Land, are not tied to a specific archaeological site and are primarily focused on providing entertainment and creating revenue. In the case of Viking Land this has led to the Vikings being portrayed in a rather popular stereotypical fashion, with the more exciting parts of Viking history being emphasised (i.e. brutal, pillaging and seafaring warriors) (Halewood and Hannam 2001, 571).

A fourth type of open-air attraction is the reconstructed historical village which is usually tied to an archaeological site and is designed to give a less popular entertainment-oriented experience to visitors. As a consequence, the Viking village reconstruction of Foteviken (Malmö, Sweden) is more focused on agricultural aspects and village life than warfare. Trade Fairs (type 5) initially evolved around artisans producing historic wares, but later on they became more carnevalesque, featuring music entertainment and people, mostly

visitors, wearing historical costumes. It is remarked that trade fairs seem to resemble a modern version of the medieval seasonal fair, which is characterised by a combination of entertainment and trading (Halewood and Hannam 2001, 572-574). It should be noted that all types are or claim to be equally concerned with providing visitors an authentic Viking experience. It would seem, however, that a Viking trade fair is a more authentic experience than a museum exhibition, especially when compared to the austere set-up of Bygdøy.

It is debatable whether such a 5 type scheme is necessary, since theme parks and village reconstructions seem to be two sides of the same coin. Also, doesn't the Jorvik Viking Centre resemble a scaled down version of a theme park? Still, these 5 types form an insightful framework to explore the complexities of visualisation at archaeological heritage sites

4.3 All types combined: Tintagel.

An interesting site where all types of heritage tourism seems to co-exist is the town and castle of Tintagel, Cornwall (figure 8). The legendary birthplace of king Arthur, a central figure in British folklore, is a popular destination for a wide variety of tourists, encompassing both New Age 'Arthur believer' tourists and cultural-heritage oriented tourists. The town is

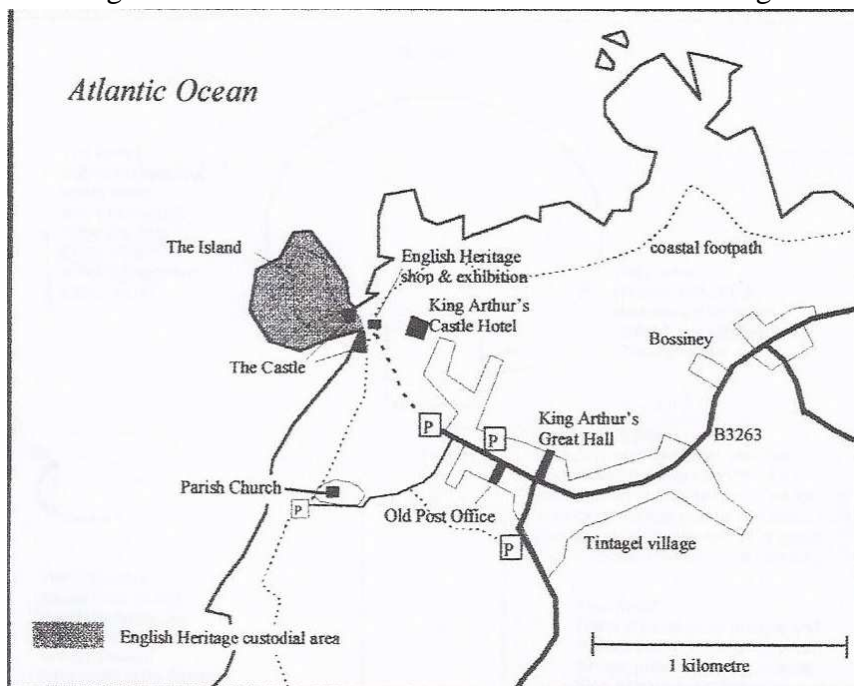


Figure 8. An overview of the Tintagel heritage complex (Robb 1988, 584).

separated from the castle and is characterised by souvenir shops and various attractions that are vaguely connected to a popularized version of the Arthurian myth ('The Surfing Merlin's', King Arthur's Great Hall) (Robb 1998). Indeed, the vibrant mix of popular culture and the carnevalesque reminds one of the theme parks and trade fairs discussed earlier.

Since most tourists are content with only visiting the town and never bother to explore the actual archaeological site (Robb 1998, 584), it seems the majority aren't interested in Dark Age archaeology but instead are more interested in the stories surrounding Tintagel (there is

also a Dark Age cemetery at Tintagel, yet this site isn't developed and is hardly incorporated in the larger heritage complex). In this way it is the sense of place connected to a mythological story that makes up most of the attraction to a large segment of the public, even though the archaeological evidence for a historical Arthur-figure at Tintagel is limited at best (though a inscribed sixth century stone uncovered by Chris Morris in 1998 mentions a certain (descendant of) 'Arthos' (Walker 1998)).

The museum at the castle site contains a solid archaeological exhibition on (non-Arthurian) Dark Age Tintagel, and seems a bit reminiscent to the Bygdøy Viking museum discussed earlier, yet the museum shop features products tied to the popular image of the Arthurian myth (Robb 587). This mixture of popular and more academic portrayals of Tintagel seems to characterise the site. Moreover, it has been argued that the occurrence of these 'truth markers'², signifying the various levels of interpretations at Tintagel, are situated in such close proximity to each other as to confuse visitors (Robb 1998, 591-592, 594). When one visits 'Arthur's footprint' and subsequently visits the museum with its emphasis on Dark Age archaeology, which is devoid of King Arthur, what is one to think of the entire site? Is the story of Tintagel, in an archaeological sense, authentic? Does the commercialism and commoditization (in this case: creating a market out of heritage 'products' (Cohen 1988, 380)) of Tintagel have an impact on the effectiveness of communicating archaeological information to the audience?

This raises the question how authenticity and commoditization relate to each other and how these can be used to create effective visualisations of the past for the general public.

4.4 Authenticity and commoditization.

The example of Tintagel shows how important the element of place can be to the general public. Indeed, 'place' seems to be considered synonymous to 'real' or 'authentic', without necessarily being 'authentic' in an archaeological sense. Thus the concept of place is essential to the stories being told (Halewood and Hannam 2001, 575), and the resulting tourist-experiences, at all types of heritage tourism sites. Yet, authenticity is also a prime concern for archaeologists when communicating archaeological information to the public. In this case, authenticity is understood as being as close and true to the current archaeological interpretation pertaining to a historic site or object as possible. One can compare these

² This concept was first coined by Dean MacCannell to describe the interaction of tourists with attractions. For more see MacCannell, D., 1976. *The Tourist: A New Theory of the Leisure Class*. London: Routledge.

considerations with the concept of reproduction discussed in chapter I, which leads one to wonder about the nature of authenticity in an archaeological heritage setting.

According to Erik Cohen the meaning of authenticity changes according to the needs of the individual tourist. He concludes that, among others, on the one hand there is a segment of (cultural) tourists who demand nothing less than ‘total authenticity’ (that is, authentic to the mental image they have of an attraction or holiday destination), but on the other hand there are tourists who know the heritage sites they visit cannot be authentic, but decide to indulge themselves and play along with the ‘game’ of tourism regardless. In this case one encounters ‘staged authenticity’, a display specifically designed to entertain tourists, much like a theatre play (Cohen 1988, 377-379).

Theme parks, our third type of heritage tourism setting, seem to focus on the latter segment of tourists. They create a staged authenticity which is supported by actors, decors, IMAX-theatre set ups, various other attractions and themed restaurants. In the case of Disney Land, the apex of theme parks, one can think of actors wearing costumes of Disney characters, a semi-medieval architecture supplemented by areas themed to the look of various Disney animation films and attractions such as rollercoasters etc.

Evidently, this is an effective strategy since theme parks like Disney Land have managed to attract a large audience and as a consequence created substantial revenues. Have these commercial theme park qualities been used in archaeological heritage sites as well? At first, archaeologists were wary of involving entertainment and commercialism in heritage projects (MacDonald and Alford 1995, 144), but it seems the Jorvik Viking Centre has been a turning point: by utilising a theme-park attraction, the time car ride, the centre creates a staged authenticity and has managed to attract a steady stream of visitors. In effect, the direction of the Jorvik Viking Centre has opted to broaden its visitor appeal by involving the segment of tourists who are not interested in experiencing total authenticity, thus targeting a group that isn’t a part of the traditional audience of archaeological heritage sites and museums.

Since traditional museums deal with the same pressure to create more revenue as archaeological heritage sites it is interesting to investigate their reaction to the visualisations utilised by these heritage sites, especially archaeological theme parks. One way museums tried to attract more visitors was by making their exhibitions more diverse by using multimedia e.g. interactive touchscreens and movies. The increasing use of multimedia is characterised by a growing interest in the combination of entertainment and education, known

as edutainment (MacDonald and Alford 1995, 137-138). The use of multimedia and digital technology in museum exhibitions will be further discussed in the next chapter.

The growing use of theme park inspired ‘attractions’ has been accompanied by archaeologists and museum professionals’ concerns that a commercial outlook can in some ways harm the archaeological record or might produce a simplistic interpretation of the archaeological record. Indeed, Viking land shows a rather one-sided perspective on the lives of Dark Age Scandinavians. The Jorvik Viking Centre however seems to provide a balanced exhibition and reconstruction of Dark Age York, using the time cart ride as a means to attract a large audience, as argued before. With regard to museums it seems difficult to reconcile its traditional academic functions of acquiring archaeologically valuable artefacts and researching the museum collection with a new ethos of entertainment. Similarly, the sale of souvenir reproductions of actual historical objects at museums and heritage sites have been debated as to whether this practice harms the communication of archaeological information to the public, since the reproductions are by nature ‘inauthentic’ (Halewood and Hannam 2001, 576; MacDonald and Alford, 1995, 144).

All in all, there seems to be a fear of commoditization, a fear that it leads to archaeological heritage sites to be nothing more than a staged authenticity. Yet, commoditization is a powerful force and can help to maintain traditional arts (like pottery or ritual dances) by creating a stream of revenue and thus an imperative to practice these arts (Cohen 1988, 382). This approach has been criticised as creating inauthentic practices since these arts aren’t being professed in a traditional environment. Then again, why should a revival be inauthentic? Practitioners of revived traditional dances have been reported to be happy to perform their dances to tourists, and have been able to attain a hitherto never seen level of skill through regular practice (Cohen 1988, 382). Moreover, this example shows how an originally staged authenticity can become a new instance of authenticity. For example, Disney Land has become an authentic example of a theme park (Cohen 1988, 380), and it seems the time cart ride of the Jorvik Viking Centre might be on its way to become an authentic example of an archaeological simulation that caters to almost all the senses by using historical-themed sounds and smells, a feat that even virtual reality, which is the subject of the next chapter, hasn’t succeeded to replicate.

5. Multimedia and digital models

5.1 Introduction: digital technology in archaeological heritage.

With the advent of digital technology, the role of digital 3D models for archaeological heritage projects has become ever more prominent. The reasons for this is the fact that museums and heritage sites increasingly feel commercial pressure from and increasing competition with non-heritage entertainment venues in a struggle to get the attention of the general public, and hope to attract large audiences through use of hybrid exhibitions featuring interactive 3D models or even Virtual Reality systems (Dawson *et al.* 2011, 388; MacDonald and Alsford 1995, 137-138; Roussou 1999, 1; Tost and Economou 2007, 159-160;).

Furthermore, interactive 3D environments, in the form of serious games for example, and Virtual Reality are widely thought to provide a new way of learning through interaction and entertainment which is especially suitable for children (Tost and Economou 2007, 159), as games can be considered, in an evolutionary sense, to be a natural learning environment that caters to the innate human curiosity for the exploration and manipulation of (virtual) landscapes (Bintliff 2011, 19-20). The 3D environments would provide a sense of immersiveness to such high degree as to make the user give its full attention to the digital world, while in the process forgetting he or she is actually in a learning environment. This is supposed to be especially true for Virtual Reality, since it attempts to block all outside real-life influences (Anderson *et al.* 2009, 7; Roussou 1999, 34).

Finally, digital technology, again this especially concerns Virtual Reality systems, allow visitors to forget the real physical world and experience reconstructions of archaeological sites on a scale and level of immersion never seen before (Tost and Economou 2007, 159). For archaeologists 3D models provide a convenient way to present the public with archaeological reconstructions while at the same time making the public aware of the hypothetical nature of reconstructions of archaeological sites. By using a layered approach in 3D reconstructions, archaeologist can flag the various levels of uncertainty in, for example, a reconstructed medieval city wall. These levels can be turned on or off at will by the end-user and enables him or her to fully appreciate to nature of uncertainty that has proved to be so persistent in archaeology. For example, the 3D reconstruction of Livia's Villa (see appendix 16), Prima Porta, offers three layers: 'suggestive', 'probable', 'very probable' (for further reference and download see the website of the Virtual Museum of the Ancient Via Flaminia: www.vhlab.itabc.cnr.it/flaminia/).

In order to explore and shed light on the complexities of how digital technology is being used and has been used in archaeology this chapter is divided in three categories, ranging from non-interactive to the most interactive of 3D systems: static digital 3D models, interactive digital 3D models and Virtual Reality.

5.2. Static digital 3D models and multimedia.



Figure 9. A 3D reconstruction of Koroneia (from personal communication with John Bintliff).

On first sight, digital 3D models seem to have several advantages over traditional reproduction drawings and scale models. First, the digital nature of 3D models allows for endless modification in order to suit the needs of specific exhibitions or to follow the current interpretation of the archaeological site or artefact in question. A case in point is the reconstruction of the classical site of Koroneia by Chiara Piccoli (see figure 9). Second, by now digital files can be easily exchanged through the web, which facilitates experts' communication on 3D models, but also makes 3D models highly accessible to the public through museum websites (Bowen 2000, 4; Anderson *et al.* 2009, 8; Rua and Alvito 2011, 3297). For example, the 3D model of AD 320 Rome, *Rome Reborn* (www.romereborn.virginia.edu), was released as a Google Earth plugin for the general public to explore at home (figure 10). Finally, 3D models of archaeological sites can be incorporated in a short animation film to help the audience become aware of the spatial dimensions of the site and to visualize what the site might have looked like in the past. Films like these are incorporated in exhibitions, where they provide a way to bring all the fragmented

archaeological material on display together in a coherent way without asking too much of a visitors time.

As mentioned before, the use of multimedia in museum exhibitions is thought to help catch the short attention span of visitors and to help communicate archaeological information in an accessible and entertaining way. Multimedia exhibitions feature a combination of animation films, life action documentary films (for example see Roman Bath: www.romanbaths.co.uk/walkthrough/7_people_of_aquae_sulis.aspx), photographs of the site, photographs of artefacts and textual explanations, mostly presented through touchscreens where the visitor can decide what he or she wants to examine closer (MacDonald and Alford 1995,137-138).



Figure 10. *Rome Reborn* (www.romereborn.virginia.edu).

However, even though visitors can make a selection of the sources and forms of contextualisation they want to see, multimedia are not truly interactive since they eventually involve a visitor passively reading or watching the material they have chosen to investigate. In other words, there is no true agency on the visitors side and thus there is very little sense of involvement. Moreover, based on personal observations, it seems to the writer of the present paper that people rarely examine all the multimedia sources presented on a touchscreen: while short films are time efficient, multimedia touchscreens are not and in the end offer a visitor experience not much different from the traditional textual and visual explanations (reconstruction drawings) featured in exhibitions³.

³ On a side note, it would seem visitors rarely visit archaeological exhibitions simply to stare at screens, since 'real' material remains are the basis of the archaeological discipline.

This lack of agency and involvement is a major shortcoming, since both pedagogic and heritage research show that interactivity, i.e. an active control of one's learning path, also referred to as 'learner control', facilitates effective learning (Forte *et al.* 2006, 5-6; Friend and Cole 1990, 47-49; Relan 1991, 7-14; Tost and Economou 2007, 172-174). A more effective use of multimedia seems to be the use of virtual museum webpages, which combine all three previously mentioned advantages of 3D models to create an accessible and comprehensive public database for members of the public to use at home, even if they are in such a remote geographic location as to never visit the actual museum. Also, virtual exhibitions allow the public to see digital models of objects that aren't usually on display in traditional exhibitions (Bowen 2000, 5).

In this way, if multimedia isn't the prime way for effective learning at exhibitions, multimedia can fulfil a central role in living up museum websites. It seems museum websites are keeping up with general trends on the internet, which features ever more elaborate and comprehensive websites. In a general sense, multimedia installations at exhibitions seem to have become obsolete, since the visitor can view all multimedia material at home through museum websites, and visit museum exhibitions to view the archaeological material. It would seem that after a period of increased use of multimedia the influence of internet makes museums to emphasise the 'real thing' again in future exhibitions, maybe even turning to the use of scale models and reproduction drawings as a time efficient and imaginative visual aid for the public.

A next step in virtual exhibitions could be to offer visitors the possibility to rotate 3D models of archaeological artefacts on a x, y, and z axis to allow for a more individualised, thorough investigation of the museum collection. The use of interactivity in archaeological 3D models will be discussed next.

5.3. Interactive digital 3D models: serious games.

Ever since the rise of home computer gaming in the 1980's, PC games have proved to be a hugely popular form of home entertainment, with current annual revenues that surpasses both the revenue of the film industry and the revenue of the music industry together (Guardian 27-9-2009: *Videogames now outperform Hollywood movies*). The success of 3D games in attracting a large audience led to the debate whether games could be used for more than mere entertainment to supplement education. These so-called 'serious games' are developed with a learning objective in mind and feature a game based approach to learning and are currently being used in the training of surgical and military personnel (Anderson *et al.* 2009, 1).

Moreover, serious games are also being used to create public interest, i.e. as a marketing tool, as is seen most clearly and successfully in *America's Army* (www.americasarmy.com), a promotional game made to create public awareness of the United States Army. By playing the role of a new recruit in the United States Army, players could learn about the different career paths available to potential recruits. The game proved to be highly popular, even among non-United States citizens, which suggests that the element of entertainment could indeed be a powerful asset to facilitate interactive learning and learner control.

Archaeologists also seek to popularize archaeological heritage and to communicate archaeological information through serious heritage games (for example see www.dig-itgames.com, an independent serious game developer founded by an archaeologist) In doing so they



Figure 11. *Virtual Egyptian Temple* (Anderson et al. 2009, 4).

hope to utilise the various characteristics inherent to the gaming medium that make games such a distinct and efficient form of visualisation and communication. Games cater to both the visual and hearing senses, and the most advanced games succeed in this in such a way that they are indiscernible from blockbuster feature films. What makes games stand out in relation to films however, is its added dimension of interactivity in the form of a game environment featuring clear goals that the player must struggle to fulfil. The degree to which the latter succeeds in providing a pleasant experience is referred to in a popular sense as ‘gameplay’. This game element is a powerful incentive for users to play and invest time in the game. Finally, the possibility to explore elaborate 3D environments makes that games have a high potential to provide players with a strong sense of immersion or presence (the sense of ‘being there’) which leads to effective learning (Tost and Champion 2007, 1-3)

One example of a serious game developed in an archaeological heritage context is *Gates of Horus* (figure 11), which is based on the 3D model *Virtual Egyptian Temple* (http://publicvr.org/html/pro_gates.html), which features an Ancient Egyptian temple showcasing all the defining characteristics of temples from the New Kingdom period (the reconstruction itself has no real-world counterpart) for the general public. The gameplay

consists of the player trying to gather information and answer the questions of a priest NPC (Non-Playable Character) in order to advance to the inner sanctum of the temple (Anderson *et al.* 2009, 4; Jacobson and Holden 2005).

Another example is *Virtual Priory Undercroft* (figure 12) which aims to create interest with children for the Priory Visitors Centre, Coventry, which features the cellars of Coventry's original cathedral. The game's objective is for the player to collect several medieval artefacts that used to be located throughout the site. He or she



Figure 12. *Virtual Priory Undercroft* (Anderson *et al.* 2009, 5).

needs to answer quiz questions about the Priory to receive hints on the location of the various artefacts (Anderson *et al.* 2009, 5).

It has been argued that archaeological serious game could become more sophisticated by use of AI (Artificial Intelligence) to create believable NPC's. It should be noted that the AI in games does not involve any real intelligent software, rather, the impression of intelligence is created by programming a set of AND, IF, OR etc. scenarios to define how the NPC reacts to possible player actions (Anderson *et al.* 2009, 12). Commercial historical-themed computer games use elaborate AI to enhance gameplay and to create convincing historical environments. Examples are the *Total War* series (www.totalwar.com) that since its first instalment in 2000 (*Shogun: Total War*)



Figure 13. An 18th century battle in *Empire: Total War* (www.totalwar.com).

has placed the player in command of classical, medieval, 18th century (figure 13) and Samurai armies to partake in historical battles against the AI or other players. Another example is the *Assassins Creed* series (figure 14) which lets the player play through a Dan Brownesque story while exploring detailed reconstructions of Renaissance Florence, Venice, Rome and Constantinople.

Creating elaborate games like these is difficult in an archaeological heritage setting since most institutions in this field have to deal with increasingly stringent budgets. A



Figure 14. *Assassin's Creed 2* (www.gamingreality.com).

convenient way for archaeologists to gain access to advanced game technology is to use a third party game engine (Anderson *et al.* 2009, 7). These software programs have been developed to serve as the programming foundation for commercial

games and feature full AI functionality, a graphics engine and a physical engine. Moreover, with the added ability for players to walk through the 3D architecture and make quick changes, game engines facilitate constant evaluation and modification of a 3D model (Rua and Alvito 2011, 3299-3300, 3305). It is usually costly however to obtain a licence for the most recent game engines. Fortunately, some game engines are open source while others require only a copy of the game and the



Figure 15. A virtual world from *The Elder Scrolls: Oblivion* created by the *The Elder Scrolls: Construction Set* editor (www.elderscrolls.com).

associated editor software to access (Anderson *et al.* 2009, 7). In case of the latter, archaeologists take advantage of editor software normally used by fans of games who enjoy creating extra ingame content and share it with others (these fan-made modifications are referred in gamer slang as 'mods'). The use of *The Elder Scrolls: Construction set* (Bethesda Softworks), which allows for extensive modification in a Gamebryo Engine based

environment, to create a 3D reconstruction of a Roman villa is an example of archaeologists using such an editor (Rua and Alvito 2011). See Champion 2007 for a discussion of presence in the virtual world of *The Elders Scrolls: Oblivion* (figure 15), the game which was made using the Gambryo Engine and the editor.

5.4. Virtual Reality.

Virtual Reality (VR) systems create highly immersive interactive 3D worlds by blocking out all real life influences, while their counterpart Augmented Reality (AR) overlays a part of reality through projection (Anderson *et al.* 2009, 7,8). Both are increasingly used in museum exhibitions (one of the first VR system in this context was a CAVE installation at Ars, Austria, 1999 (Roussou 1999, 34. For reference, see www.aec.at)) to create public awareness of archaeological cultural heritage (Tost and Economou 2007, 159). The Hellenic

Cosmos, Athens, for example, features an elaborate Virtual Reality system ('Tholos' (figure 16) a virtual

reality theatre with 132 seats which allows visitors to explore the ancient Agora of Athens) in conjunction with a traditional exhibition to try and captivate its visitors (Tost and Economou 2007, 161-162). Another example was the unconventional exhibition 'Building Virtual Rome' which took place in Trajan's Markets, Rome. Here a wide range of Archaeological 3D models and Virtual Reality systems featuring the archaeology of the Roman world, but not necessarily Trajan's Market, were exhibited to inform the audience about the ways how 3D models and Virtual Reality can be utilised to bring the archaeological record to life. Also, visitors were introduced to new cutting edge VR technology (Forte *et al.* 2006, 1-3).

Both exhibitions have been subject to empirical research concerning the relation between different attributes of Virtual Reality systems (such as the degree of interactivity and learning capacity) and visitor experiences (such as learning, fun, presence) (Forte *et al.* 2006, 3; Tost and Economou 2007, 162). In both cases conclusions were drawn about the importance of interactivity for effective learning, though it should be remarked that there is a general lack of data to justify a comprehensive conclusion. Moreover, the amount of collected data at the Tholos exhibition was rather small, with 97 interviews of which only 23 visited the

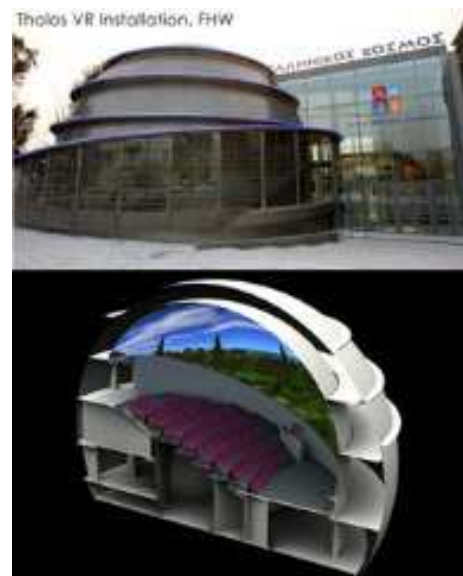


Figure 16. The *Tholos* at the *Hellenic Cosmos* (www.hellenic-cosmos.gr).

traditional exhibition that was associated with the Tholos installation. Those who didn't visit the exhibition were asked during the interviews to imagine what an exhibition would be like compared with the Tholos (Tost and Economou 2007, 164), which leads to somewhat questionable data results. Nevertheless, the exhibition was considered a fundamental medium for communicating archaeological information when compared to the Tholos. In effect, the exhibition was considered suitable for in-depth learning, whereas the Tholos was mainly seen as a good way for the public to get a general picture, a learning framework, of the archaeological site. It was in this context that the visitors remarked that 'nothing beats the real thing' (Forte *et al.* 2006, 5). Other research indicated that educated visitors are highly sceptical in this respect and are not primarily concerned with the technical sophistication of VR system and instead consider content to take pre-eminence over form (Roussou 1999, 37).

An interesting example illustrating this interplay between Virtual Reality and reality is the use of VR reconstructions of traditional architecture and artefacts to supplement exhibitions on the Inuit at the Virtual Museum of Canada (Dawson *et al.* 2012). The immersive 3D environments helped young Inuit to explore the traditional Inuit way of life and made them feel connected to the past, a feat the Inuit Elders found difficult to accomplish. In this way VR helps the Inuit in maintaining their cultural identity by creating an accessible picture of the past for the younger generations for Inuit (Dawson *et al.* 2012, 396). This example seems to suggest that 'nothing beats the real thing' need not necessarily be true, and it at least shows the communicative power a well-designed virtual world can have in influencing the non-virtual world.

Although it seems evident that Virtual Reality has the capability to enhance exhibitions, museums find it difficult to implement these systems. The first difficulty is the high costs associated with designing, installing and maintaining VR systems (Roussou 1999, 35-36). This problem is exacerbated by the specialised technical nature of VR systems which makes it difficult for archaeologist and museum professionals to assess the financial risks associated with a specific VR system, since they have to rely solely on outside advice. To remedy this problem archaeologists have taken the initiative to develop standardised methodologies to create affordable systems at minimal risk (see for example Bruno *et al.* 2009, 44 for a flow chart and Kaminski *et al.* 2010 on how to implement digital presentation techniques in a heritage organisation).

Another problem with VR systems in a heritage context is the fact that they are usually rather fragile and not designed with novice users in mind, making these VR systems especially unattractive for children and underlining the need to create VR systems that are

specifically designed for a visitor-friendly heritage context. 'Visitor-friendly' VR systems are considered to be robust, easy to maintain, have accessible interface and have an attractive design (Roussou 1999, 38). Also, some visitors can be subject to motion sickness and it is in these circumstances that a trained guide is required to help visitors and ensure a smooth operation of the VR system (Roussou 1999, 35).

To illustrate these issues it is interesting to take a look at the research data of a survey undertaken (14-3-2012) by Chiara Piccoli at the Allard Pierson Museum, Amsterdam. A focus group of 21 archaeology students were asked to evaluate the Regolini-Galassi Etruscan Tomb Virtual Reality system which accompanied a traditional exhibition. The respondents were to rate the system on ease of interaction, feeling of immersion, perceived learning effectiveness and perceived potential of Virtual Reality systems to add to an enjoyable museum experience. It is striking that virtually all respondents are unanimous on the ease of interaction and the learning capacity of this Virtual Reality system (for an overview of results see table 1). The sense of immersiveness was considered rather lacking however, mostly because the open environment of the exhibition prevented a full sense of interaction with the system. In effect, outside stimuli need to be blocked to create more immersive experience. Also, many students considered the original artefacts more interesting than its digital counterparts, though in this respect it must be noted all are students of archaeology. A future survey featuring a second layman focus group could help to come to more complete conclusion.

It is clear that Virtual Reality systems, serious games and virtual web exhibitions offer many ways to visualise archaeological material for the public. One can wonder how these digital visualisations compare with reconstruction drawings, scale models and theme parks: is the degree of learning found in serious games and VR also possible in these other media? At the least it seems that digital models face the same complexities of reproduction as reproduction drawings and scale models. The Mausoleum of Halicarnassus, for example, has been reconstructed in three different ways, all of which are used as heritage visualisations for the general public (see appendix 17 and Ogleby 2005, 192-199). Also, the lighting 3D objects forces the 3D artist to make choices similar to the draughtsman. Finally, one can wonder how Virtual Reality relates to the authenticity issue found at theme parks and museums. We will compare all media in the conclusion to the present paper.

6. Conclusion

In the introduction the following research question was formulated:

What media of visualisation have been used in the past in an archaeological heritage context, and how well do they function as a tool for the visualisation of archaeological material for the public?

And this question was explored through the following sub-questions:

- What forms of visualisations for the public have been used in the past by archaeologists?*
- What were the perceived advantages and disadvantages of various media of visualisation?*
- How do the different media relate to each other?*

Looking back at the previous chapters, it seems two themes are recurrent in all types of archaeological visualisation for the general public: authenticity, which has proven to be rather negotiable, and interactivity, which correlates with learning and entertainment. Each type of visualisation has its own degree of authenticity and interactivity, as summarized in the following table (table 2).

Table 2. Summary of authenticity and interactivity across different media.

	<i>Little</i>	Perceived authenticity	<i>A lot</i>
<i>Little</i>	Traditional exhibition	3D models Illustrations	
Interactivity		Scale models Heritage centre	Virtual Reality Village reconstruction
<i>A lot</i>	Theme park	Trade fair	Serious game

Although the problem of reproduction, that is the impossibility to create a ‘real’ or ‘authentic’ reconstruction, has been duly described in literature on reproduction drawings, it is clear that this inability also holds true for scale models, theme parks, and 3D models and Virtual

Reality. Indeed, it can be said that the complexities of the creation of an archaeological reproduction are essentially the same across all media. The use of 3D models and Virtual Reality might seem more ‘real’ to the public though it is basically another form of drawing, drawing with pixels. Moreover, it seems the digital medium suffers from a perceived realness created by the authority of technology, just as naturalistic reproduction drawings are considered ‘real’ because they are technically refined in terms of draughtsmanship.

Interactivity has an important role to play in archaeological visualisation as it has proven to be a powerful tool to engage the public. First, research has shown interactivity facilitates an efficient way of learning. Second, interactivity is a major contribution to the creation of entertaining archaeological heritage visualisations, that is, interactive visualisations that the general public actually wants to partake in for more than just a fascination with impressive technology like Virtual Reality. The popularity of theme parks and commercial games proves how interactivity and fun go hand in hand in succeeding to attract a large segment of the public, and one could argue that it is for this reason that the element of ‘fun’ is the most important aspect to archaeological visualisation.

To make for further comparisons between the different visualisation media a research into the workings of presence and learning at archaeological theme parks would make for an interesting comparison with Virtual Reality systems. Furthermore, to evaluate archaeological visualisations it seems necessary to keep track of developments in commercial digital entertainment and the of influence it has on the general public.

All in all, archaeology has a lot to gain from visualisation for the public, and although archaeologists and other heritage professionals focus mostly on 3D models and Virtual Reality, it would seem this is also true for the more traditional types of visualisation. As visitor research shows that in the public’s opinion ‘nothing beats the real thing’ the role of multimedia at exhibitions is less prevalent than originally thought, dealing mainly with archaeological sites bereft of monumental architecture where there is no ‘real thing’ in the first place. This reminds us that all forms of visualisation are merely tools available to the archaeologist and heritage experts to select as needed and solve a particular heritage visualisation problem.

Summary

The relationship between archaeological heritage and the general public has been a recurrent theme in the archaeological discipline, where an increasing reliance on revenue streams in heritage settings leaves archaeologists to wonder how to present archaeology in an accessible, visual, and imaginative manner to the public. The complexities of several visualisation media are discussed in a heritage setting: illustrations, scale models, theme parks and museums and digital media (3D models, serious gaming and Virtual Reality). It is found that the authenticity and interactivity are recurrent themes in archaeological visualisation. The first proves to be rather negotiable, and the latter has proven itself to be a powerful way to capture the attention of the audience. Finally, it is concluded that archaeology has a lot to gain from visualisation for the public, and although archaeologists and other heritage professionals focus mostly on 3D models and Virtual Reality, it would seem this is also true for the more traditional types of visualisation. This reminds us that all forms of visualisation are merely tools available to the archaeologist and heritage experts to select as needed and solve a particular heritage visualisation problem.

De relatie tussen archeologisch erfgoed en het brede publiek is een terugkerend thema in de archeologische discipline, waar een toenemende afhankelijkheid van inkomstenstromen bij erfgoedinstaties leidt tot de vraag hoe archeologie op een toegankelijke, visuele en tot de verbeelding sprekende manier aan het publiek gepresenteerd kan worden. De volgende visualisatiemethoden worden onderzocht in een erfgoedsetting: illustraties, maquettes, thema parken en musea en digitale media (3D modellen, serious games en Virtual Reality). Het blijkt dat authenticiteit en interactiviteit terugkerende thema's zijn in de archeologische visualisatie. De eerste blijkt bij nader onderzoek geen vaste betekenis te hebben en de tweede blijkt een effectieve manier om de aandacht van het publiek te trekken. Tot slot wordt geconcludeerd dat de archeologie veel te winnen heeft bij visualisatie voor het publiek. Dit geldt zowel voor de digitale media als voor de traditionele visualisatiemethoden, wat erop wijst dat alle visualisatiemethoden uiteindelijk gereedschap zijn dat archeologen en erfgoeddeskundigen naar believen kunnen gebruiken om een erfgoedvraagstelling het hoofd te bieden.

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- 7.15 A scale model of classical Delphi used as an illustration (MacKendrick 1962, 292-293).
- 7.16 Layers in indicating various levels of certainty in a 3D reconstruction of Liva's villa, Prima Porta (Forte 2007).

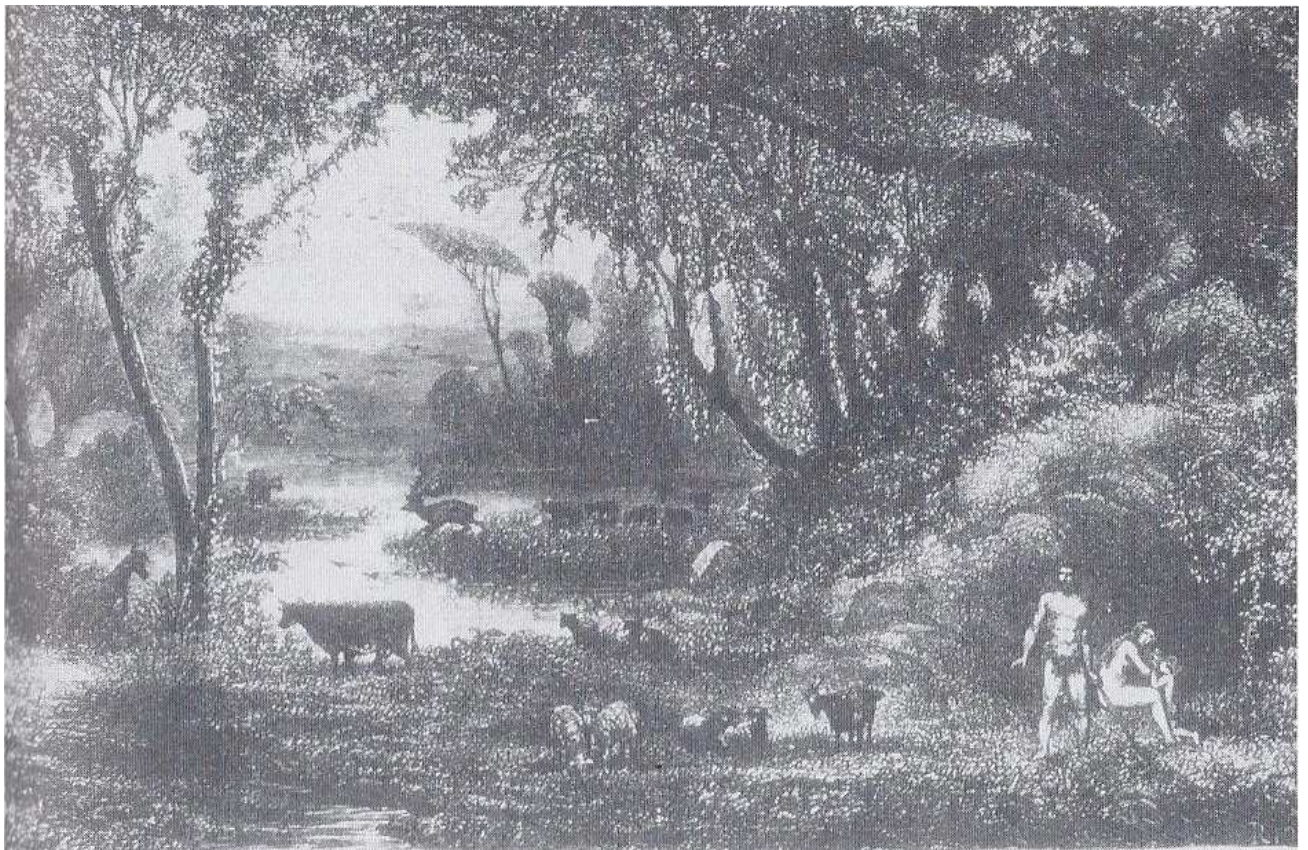
7.17 Different reconstructions of the Mausoleum of Halicarnassus (Ogleby 2005).

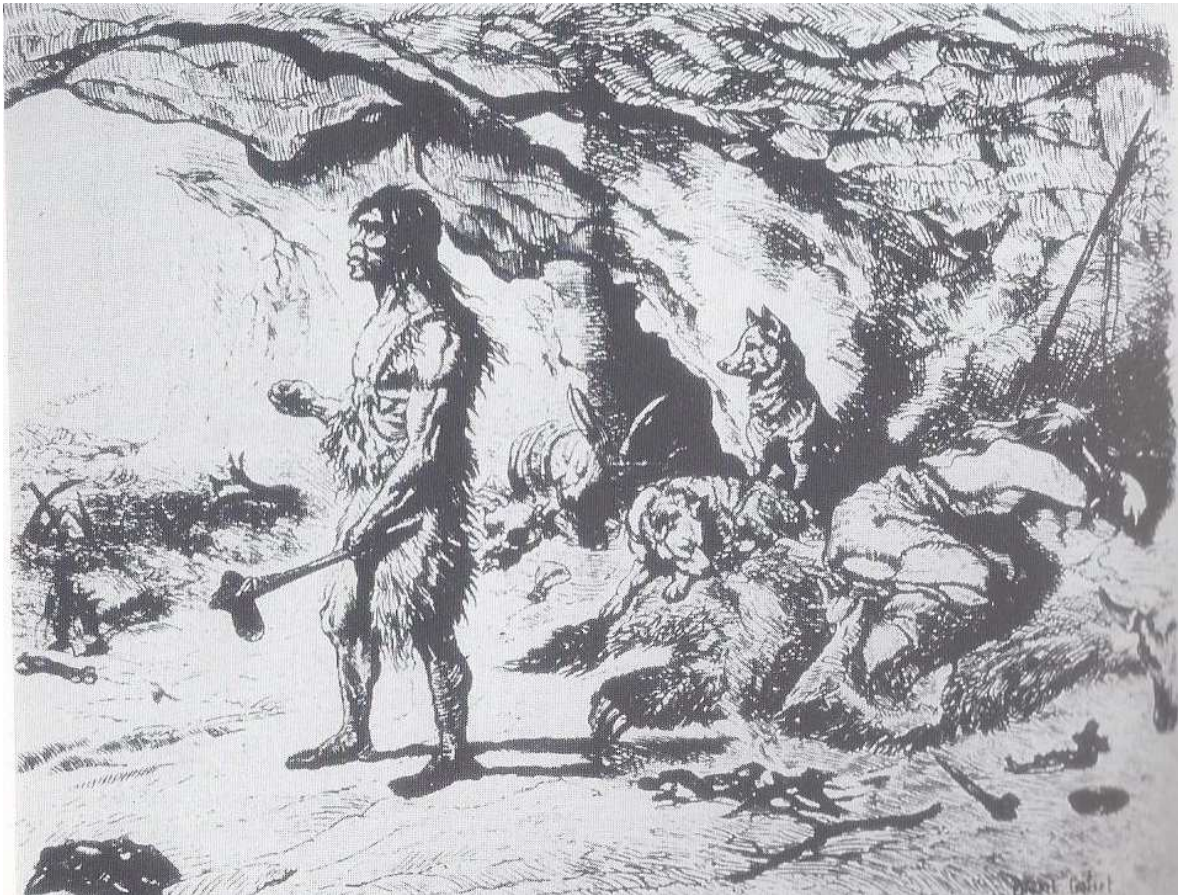
D. Appendix



1. An Edenic image of prehistory by Franz Unger (1800-1870) (Moser and Gamble 1997, 191).

2. An Edenic image of prehistory by Edouard Riou (1833-1900) (Moser and Gamble 1997, 192).








3. The noble barbarian motive, originally published in *Harper's Weekly* magazine, 1873 (Moser and Gamble 1997, 203).

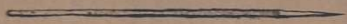
4. The noble barbarian motive by Zdenek Burian (1905-1981) (Beaumont 1990).







BASIC SKILLS OF THE HUNTER AND FOOD GATHERER


The making of recognisable tools  


Use of fire 

Earliest known wooden spears 

Earliest evidence for bows and arrows   


Earliest domestication of dog 




Earliest fishing nets and boats with paddles 


Sledges on runners 


Skis  


SKILLS DEVELOPED FROM AGRICULTURE AND PASTORALISM


First cultivation of cereal crops 

Domestication of sheep, goats and cattle   

Domestication of horse 


Earliest cultivated rice 





Manufacture of linen 



Manufacture of cotton 




Manufacture of wool  

Basketry 



Sailing boats 


Use of solid and tripartite wheels    

Use of spoked wheels  

Metal working in copper, bronze and gold   

Metal working in iron  


Making of pottery  

Making of faience 

Making of glass   

THE ARTS

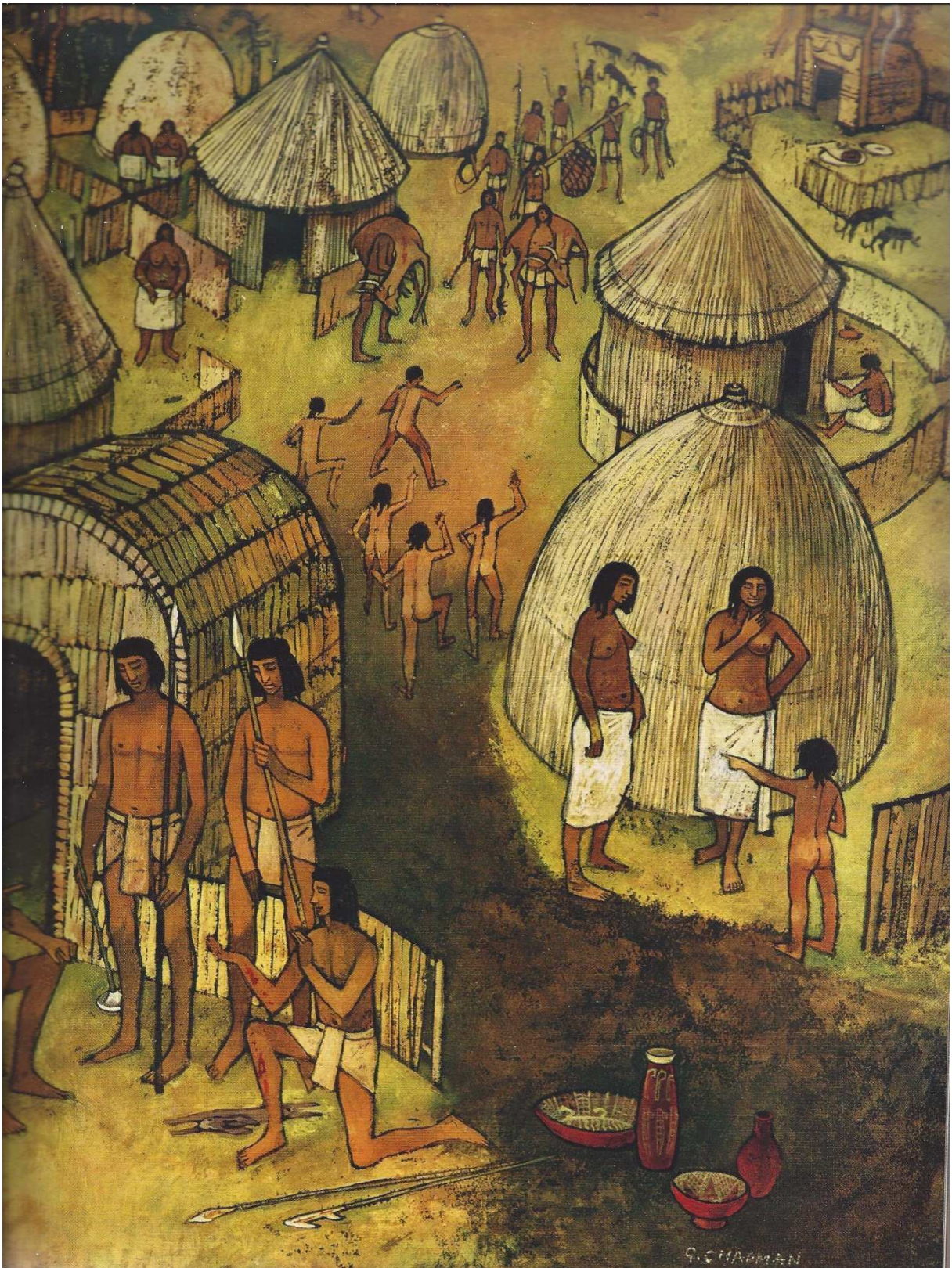
Representational art   

Human portraiture 

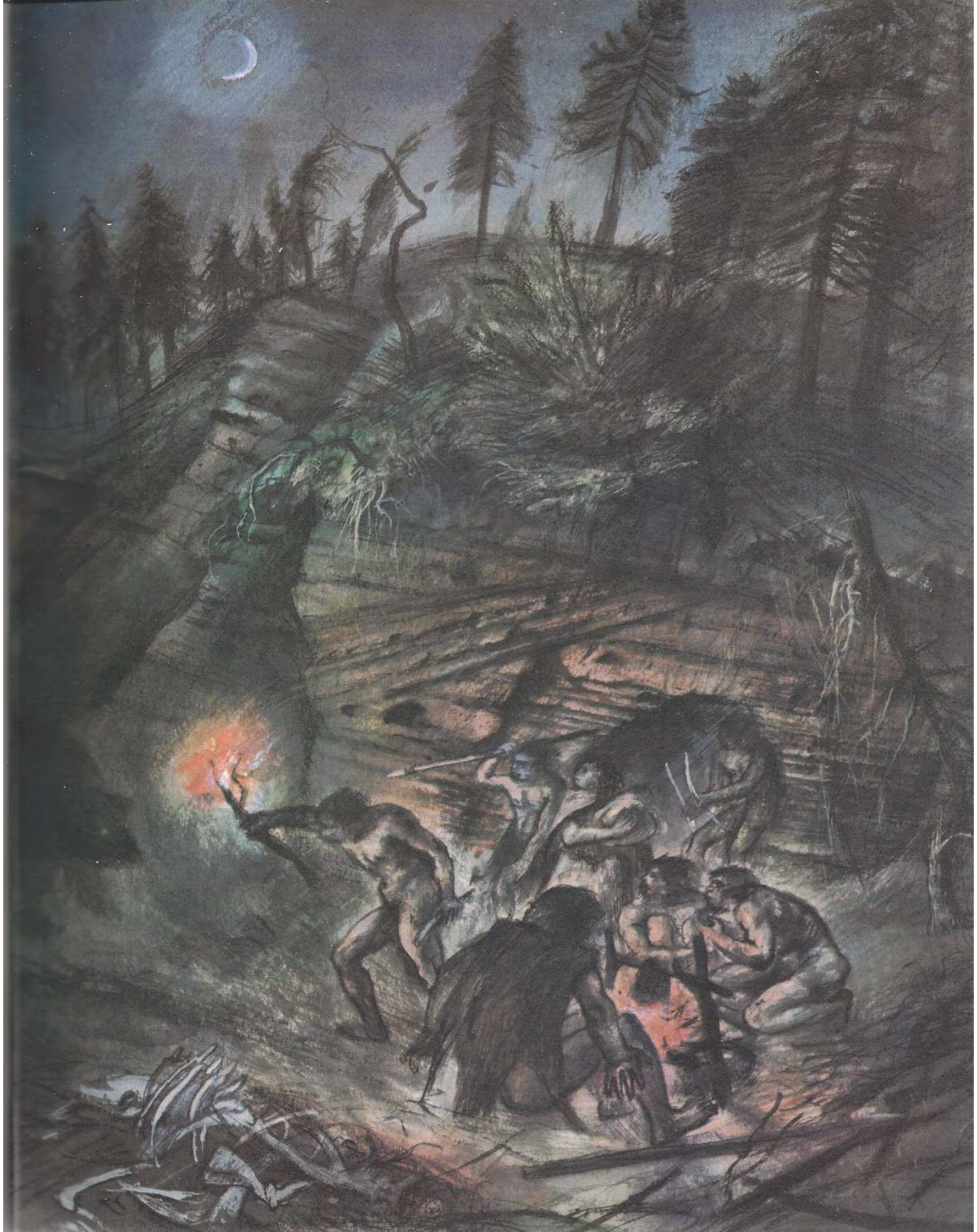
Writing  

Remarks of man's cultural achievements 500,000-1,000 BC
 PART we have selected some of the most important tech-
 discoveries and developments made by the diverse groups
 on the theme of this book.
 Skills are the achievements of the earliest and most primi-
 tives, Agriculture and Pastoralism and the skills developed by
 settled and gradually urbanized cultures follow next. Finally
 representational art and the first music-making go back to
 Age, others of the Arts such as writing were once more
 of the first urban communities.

5. Depicting ancient technology through iconic images (Piggott 1962, 16).



6. A depiction of Ancient Egypt by Gaynor Chapman (1935-2000) (Piggott 1962, 101).



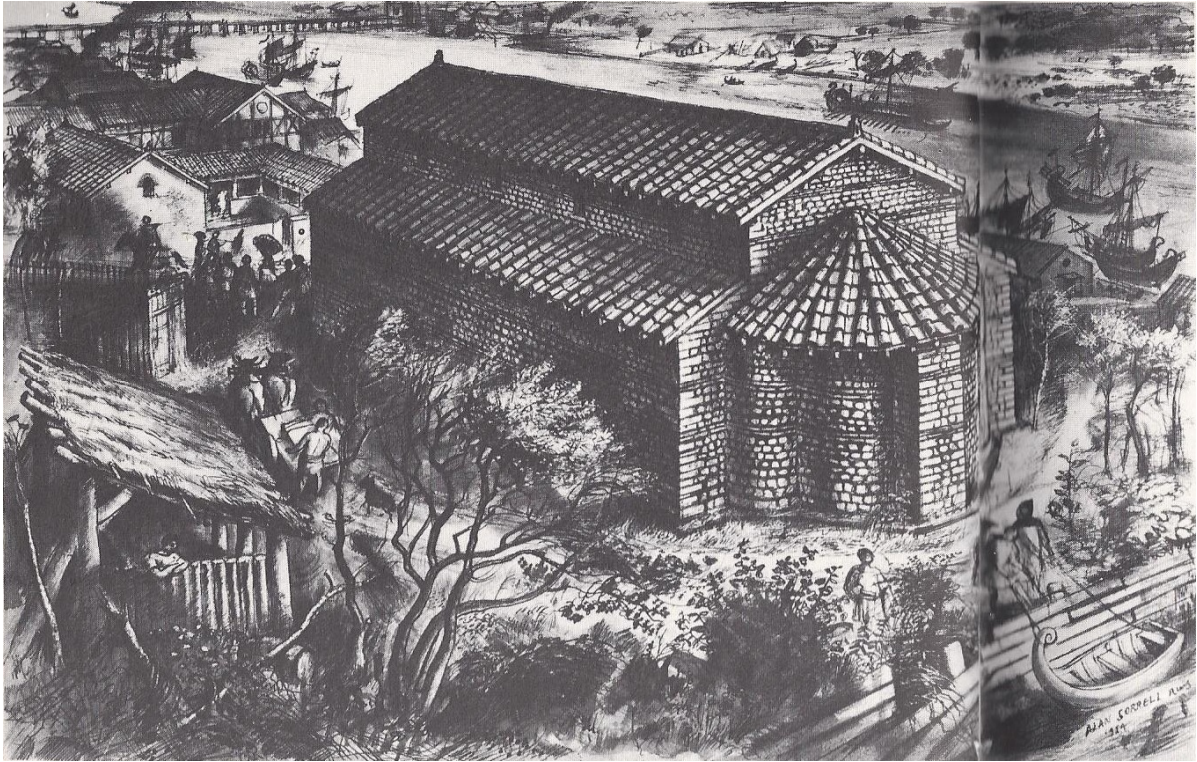
7. Prehistory depicted by Alan Sorrell (1904-1974) (Jessup 1967, 7).



8. Prehistory depicted by Alan Sorrell (Jessup 1967, 9).

9. A reconstruction of artefacts by Alan Sorrell (Jessup 1967, 31).

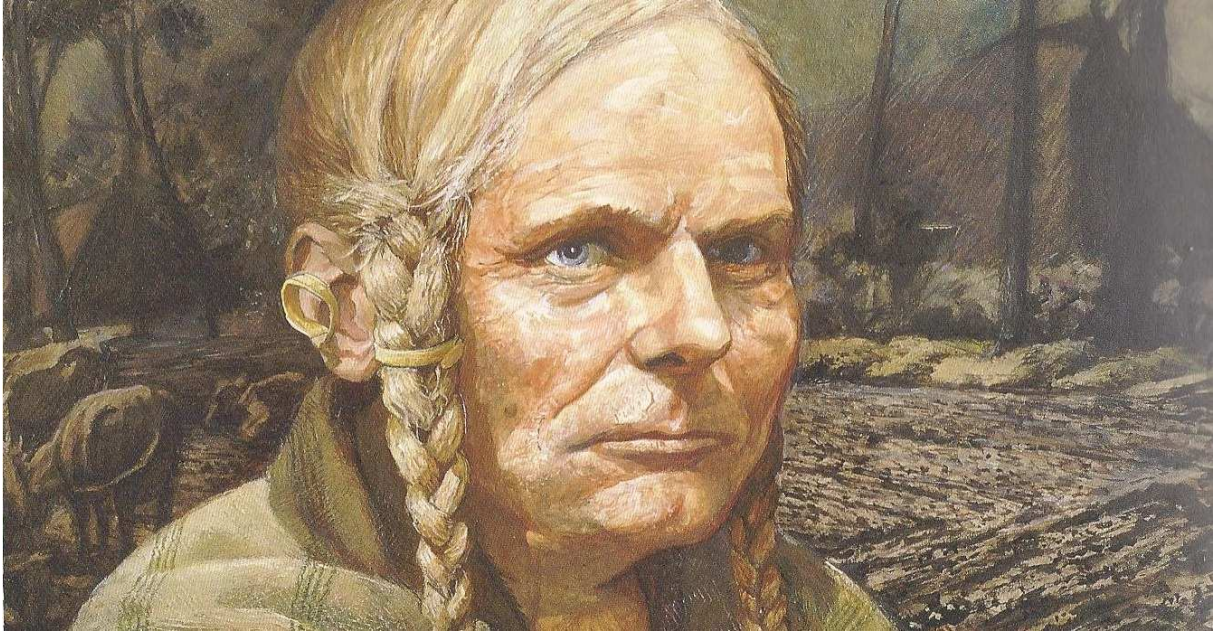




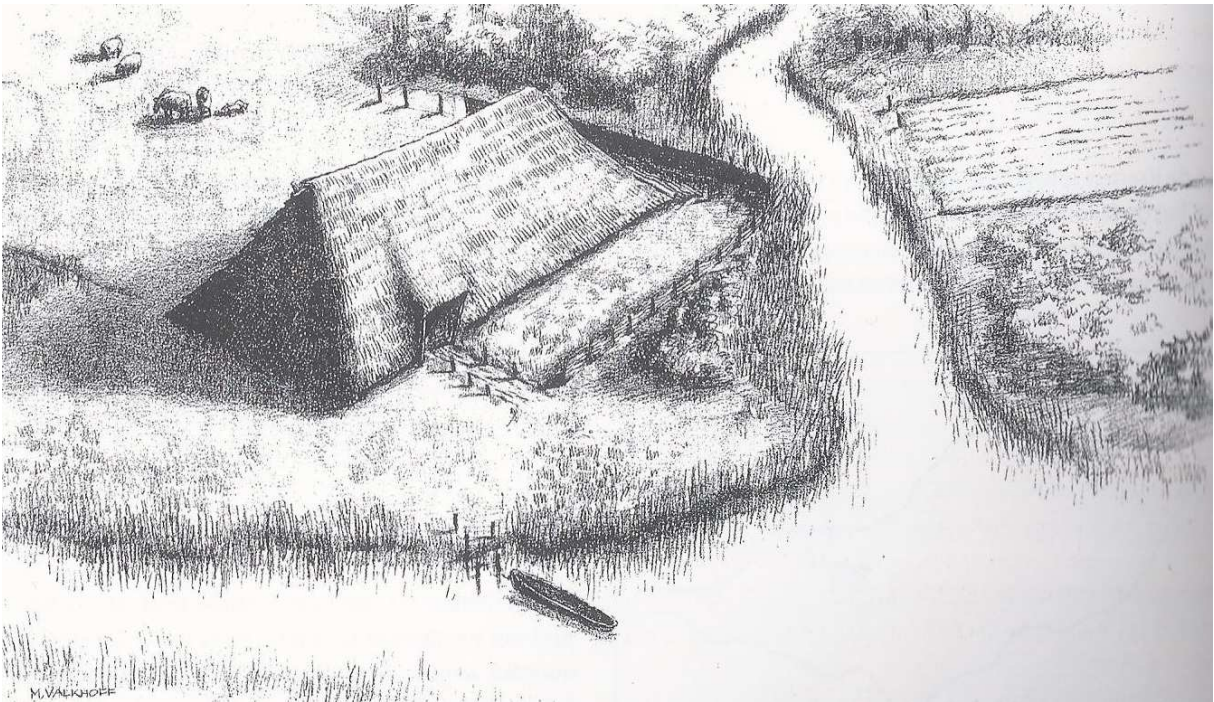
10. Depiction of a roman settlement by Alan Sorrell (Wheeler 1964, 86-87).

11. Diocletian's palace by Ernest Hébard (Wheeler 1964, 144).





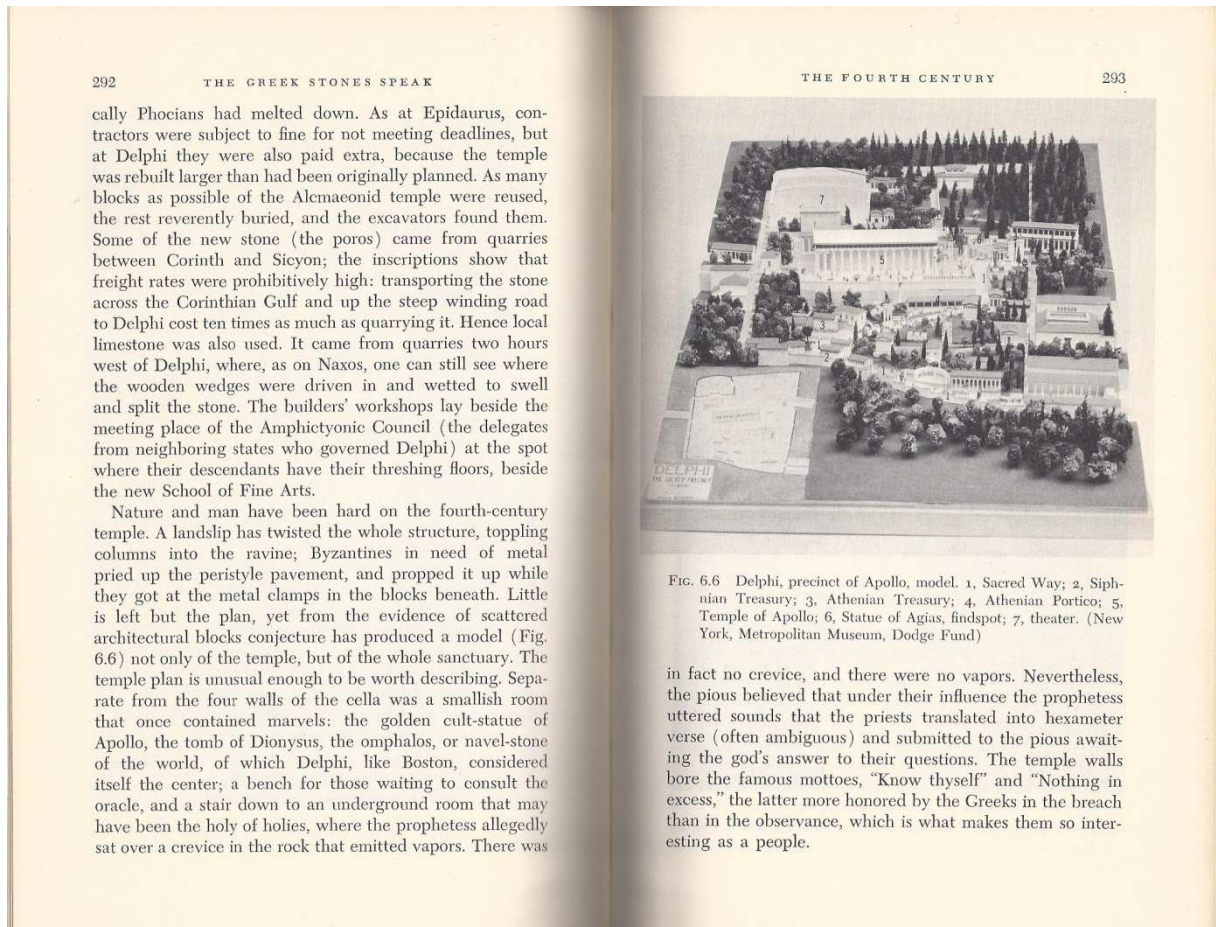
12. A portrait of a prehistoric man (Louwe Kooijmans *et al.* 2009, 551-561, pl.46B).



13. An Iron Age farm (Louwe Kooijmans *et al.* 2009, 598).



14. A prehistoric hunting and gathering scene (Louwe Kooijmans 2009, 157-161, pl. 9B).



cally Phocians had melted down. As at Epidaurus, contractors were subject to fine for not meeting deadlines, but at Delphi they were also paid extra, because the temple was rebuilt larger than had been originally planned. As many blocks as possible of the Alcmaeonid temple were reused, the rest reverently buried, and the excavators found them. Some of the new stone (the poros) came from quarries between Corinth and Sicily; the inscriptions show that freight rates were prohibitively high: transporting the stone across the Corinthian Gulf and up the steep winding road to Delphi cost ten times as much as quarrying it. Hence local limestone was also used. It came from quarries two hours west of Delphi, where, as on Naxos, one can still see where the wooden wedges were driven in and wetted to swell and split the stone. The builders' workshops lay beside the meeting place of the Amphictyonic Council (the delegates from neighboring states who governed Delphi) at the spot where their descendants have their threshing floors, beside the new School of Fine Arts.

Nature and man have been hard on the fourth-century temple. A landslide has twisted the whole structure, toppling columns into the ravine; Byzantines in need of metal pried up the peristyle pavement, and propped it up while they got at the metal clamps in the blocks beneath. Little is left but the plan, yet from the evidence of scattered architectural blocks conjecture has produced a model (Fig. 6.6) not only of the temple, but of the whole sanctuary. The temple plan is unusual enough to be worth describing. Separate from the four walls of the cella was a smallish room that once contained marvels: the golden cult-statue of Apollo, the tomb of Dionysus, the omphalos, or navel-stone of the world, of which Delphi, like Boston, considered itself the center; a bench for those waiting to consult the oracle, and a stair down to an underground room that may have been the holy of holies, where the prophetess allegedly sat over a crevice in the rock that emitted vapors. There was

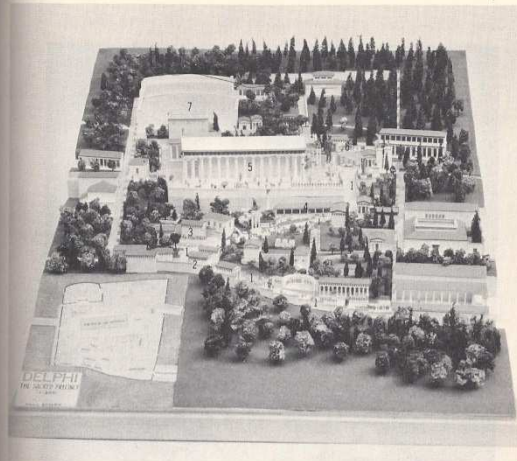


FIG. 6.6 Delphi, precinct of Apollo, model. 1, Sacred Way; 2, Siphnian Treasury; 3, Athenian Treasury; 4, Athenian Portico; 5, Temple of Apollo; 6, Statue of Agias, findspot; 7, theater. (New York, Metropolitan Museum, Dodge Fund)

in fact no crevice, and there were no vapors. Nevertheless, the pious believed that under their influence the prophetess uttered sounds that the priests translated into hexameter verse (often ambiguous) and submitted to the pious awaiting the god's answer to their questions. The temple walls bore the famous mottoes, "Know thyself" and "Nothing in excess," the latter more honored by the Greeks in the breach than in the observance, which is what makes them so interesting as a people.

15. A scale model of classical Delphi used as an illustration (MacKendrick 1962, 292-293).



* evocativo, ** probabile, ***molto probabile



Architettura *** decorazione *



Architettura ** decorazione *



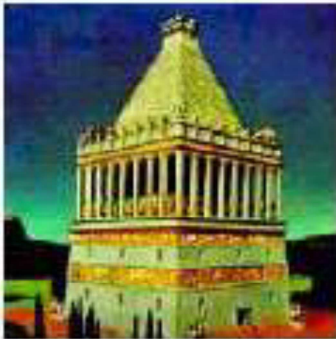
16. Layers in indicating various levels of certainty in a 3D reconstruction of Livia's villa, Prima Porta (Forte 2007).

17. Different reconstructions of the Mausoleum of Halicarnassus (Ogleby 2005).



Figure 3:

www.allaboutturkey.com/ita/bodrum.htm#pic/halikarnas_mozole.jpg



http://www.moyak.com/researcher/resume/papers/definitions_ancient.html



Figure 1: <http://www.crystalinks.com/mausoleumhal.html>



Figure 2: <http://www.unimuseum.org/maus.htm>
Copyright Lee Krystek, 1998



Figure 4: library.thinkquest.org/.../ancient_5.htm



Figure 5: <http://www.waltm.net/wonder1.htm>
This appears to be a reversed version of the Larrinaga image which has been modified (badly)