World Heritage papers

Human Evolution: Adaptations, Dispersals and Social Developments (HEADS)

World Heritage Thematic Programme

Evolución Humana: Adaptaciones, Migraciones y Desarrollos Sociales

Programa Temático de Patrimonio Mundial

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Human Evolution: Adaptations, Dispersals and Social Developments (HEADS)

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Photo: Nuria Sanz

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Introduction

Following an informal, but widely shared definition, landscape 'comprises the visible features of an area of land, including physical elements such as landforms, living elements of flora and fauna, abstract elements like lighting and weather conditions, and human elements like human activity and the built environment'.[1] Past and present landscapes are the result of the ever-changing balance between contrasting agents, some of which add deposits on top of them, while others erode and destroy them. The pace of change is variable in time and space, but change always happens. This is self evident when looking at landscapes of the past few centuries or millennia. There are scores of towns on hills or highlands which have been ruined and eroded, while others lie buried in lowlands. After 2,000 years the Rome of Julius Cesar along the Tiber River was at 6 m below the modern one, and similarly the 14th century Florence of Dante Alighieri was some metres below today's streets and buildings after just seven centuries. If one makes reference to earlier prehistoric times, the compounded effect of obliterating and eroding agents is such that only under truly exceptional circumstances can any sizeable preserved fragments of past landscapes be made visible. In such cases, agents adding deposits on extant features of land have prevailed over agents eroding the landscape, otherwise, by definition, nothing would have survived to present times.

I will first refer to the definition of landscape as adopted by the World Heritage Committee and in accordance to the World Heritage Convention,[2] and examine properties already listed as cultural landscapes; then I will describe examples of prehistoric landscapes, and eventually discuss the vulnerability of paleo-landscapes and their relevance to the Convention.

The chosen examples of prehistoric landscapes illustrate various time periods and different agents involved in burial and preservation:
1) Melka Kunture (Ethiopia), Lower and Middle Pleistocene, characterized by alluvial deposits;
2) Krems-Wachtberg (Austria), Upper Pleistocene, characterized by aeolian-borne deposits;
3) Torre Spaccata (Italy), Middle Holocene, characterized by volcanic deposits.

Landscapes and the World Heritage Convention

In 1992, landscapes were adopted by the 16th session of the World Heritage Committee under the heading of 'cultural landscapes',[3] and the cultural criteria used to justify inscription of properties on the World Heritage List was revised to ensure their inclusion as 'combined works of nature and of man' as per Article 1 of the 1972 Convention, which defines 'cultural heritage' for the purposes of the Convention. Interestingly, 'combined works of nature and of man' is an excerpt of the following paragraph, which should be read in its entirety:

> sites: works of man or the combined works of nature and man, and areas including archaeological sites which are of outstanding universal value from the historical, aesthetic, ethnological or anthropological point of view (UNESCO, 1972).

In other words, since the very beginning of the Convention, archaeological sites were closely linked to the natural environments, and the importance of embedded scientific values related to history, ethnology and anthropology was underlined.

1. This definition circulates on the Web, and is found, for instance, in documents of Australia and New Zealand, but I have not been able to properly track its origin.
2. For the full text of the Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention), see: http://whc.unesco.org/en/conventiontext/ (in English), http://whc.unesco.org/fr/conventiontexte/ (in French).
3. See http://whc.unesco.org/en/culturallandscape (accessed March 6, 2010).

In 1992, a more detailed definition was given.

> [Cultural landscapes] are illustrative of the evolution of human society and settlement over time, under the influence of the physical constraints and/or opportunities presented by their natural environment and of successive social, economic and cultural forces, both external and internal[4].

Categories of landscapes were further established in Annex 3 of the Operational Guidelines for the Implementation of the World Heritage Convention[5]. While it is recognized that 'the most easily identifiable is the clearly defined landscape designed and created intentionally by man', the sub-category of 'organically evolved landscape' seems relevant for the purpose of defining paleo-landscapes, as follows:

> a relict (or fossil) landscape is one in which an evolutionary process came to an end at some time in the past, either abruptly or over a period. Its significant distinguishing features are, however, still visible in material form.

The Operational Guidelines further clarify that:

- cultural landscapes … are illustrative of the evolution of human society and settlement over time, under the influence of the physical constraints and/or opportunities presented by their natural environment and of successive social, economic and cultural forces, both external and internal;
- they should be selected on the basis both of their outstanding universal value and of their representativity in terms of a clearly defined geo-cultural region and also for their capacity to illustrate the essential and distinct cultural elements of such regions.
- the extent of a cultural landscape for inscription on the World Heritage List is relative to its functionality and intelligibility. In any case, the sample selected must be substantial enough to adequately represent the totality of the cultural landscape that it illustrates.
- general criteria for protection and management are equally applicable to cultural landscapes. It is important that due attention be paid to the full range of values represented in the landscape, both cultural and natural.

Subsequently, in 2000, a definition of 'landscape' was also approved by the Council of Europe in Florence, within the framework of the European Landscape Convention. It is stated that this convention 'can be regarded as complementary to the Unesco one'.[6] According to Article 1 of the European Landscape Convention, '"landscape" means an area, as perceived by people, whose character is the result of the action and interaction of natural an/or human factors'; and after point 38:

> 'landscape' is defined as a zone or area as perceived by local people or visitors, whose visual features and character are the result of the action of natural and/or cultural (that is, human) factors. This definition reflects the idea that landscapes evolve through time, as a result of being acted upon by natural forces and human beings. It also underlines that a landscape forms a whole, whose natural and cultural components are taken together, not separately.

Cultural Landscapes and Prehistory in the World Heritage List

To date, 66 properties from 43 countries have been included as cultural landscapes on the World Heritage List[7]. In 19 instances, i.e. almost one in three, the nomination file mentions prehistory, or prehistoric sites belonging to different time periods. For the sake of the present purpose, I also include the Uluṟu-Kata Tjuṯa National Park (Australia), as it is stated that 'cave paintings on Ayers Rock up to 10,000 years old indicate the length of time Aborigines have been present in the area'.[8] Prehistory, however, is only cursorily mentioned in 7 of the 19 properties, often under the heading of 'History and Development' of the site, and is not further described or not fully illustrated.

4. UNESCO World Heritage Centre. 2008. Operational Guidelines for the Implementation of the World Heritage Convention, http://whc.unesco.org/archive/opguide08-en.pdf (accessed 19 May 2011).
5. UNESCO World Heritage Centre, op. cit., Annex 3.
6. See http://www.coe.int/t/dg4/cultureheritage/heritage/Landscape/default_en.asp (accessed 5 March 2010)
7. See http://whc.unesco.org/en/culturallandscape (accessed March 6, 2010).
8. IUCN Summary 447a Ulur _u (Ayers Rock-Mount Olga) National Park (Australia). Summary prepared by IUCN (April 1987) based on the original nomination submitted by Australia.

Accordingly, it does not seem of major importance – even in the case of Willendorf in the Wachau (see below). It is rather an aspect of the authenticity of the property, and an added value to broadly or totally different thematic issues.[9]

Therefore, for the purposes of this paper, I retain 12 properties which exemplify how prehistory has been so far integrated into cultural landscapes (Table 1). The selection criteria are the following: (ii), (iii), (iv), (v) and (vi), i.e. all the cultural criteria have been taken into account, except for criterion (i), which is 'to represent a masterpiece of human creative genius'. Two properties (Uluru-Kata Tjuta National Park and Ecosystem and Relict Cultural Landscape of Lopé-Okanda) are also nominated in accordance to natural criteria, that will not be further discussed.

Table 1. Cultural landscapes in the WHL with conspicuous prehistoric evidence

State Party	Criteria	i	ii	iii	iv	v	vi	Rock art
Argentina	Quebrada de Humahuaca		x		x	x		x
Australi	Uluru-Kata Tjuta National Park					x	x	x
Azerbaijan	Gobustan Rock Art Cultural Landscape		x	x			x	x
Gabon	Ecosystem and Relict Cultural Landscape of Lopé-Okanda			x	x			x
India	Rock Shelters of Bhimbetka			x		x		x
Kazakhstan	Petroglyphs within the archaeological landscape of Tamgaly			x				x
Kyrgyzstan	Sulaiman-Too Sacred Mountain			x		x		x
Lithuania	Kernavé Archaeological Site (Cultural Reserve of Kernavé)			x	x			
Mongolia	Orkhon Valley Cultural Landscape		x	x	x			x
Norway	Vegaøyan- The Vega Archipelago					x		
Sweden	Agricultural Landscape of Southern Öland				x	x		
Zimbabwe	Matobo Hills			x		x	x	x
TOTAL		–	3	8	5	6	4	9

The relevant cultural criteria for selection are the following:
(ii) to exhibit an important interchange of human values, over a span of time or within a cultural area of the world, on developments in architecture or technology, monumental arts, town-planning or landscape design;
(iii) to bear a unique or at least exceptional testimony to a cultural tradition or to a civilization which is living or which has disappeared;
(iv) to be an outstanding example of a type of building, architectural or technological ensemble or landscape which illustrates (a) significant stage(s) in human history;
(v) to be an outstanding example of a traditional human settlement, land-use, or sea-use which is representative of a culture (or cultures), or human interaction with the environment especially when it has become vulnerable under the impact of irreversible change;
(vi) to be directly or tangibly associated with events or living traditions, with ideas, or with beliefs, with artistic and literary works of outstanding universal significance.

Rock art is mentioned in bold when it is a most conspicuous aspect of the property.

9. Prehistory and/or prehistoric sites are cursorily mentioned in the nomination files of the following properties: Hallstatt-Dachstein, Wachau, Lednice-Valtice Cultural Landscape, Upper Middle Rhine Valley, Cilento and Vallo di Diano, Costiera Amalfitana or St. Kilda.

Interestingly, even if no 'masterpiece' is recognized as such, at 9 out of the 12 properties rock art is recorded in the nomination as either the prevailing evidence, or at least as a conspicuous part of it, sometimes starting with the very name of the property (for instance, Petroglyphs within the archaeological landscape of Tamgaly, Gobustan Rock Art Cultural Landscape, etc.). Rock art is integrated into the cultural landscape in a variety of ways. Concerning Sulaiman-Too Sacred Mountain (Kyrgyzstan), 'the majority of images belong to the Bronze Age', and 'five peaks and slopes contain a large assembly of ancient cult places and caves with petroglyphs'.[10] The nomination of Gobustan (Azerbaijan), specifies that:

> ICOMOS considers that the rock engravings are an exceptional testimony to a way of life that has disappeared and particularly in the way they graphically represent activities connected with hunting and fishing which reflect a time when the climate and vegetation of the area were quite different from today.[11]

In India, at Rock Shelters of Bhimbetka, there are 'rock shelters, displaying paintings that appear to date from the Mesolithic Period right through to the historical period', and 'the cultural traditions of the inhabitants of the twenty-one villages adjacent to the site bear a strong resemblance to those represented in the rock paintings'.[12] At Relict Cultural Landscape of Lopé-Okanda in Gabon, the archaeological record starts 400,000 years ago, and there are 'extensive remains of Neolithic and Iron Age sites and large numbers of petroglyphs, both associated with the spread of Bantu peoples from the southern Sahara into central, east and southern Africa'.[13]

Only in the named cultural landscapes of the northernmost countries (Lithuania, Norway, Sweden) is prehistory manifest somehow without the supporting evidence of artistic activity. At Kernavé Archaeological Site (Cultural Reserve of Kernavé) in Lithuania:

> the relief of the surface, structured in a natural way, served well for the development of the economical activities as well as defensive purposes. This was the reason for the early settlement in this place in the late Paleolithic period (9th–8th millennia BC) as well as the succession of cultural activities to the Late Middle Ages and to the present… the site is a complex ensemble of archaeological properties, encompassing the town of Kernavé, forts, some unfortified settlements, burial sites and other archaeological monuments from the late Paleolithic period to the Middle Ages.[14]

At Vegaøyan- The Vega Archipelago (Norway), the property preserves the evidence left by fishermen and farmers in the last 1,500 years, but there is more than that, as:

> many Stone Age (Mesolithic) habitations have been found on the older strandlines flanking the mountains on Vega… In this treeless landscape, which was subsequently forsaken when the people moved to lower, more fertile areas, the up to 10,000-year-old remains can be experienced in virtually authentic surroundings… A Stone Age Trail has been set out… equipped with information signs and a brochure, to show how the Stone Age people lived.[15]

The property of Agricultural Landscape of Southern Öland (Sweden):

> is dominated by a vast limestone pavement. For some five thousand years human beings have lived here and adapted their way of life to these physical constraints. As a consequence, the landscape is a unique one, with abundant evidence of human settlement from prehistory continuous up to the present day… Stone Age passage graves, monumental cairns from the Bronze Age, prehistoric forts, house foundations, complex systems of stone enclosures with fossil arable land and large burial grounds from the Iron Age testify to a rich and important pre-history.[16]

Overall, however, as said above, rock art is prominent in the cultural landscapes relevant to prehistory. This is related to visibility, which is higher for evidence standing on rocks above the ground than for buried remains. It is also easier to link art to a narrative, even when it is not any more

10. Advisory Body Evaluation, 2009, Sulaiman-Too (Kyrgyzstan), No 1230 rev.
11. Advisory Body Evaluation, 2007, Gobustan (Azerbaijan), No 1076 rev.
12. See http://whc.unesco.org/en/list/925
13. Advisory Body Evaluation, 2007, Ecosystem and Relict Cultural Landscape of Lopé-Okanda, No. 1147 Rev.
14. Nomination File, 2004, Kernavé Archaeological Site (Cultural Reserve of Kernavé).
15. Nomination File, 2004, Vegaøyan- The Vega Archipelago.
16. Nomination File, 2000, Agricultural Landscape of Southern Öland.

possible to decipher its content: petroglyphs in sacred places or places of worship are an example. However, scattered remains of the past, as found during archaeological research, are generally buried, fragmented, and small-sized, and need a great investment of scientific research before they can be understood to any extent and provide information on human past behaviour.

Rock art, however, is only documented during the last millennia, and simply does not appear during the preceding 2.5 million years, or more, of human evolution. It is also often linked to worship and non-domestic activities, and gives only limited clues to other aspects of life. Furthermore, it needs, by definition, rocky supports, and cannot be found in alluvial plains, sand dunes, etc.

Another aspect of prehistoric life that is documented again and again in cultural landscapes is related to the funerary sphere. Even if not as conspicuous as art, burials – all of them related to relatively late phases of prehistory – are mentioned at some detail in five properties (Gobustan Rock Art Cultural Landscape, Petroglyphs within the Archaeological Landscape of Tamgaly, Sulaiman-Too Sacred Mountain, Kernavé Archaeological Site (Cultural Reserve of Kernavé), and Orkhon Valley Cultural Landscape). In these cases, tombs and graves are probably more easily spotted as well because of higher visibility and because they allow a relatively straightforward interpretation.

A more balanced sample is needed to fully illustrate and preserve landscapes of the very ancient past. Paleo-landscapes, furthermore, are quite distinct from cultural landscapes with prehistoric evidence: the landscapes perceived today are generally very different from the prehistoric ones. Nowadays the remains of the past stand side by side with buildings of historical age, while vegetation, landforms, etc. have all changed. Of the above-mentioned properties, only a few approach a real paleo-landscape, to exemplify an environment of the past. One such example is the Vegaøyan as 'up to 10,000-year-old remains' can be seen and visited 'in virtually authentic surroundings'. While in the Lopé-Okanda, where open environments alternate with dense forests:

> il faut admettre que les hommes ont indubitablement et largement contribué au maintien local d'un paysage ouvert, notablement lors de la phase humide de l'Holocène inférieur. Le paysage particulier de la Lopé-Okanda est donc bien un paysage culturel résultant en partie de l'action humaine.[17]

Both in the Norwegian and in the Gabonese case it is suggested that things remained static for a long time, either because the area was 'forsaken' when people moved elsewhere – and natural agents, it should be added, were in no great activity – or because humans continued to clear the forest during millennia in a row, keeping the landscape rather unchanged. A further interesting approach is the comment by ICOMOS that, at Gobustan, rock art graphically represents a past environment different from that of today.[18]

All the above-mentioned cultural landscapes are part of the extant surface of the Earth. Examples of buried landscapes will be illustrated below. They have little in common with landscapes existing today at the same location and, accordingly, will be described as paleo-landscapes.

Eroded paleo-landscapes at Melka Kunture (Ethiopia)

Melka Kunture is a rich and complex archaeological and palaeontological area, 50 km south of Addis Ababa. At more than 2000 m asl, it extends over some 70 km^2 on the banks of the upper Awash River, on the shoulder of the Ethiopian Rift. Sediments include gravels, sands, silts and clays, which are consistent with a fluvial depositional environment. The alluvial deposits are interbedded with tephra and other volcanic products, to a compounded thickness of c. 100 m. The very long sequence has been dated through magneto-stratigraphy and K-Ar, and through 40Ar/39Ar on volcanic tephra by the Berkeley Geochronology Center (Morgan, 2009; Morgan et al., forthcoming). More than 70 archaeological layers are known to exist (Chavaillon and Piperno, 2004). Twenty have been tested, and eight extensively excavated. Every major period of the African archaeological record is included, beginning at 1.7 million years with the Oldowan, discovered at Karre I, Kella III, Gombore I, Garba IV, and as evolved Oldowan at Gombore Iγ. At around 1 million years, Garba

17. Dossier d'inscription, 2007, Ecosystème et paysage culturel relique de Lopé-Okanda (In French).
18. Cf. Advisory Body Evaluation, 2007, Gobustan (Azerbaijan), No 1076 rev.

XII and Simbiro III illustrate a transitional phase from the late Oldowan to the Early Acheulean and to an archaic phase of the Acheulean. Gombore II, at c. 0.8 million years, is Middle Acheulean, while Garba I, at c. 0.5 million years, is Late Acheulean.

At c. 0.2 million years, the Acheulean-Middle Stone Age transition, and the early Middle Stone Age, are both documented at Garba III, where fragmented remains of an archaic Homo sapiens have been discovered. Four probable Homo erectus specimens were also found at the earlier sites. The Late Stone Age, so far undated, outcrops in a disturbed position at Wofi and Kella. Obsidian exploitation, which starts at the Oldowan sites, is impressively documented at Balchit, 7 km away from the core area of Melka Kunture, and next to outcrops of this volcanic glass. Extensive accumulations of tens of thousands of blades, cores, and débris litter the landscape. Obsidian has been in use up to historical times.

After paleobotanical and paleontological investigations, dry, open savannah environments were in existence all over the sequence. The vertebrate paleontology includes bovids, giraffids, hippopotamids, and suids, as well as primates (Theropithecus cf. oswaldi). Hippopotamus sp. is especially abundant at the excavated sites, which were close to the paleo-Awash River and its tributaries. Early hominid fossils and artifacts are found in similar environments at other sites of Africa and the Middle East.

Site density is self-evident in Figure 1, which is the area closest to the site museum. Within 2 km^2, a dozen of Lower and Middle Pleistocene archaeological sites, some multi-layered, have been surveyed and/or excavated. They are at different depths, blanketed by alluvial and volcanic deposits which protected them, allowing for today's research. The covering sediments are of variable thickness, which is always within approximately 10 m, often markedly less. The depth of the sites is not correlated with their age, which is bracketed between 1.7 and 0.2 million years. The gently undulating modern landscape, dissected by the Awash River, encompasses 1.5 million years of the past. Throughout this enormous span of time, remains left by ancient groups have accumulated again and again, and have been again and again eroded. The few remnants of multiple superimposed paleo-landscapes are now compounded into a kind of chronological patchwork. Surviving islets of deposits of different Pleistocene age, subsequently covered by a few metres of sediment, stand more or less side by-side and, at first glance, appear as an undifferentiated surface.

To understand how sites have accumulated through time, one has to look below the modern surface, making use of a natural or excavated stratigraphic sequence. An example can be seen in Figure 2, which depicts the bed and banks of an intermittently-flowing tributary of the Awash River. It is the area of Simbiro, a few kilometres upstream of the main channel of the River, where site density is no less than that close to the museum. Flowing waters have eroded a gully in the alluvial plain of the Awash, allowing the inspection of deposits over a distance of some kilometres and which are at a few metres below modern ground level. A tephra layer dated to 0.8 million years, not visible in the picture, stands to the left of the young boy, and caps all the sequence between his feet and the man standing in the dry bed of the rivulet. Overall, there are four distinct archaeological layers, evidenced by accumulated pebbles, lithic artifacts and bones, all of them, accordingly, of an age of

1. Melka Kunture. Aerial view of the banks of the Awash River, with the location of Middle Pleistocene paleolithic sites close to the museum. Photo: Margherita Mussi

2. Melka Kunture, Simbiro. Superimposed Acheulian paleolithic levels, pre-dating 0.8 million years, truncated by erosion. They all originally extended on a much larger area, and each defined a now buried paleo-landscape. Photo: Margherita Mussi

more than 0.8 million years. The layers are more or less horizontal, or gently dipping, but they are abruptly cut by erosion at both ends. Along the gully, one can observe again and again this phenomenon, which interrupts the archaeological layers. However, the void created by erosion in the past has often been subsequently filled by deposit laid during a flood. The ground at the top is generally more or less even. Walking on the raised surface without the knowledge of geologic matters, the different age of underlying contiguous deposits can easily be missed.

At Atebella, a few kilometres away and along another affluent of the Awash River, the landscape is slightly different, but the result is the same. Several prehistoric sites, not yet excavated, have been discovered, which pre-date 1.2 million years, the age of a dated volcanic deposit higher up in the local stratigraphic sequence. During Spring, when there is more flowing water, the river erodes along its banks the sediments which happen to be the least resistant. In Figure 3, a more compact archaeological layer has been somehow cleaned of the deposits capping it. Bifacial tools are in full sight, as the one next to the folded metre. This early Acheulean prehistoric site of more than1.2 million years is now integrated into the modern landscape, while belonging to a very different time period. It will be part of it as long as it resists the seasonal floods that erode the river banks.

A paleo-landscape at Wachtberg in the Wachau Cultural Landscape (WHL), Austria

The Wachau Cultural Landscape is a stretch of the Danube Valley in Austria, and was inscribed on the World Heritage List as a cultural landscape in 2000. It includes the town of Krems. According to the nomination file, 'the core zone around the town of Krems is accompanied by a buffer zone throughout the entire area of the cadastral community of Egelsee and in the area of Krems's Kreuzberg and Wachtberg terraces down to the river Krems'.[19]

In year 2006, the prehistoric community was struck by a paper in the journal Nature, which described a rather astonishing discovery precisely at Wachtberg, in the buffer zone: two 27,000 years old Gravettian burials of newborn babies, one with a single infant, and another one with two little skeletons, most probably twins (Einwögerer et al., 2006) (Fig. 4). The Gravettian encompasses Europe from the Atlantic shores to the Russian plain, and is actually recognized as the first pan-European culture. It is well known for dwelling structures, lithic, ivory and bone implements, wall art and portable art, including the so-called 'venus' figurines and depictions. Tens of burials have also been discovered, allowing for the full investigation of the anthropological characteristics of

19. Nomination file, 2000, Wachau Cultural Landscape.

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paleolithic Homo sapiens in Europe. However, prior to 2006, the burial sample was biased towards adults and adolescents, with apparently little interest for newborns. The discovery at Wachtberg opened new ground for the study of the Gravettian cultural complexity.

The discovery of a Gravettian site in suburban Krems was not a surprise in itself. The Danube Valley, as well as of some of its affluent, in Austria and elsewhere in central Europe, has long been known for its rich Upper Pleistocene record, especially for evidence related to the period when the Gravettian was in full bloom. This definitely reflects a thriving, if sparse, population of prehistoric hunter-gatherers, but it is also the outcome of favorable conditions allowing for good preservation. Throughout the cold phases of the last glacial age, the dry, heavy winds repeatedly blanketed the landscape with very fine-grained, airborne particles, which often accumulated over several metres. This deposit, known as 'loess', is found over large stretches of the Eurasian middle latitudes, and includes countless prehistoric sites. Implements, dwelling structures, and animal and human remains have been delicately covered by the wind-blown dust, which in the end totally buried them. When this happened quickly after abandonment, and whenever destructive agents such as frost and erosion have not since prevailed, evidence of the past is safely kept up to present times. This is well illustrated at the aptly name 'mega-sites' in the loess of Moravia, in southern Czech Republic, north-east of Vienna. Along the Dvje River, over a stretch of some 5 km, Dolní V ěstonice, Pavlov and Milovice, all of them Gravettian sites, stand next to each other. Over the years a compounded area of more than 10,000 m ^{2} has been excavated. Accordingly, it is an extensive paleo-landscape below some metres of loess, which is being documented.

Elsewhere, however, the loess cover is more than a protective blanket which can be removed: when the wind-blown deposits are several metres thick, prehistoric sites cannot be easily spotted, and even less so researched. Past remains are totally obliterated, and later development, including buildings, may be built on top of them. This is the very case of Wachtberg, in suburban Krems. The aerial photo (Fig. 5) depicts a rather densely settled area, where excavations have been under way since the late 19th century. Some of the early find spots, and namely Hundssteig, have since disappeared under buildings and roads. The more recent excavations, which started in 2005, are located at Wachtberg in a rather green area, a not yet built one – but things have dramatically changed since then, and a house is now in existence where the burials once were (Fig. 6 and 7). The archaeological research was done under high pressure, in the middle of building operations. Much more than burials was actually found, and well-preserved dwelling structures allow an unusual insight into the Gravettian way of life. Notwithstanding difficulties, the archaeological team has been able to piece together a continuous plan of the prehistoric features over an area some 50 m ^{2}. There is ground to believe that this remarkable site is only a fraction of a Gravettian mega-site, which was probably reasonably preserved before Krems started to expand in the 20th century. The buried paleo-landscape of 27,000 years ago extends below up to 8 m of loess, under a whole suburb of the town.

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3. Melka Kunture, Atebella. An Acheulian site, pre-dating 1.2 million years, with bifacial implements in full sight. Photo: Margherita Mussi

4. Krems-Wachtberg. The ochrated burial of two newborn babies, from a 27,000 years old Gravettian site, within a paleo-landscape extending under a suburb of Krems. © Austrian Academy of Sciences, Prehistoric Commission

5. Krems. Aerial view, with the excavated areas where Upper Paleolithic sites were unearthed under loess deposits. Photo taken from the South. © Aerial Archive, Department for Prehistory and Early Historic Archaeology of the University of Vienna; Graph: Austrian Academy of Sciences, Prehistoric Commission

The case of Wachtberg is a good example of how a buried landscape is preserved, but at the same time in danger of being lost because of the very reason which allowed it to survive over many millennia. In the nomination file of the Wachau Cultural Landscape property, reference is made to another major Gravettian site, Willendorf, which lies upstream of Krems. In the description of the area, it is underlined that 'the Wachau is a very ancient settlement region, proved most impressively by the finds of the so-called Fanny from Galgenberg (approx. 32,000 years old) and the Venus of Willendorf (approx. 26,000 years old)'. The 'Fanny' figurine was found at another loess site, i.e. at an earlier, Aurignacian one. Both finds, however, are portable art. The iconic status of the Willendorf Venus apparently blurs the perception that it was originally discovered in a prehistoric settlement which, in turn, was once part of a well-dated paleo-landscape. The site, and a few more nearby, were unearthed a century ago, at the time of the construction of the railroad which stretches along the Danube Valley. This meant digging deep into loess deposits of the Upper Pleistocene. At the time, over a sizeable distance, one could follow along the sections in the loess superimposed paleo-landscapes, which were evidenced by archaeological finds and other features of the past. The place where the Venus figurine was discovered is kept clean from vegetation and open to the public, allowing to understand its original position, but the perception of a once larger, continuous area is now lost.

Paleo-landscapes and volcanic events at Torre Spaccata (Rome, Italy)

The outskirts of Rome are characterized by impressive architectural remains of the classic Roman age, which define a specific cultural landscape of their own. This is especially true in the Ciampino Plain, the area just south-west of Rome, at the foot of the quiescent Colli Albani volcano. The Romans took advantage of the flat morphology for hydraulic engineering, and the extensive remains of four different aqueducts are a picturesque character of the area. In more recent years, this same morphology allowed for the building of one of the Rome airports.

The Ciampino Plain, however, is a rather recent feature within the Quaternary chronological scale. Even as it is, it contrasts with the surrounding landscape, dissected by the many little valleys of a drainage network originating at the nearby volcanic mound. Recent geological investigations have demonstrated that the flat area is the outcome of volcanic events which happened during the Holocene (De Benedetti et al., 2008) it was the site of catastrophic hydrologic events, i.e. inundations provoked by the overspill of the Albano Lake, which is located upslope, in the crater of the volcano. The floods were the outcome of anomalous fluctuations in the lake level, linked in turn to endogenous causes, namely massive CO^2 emission, which ended in the lake outflow. More than water was involved, and a lahar was produced, i.e. a mudflow of volcanic fragments. The landslide flooded the lowermost slopes of the volcano, filling the valleys, clogging the drainage system, and producing, in the end, the Ciampino Plain.

6. Krems-Wachtberg, 2005. Excavation trench at the 27,000 years old Gravettian site discovered in the loess. The excavated airborne deposit, originally covering the site, stands like walls around the digging people. © Austrian Academy of Sciences, Prehistoric Commission

7. Krems-Wachtberg. he recent building on top of the Pleistocene loess deposit, which now covers part of the 27,000 years old Gravettian site. © Austrian Academy of Sciences, Prehistoric Commission

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This happened more than once, as a minimum of two lahars are well documented. One originated in prehistoric times, around 3,700 BC, while a second one is known to be of Roman Age, thanks to archaeological research (Gioia, 2008). It has actually long been known that Titus Livius, the Roman historian, had described in his 'Ab Urbe Condita Libri' a catastrophic water outflow from the Albano Lake, which had devastated the countryside at the foot of the volcano. It reportedly happened in 395 or 394 BC, during the war between Rome and the Etruscan town of Veii. The event was also described by later Roman authors. In modern times, it was believed that this was just a piece of myth, until extensive archaeological research unearthed lahar deposits at Torre Spaccata, at the limit of the Ciampino Plain, in the modern Roman suburbs. Both the archaeological remains and ^{14}C dating confirm that it deposited exactly at the time mentioned by Titus Livius. The tens of archeological trench at Torre Spaccata also evidenced that Chalcolithic and Bronze Age remains lay buried below the lahar, which had in part displaced them. Accordingly, prehistoric human groups had settled there again and again, making use of higher ground as well as well as of the valleys which had been affected by previous lahars, before the landscape underwent more changes after another destructive event in the 4th century BC.

An archaeological park and open-air museum is being opened at nearby Centocelle, which is adjacent to Torre Spaccata. The remains of three large Roman villas will be the focus of the exhibit. The villas lasted for centuries to the early Middle Ages, and were related to agricultural exploitation of the countryside close to ancient Rome. After they were excavated, the monumental remains became part of the modern landscape. They can be rather easily visited, and can be seen and understood by any interested person. The previous, pre-lahar prehistoric landscape, vice versa, was only reached by deep trenches at Torre Spaccata, and cannot be directly perceived or visited. The prehistoric finds found below will be on exhibit in a building, and the knowledge of the past will be recreated by explicatory panels and multimedia means. Even if the 4th century BC lahar blanketed a paleo-landscape and to some extent preserved it, the following historic events, including the modern expansion of suburban Rome, do not allow to put it into light. In a way, it is the opposite of the World Heritage listed property Archaeological Areas of Pompei, Herculaneum and Torre Annunziata, also deeply affected by volcanic events. Pompeii and Herculaneum have both been explored and researched since the 18th century, and the wealth and monumentality of remains led to extensive excavations. The Roman towns which disappeared under volcanic deposits were cleared of ashes and lava and reintegrated into the present day landscape. It happened at the expense of the settled land which once extended on top of the buried towns, but this has long been accepted as needed and worth the effort.

Pompeii's reintegrated landscape is exceptional in many ways, and stems from its preservation and monumentality, which were understood well before modern activity could affect it. In between Pompeii and the opposite, hidden paleo-landscape of Torre Spaccata and Ciampino Plain, lay the Bronze Age village of Nola, another victim of Vesuvius in Campania (southern Italy). Nola was buried while in full activity, around 1700-1900 BP. It was discovered just a few years ago during the construction of a shopping mall. Nola was soon nicknamed 'the prehistoric Pompeii' because of the superlative preservation, under volcanic deposits, of several dwellings and their contents, including organic remains which do not usually survive. The area of the prehistoric dwellings was eventually preserved and can now be visited, but this is only a small fragment of the buried paleo-landscape. Even at this limited scale, this only happened after legal controversy, because the planned commercial activity was at stake.

Final remarks

Prehistoric sites have been integrated into cultural landscapes. In the nomination of 8 out of the 12 properties listed in Table. 1, reference is made to criterion (iii) 'bear a unique or at least exceptional testimony to a cultural tradition or to a civilization which is living or which has disappeared'. This underpins a real concern for documenting the past. The following issues should be considered:

1) In most cultural landscapes prehistoric remains are just spots, surrounded by substantially later evidence. In paleo-landscapes, vice versa, even in those surviving only as fragments, as it is the rule, the components form an integrated and complex, even complete system;
2) Archaeology should not be perceived as part of just a three-dimensional space: in this perspective it lacks the fourth dimension, time, its most important characteristic;

3) Overall, remains are selected which stand above the ground, are easily recognizable, as rock art and burials, and can be integrated in extant cultural landscapes. This focus implies a bias towards the last few millennia of human activity. The previous 2.5 million years, or more, are simply not recorded.

Paleo-landscapes are an integrated space where humanity evolved in the past, as opposed to compounded remains of different ages surviving up to the present. They are visible at surface level, or are buried below it, and only reached through excavations. To include them appropriate strategies are required for a number of reasons:

1) Monuments and large buildings appear late in the record, Stonehenge or Barumini are the exception, not the rule. Caves are also rather visible, and some are interconnected and characterize a landscape of their own: this is the case of the Balzi Rossi, in northern Italy, where nine caves and rock shelters open over 300 m of rock cliff, and form a mega-site of the Upper Palaeolithic, comparable to those in loess of Moravia; while in the Ach Valley of southern Germany, four caves at less than one hour of walking distance from each other are linked by conjoinable lithic elements, which ensure that they were used in strict contemporaneity, as part of the same perceived landscape (Sheer, 1993). But cave settlements, too, are only a fraction of the prehistoric record, both in time and in space. The visibility of the overwhelming majority of prehistoric remains is slight, and they can be easily missed, even when they exist above ground level, which is definitely not the rule;
2) The effect of natural agents on exposed landscapes, compounded through time, is usually devastating. In the examples provided in Table.1, prehistory is a conspicuous aspect of a property only outside the Tropics and the temperate belt, i.e. either in hyper-arid surroundings (the Gobustan petroglyphs), or at high latitudes under cold climates (Norway, Sweden and Lithuania). This reflects relatively stable and conservation environments, as the lack of water and/or low temperatures keeps at bay biological activity (micro-organisms, vegetation, etc.), and also puts limits on human settlement and human impact. A rather extreme case is known to exist in the Canadian Arctic: Palaeo-Eskimo implements and dwelling structures, up to 4,000 years old, can still be found protruding from the ground, and remains of the later Dorset period, when covered by a snowbank during most of the year, even preserve the bedding material of moss and heather (McGhee, 1996). Arctic environments, however, only opened to human settlement after the end of the Last Glacial Period. Desert environments, on the other hand, are not devoid of changes (deflation, desquamation of rocky surfaces, etc.). In the long run, they are no guarantee for conservation, either;
3) Buried landscapes refer to much longer time-spans than exposed ones, potentially covering the whole prehistory. Being sealed, they have a different quality than cultural landscapes with prehistoric remains, which include mixed evidence up to historic times. Proper attention should, accordingly, be given to them. They are also safer than the exposed ones. However, as described above, they are also vulnerable because of the very origin of the successful preservation: the deposits which blanket them sometimes hide them totally, they are only reached in an extremely restricted area (Torre Spaccata), and are even covered by new buildings, or are at the risk of being turned into building ground (Nola, Wachtberg);
4) Before being buried, any piece of land has been laid exposed for some time, and accordingly has been subject to a number of natural agents. Erosion can further happen at any stage, and long after burial. Even in the case of buried landscapes, preservation cannot be expected to occur over large stretches. Melka Kunture is exceptional, because fragments of extremely ancient paleo-landscapes exist side by side over short distances, creating a kind of chronological jigsaw - but those are just fragments. Elsewhere, remains of paleo-landscapes are even less extensive, but nonetheless of outstanding value, as in the case of Dmanisi in Georgia: a fragment of a 1.7 million years old savannah survived between eroded gullies and under buildings of the Middle Ages, giving much information on the early adaptation of human beings to the middle latitudes.

The authenticity and integrity of paleo-landscape is linked to scientific recognition and multidisciplinary research, including archaeology, geology, geomorphology, palaeontology, palaeobotany, palaeozoology, and other allied sciences. This is in full accordance with the importance of embedded scientific values which is underlined in Article 1 of the World Heritage Convention. Paleo-landscapes definitely fit into the category of 'relict (or fossil) landscape' established in Annex 3 of the Operational Guidelines (see above). As 'the sample selected must be substantial enough to adequately represent the totality of the cultural landscape that it illustrates', this opens interesting perspectives to joint serial nominations, as only in truly exceptional cases it can be expected that the 'totality' might be represented at any single site of great antiquity. The case of the Middle

Pleistocene occupation of Europe can be viewed in this perspective: a number of sites exist, which preserve at the site museums evidence of different parts of the same general environment, as at Ambrona (Spain), Tautavel and Terra Amata (France), La Polledrara, Casal de' Pazzi, Isernia and Notarchirico (Italy). The landscape which was in existence in Mediterranean Europe between 600,000 and 300,000 years ago can be pieced together only by making use of the research made in different countries.

The vulnerability of paleo-landscapes is extremely high, and actually much higher than of any of the constituent elements. They deserve all the care, attention and investment of scientific research needed to preserve this precious and fragile heritage for future generations.

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