

Review

Underground Environments, Worldviews, and Sustainable Stewardship

Reuben Grima 

Department of Conservation & Built Heritage, Faculty for the Built Environment, University of Malta, MSD 2080 Msida, Malta; reuben.grima@um.edu.mt

Abstract: This paper examines an aspect of a value-based approach to underground built heritage (UBH). A key tool for the manager of any built heritage today is the mapping of its manifold values for different audiences, to inform their management strategy. This paper first reviews an important paradigm shift that has occurred in the humanities and in cultural heritage management, leading to the recognition of the centrality of the worldviews and lived experience of the different members that make up communities. Drawing on a selection of examples from the literature, it then demonstrates how many UBH sites across a wide spectrum of cultures acquired cosmological and cultic value and significance in a way that is qualitatively different to most built heritage sites above ground. The spectrum of challenges that this poses to the UBH site manager is then outlined by reviewing literature on a selection of UBH examples, from prehistoric archaeological sites to living religious sites. Some key guiding principles are proposed for the management of these different scenarios. Culturally sensitive management that respects the existing value systems of local communities is indispensable wherever such communities are present. Decision-makers need to be keenly aware of these value systems and need to recognize, empower, and complement existing traditional systems of stewardship.

Keywords: value-based; intangible; worldview; cosmology; geomythology; community; stewardship



Citation: Grima, R. Underground Environments, Worldviews, and Sustainable Stewardship. *Sustainability* **2021**, *13*, 12837. <https://doi.org/10.3390/su132212837>

Academic Editors: Ernesto Marcheggiani and Giuseppe Pace

Received: 30 September 2021
Accepted: 9 November 2021
Published: 19 November 2021

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1. Introduction

One of the distinctive characteristics of underground cultural heritage is that it is often a place of close encounters with the geology, hydrology, and hydrogeology of a locality. Even in highly urbanised settings, underground spaces often provide opportunities for direct encounters with these features of the natural world. Across a wide array of cultures, from prehistory to the present, underground spaces have consequently often had a special role in the worldviews and belief systems of those cultures and became a focus of cultic practices for many past and present communities. A useful term first used by the geologist Dorothy Vitaliano in 1968 is 'geomythology', which refers to the significance that geology may acquire in traditional belief systems. It has been succinctly defined by Adrienne Mayor as 'the study of etiological oral traditions created by pre-scientific cultures to explain—in poetic metaphor and mythological imagery—geological phenomena such as volcanoes, earthquakes, floods, fossils, and other natural features of the landscape' [1].

The significance of underground environments in such traditions will be readily apparent, and will be illustrated with a range of examples below. For the purposes of this introduction, three examples will suffice. In a wide range of cultures ranging from classical antiquity to medieval Christianity, underground environments are associated with beliefs about an underworld that is held to be the cosmological realm of the dead. Across the Atlantic, the Tewa people of North America believe that the Earth Mother and the afterworld are located underground, and that this cosmological domain may be accessed through 'earth-navels' that may be natural features or artificially created in the built environment [2]. Ranging even more widely in time, the case has been made for

comparable preoccupations even in the prehistoric world. Kathryn Yusoff's exploration of Palaeolithic rock art makes an elegant case that the human encounter with what she terms 'geologic subjectivities' played an important role in shaping the way humans apprehend the world [3].

The rationale of this paper is to examine some of the implications of these distinctive characteristics of underground environments for their practical management today. In the context of this special issue on the sustainable management of underground built heritage (UBH), the paper aims to highlight these distinctive aspects of many underground environments, and their implications for site stewardship.

More specifically, the following questions will be addressed. First, how have approaches to the study and awareness of belief systems and cosmologies developed across different disciplines in recent decades? Second, to what extent have approaches to management and interpretation of cultural heritage sites evolved to reflect these changing attitudes to the study and understanding of worldviews? Third, how have value-based approaches unfolded in this context? The fourth question that will be addressed is whether and how the specific characteristics of underground environments may be particularly well-suited to the mediation, expression, and reification of belief systems and cosmological systems. The paper will then explore the practical implications of these principles and characteristics by considering the use of underground built heritage to mediate belief systems across a series of examples. The remainder of the paper will consider the question 'what are some of the implications for the management and interpretation of these different scenarios today?' It will be argued that, where this characteristic is present as a living tradition, its interpretation and presentation in culturally sensitive ways that respect the existing value systems of local communities are indispensable for the successful management of such sites. Decision and policy makers need to recognize these value systems and to empower and complement existing, traditional systems of stewardship.

2. Theoretical Background

2.1. *Evolving Approaches to How People Perceive, Understand and Experience Their World*

Today it may seem a truism to say that the values and perceptions of citizens and communities should be an integral and influential component in the sustainable management of cultural heritage resources. However, it is worth recalling that this was not always so. This section will briefly consider some of the developments over the past three decades that have made this possible.

A useful starting point is an influential paper written by archaeologist Christopher Hawkes in 1954 [4]. Hawkes had put forward a conceptual framework which has become widely known as Hawkes' 'Ladder of Inference'. The 'ladder' in the label is a metaphor for the different levels of abstraction that may be encountered in archaeological interpretation, as shown in Table 1. He placed more empirical and positivist observations, such as those concerning past technologies, at the bottom rung of the ladder. Observations concerning economy and social organization were placed higher up the 'ladder of inference', because they entailed more subjective interpretations. The study of worldviews and belief systems were placed precariously high on the ladder, and throughout the 1960s and 1970s, the period dominated by the positivist New Archaeology movement, were considered by most mainstream archaeology to be too subjective to be worth attempting.

Table 1. Schematic representation of Hawkes' (1954) conceptual 'Ladder of Inference'.

HIGH	Religious/Spiritual Institutions and Thought Life (Ideology)
	Social/Political Institutions and Dynamics (Political Economy)
	Subsistence Economics (Modes of Production/Environment)
	Processes that Create Sites and Materials
LOW	Description of Material Objects; Natural Environment

Since the 1980s, a major paradigm shift has occurred across the humanities. At the heart of this transformation lay the recognition that the experiences and worldviews of ordinary people and communities deserved more serious attention. This recognition refracted itself in different ways across the disciplines of anthropology, sociology, history, and archaeology. The transformed intellectual landscape that resulted has witnessed the rise of critical post-colonial theory, while the writing of new forms of history gave centre stage to the common people, who till then had been ‘people without history’ [5]. In archaeology, phenomenological approaches were embraced by the mainstream during the 1990s, so that the investigation of the worldviews and experiences of individuals and societies in the past were once again accepted as worthwhile and serious endeavours [6]. A related transformation across these disciplines was the shift from more etic to more emic perspectives, and the exploration of multi-sensory approaches instead of the more Cartesian perspectives that had long been dominated by the visual at the expense of other senses [7].

2.2. Implications for Cultural Heritage Management

The sea-change in ideas, perspectives, and approaches outlined in the previous section has also transformed ideas about the role and value of cultural heritage and the past in society today. Since the 1990s, community archaeology and public archaeology have emerged from the fringes of archaeology to become recognized as central responsibilities of archaeological best practice [8–13]. In post-colonial archaeology and ethnography, the responsibilities of the researcher as an actor and protagonist shaping lives in the present and future has come to the fore [14]. Today, it is largely undisputed that researchers cannot remain passive observers, but must actively engage with issues of equity, inclusivity, and social justice in the communities and regions that they study [15,16].

The theory and practice of cultural heritage management has been radically challenged and reshaped as a result, albeit with some delay. A succession of international charters and conventions have articulated and enshrined a series of principles inspired by this paradigm shift. In 1994, the Nara Document on Authenticity addressed the need to recognise that values such as authenticity needed to be understood and interpreted in culturally-specific terms, and could no longer be dominated by Eurocentric perspectives [17]. The evolution of the definition of ‘cultural significance’ in successive iterations of the Australia ICOMOS Burra Charter over its 40-year history is instructive. In the 1979, 1981, and 1988 versions of the Charter, cultural significance was defined as ‘aesthetic, historic, scientific, or social value for past, present or future generations’. In 1999, the term ‘spiritual’ was added to this definition. An even more significant evolution took place in the 2013 revised version, which is still the current version today [18], with the addition of the following two sentences to the definition [18] (Article 1.2):

- Cultural significance is embodied in the place itself, its fabric, setting, use, associations, meanings, records, related places, and related objects.
- Places may have a range of values for different individuals or groups.

Two international instruments that were hammered out in the context of the Council of Europe also deserve to be recalled here. The first is the European Landscape Convention [19]. One of the most significant contributions of the Landscape Convention was that it emphasised that the stewardship of degraded and ‘ordinary’ landscapes was no less important than that of landscapes of outstanding beauty, because they play a significant role in the quality of life of the people who live there. This is a remarkable and original shift in emphasis. The ordinary citizen was here being put at the centre of policy, and the enjoyment and quality of life of the citizen was now being explicitly recognized as central to the rationale for cultural heritage preservation. In the same spirit, the Framework Convention on the Value of Cultural Heritage for Society [20], better known as the Faro Convention, has made explicit and emphatic statements about the centrality and role of the citizen in decisions concerning the stewardship and purpose of cultural heritage. The preamble goes so far as to declare that ‘every person has a right to engage with the

cultural heritage of their choice', as an aspect of the right to freely participate in cultural life enshrined in the United Nations Universal Declaration of Human Rights (1948) and guaranteed by the International Covenant on Economic, Social and Cultural Rights (1966); it further speaks of 'the need to involve everyone in society in the ongoing process of defining and managing cultural heritage'. Article 7 requires signatories to '... encourage reflection on the ethics and methods of presentation of the cultural heritage, as well as respect for diversity of interpretations'. Article 8, which focuses on the sustainable use of heritage, requires state parties to '... promote respect for the integrity of the cultural heritage by ensuring that decisions about change include an understanding of the cultural values involved', as discussed in more detail elsewhere [21].

In parallel with the developments outlined above, the field of cultural heritage management has witnessed the emergence, development, and widespread adoption of value-based approaches. Following pioneering work in an Australian context [22], this approach was, by the 1990s, being taken up across much of the English-speaking world, and has since become part of the mainstream global discourse on the management of cultural heritage resources. A very useful critical review of the evolution of value-based approaches to heritage management, and more particularly, of the various typologies of values that have been put forward, is provided by Fredheim and Khalaf [23]. They underline the usefulness of more inclusive typologies to help ensure that the often complex and multi-faceted reasons why a site is valued are all taken into account. As they note, a more comprehensive understanding of the range of values that may be at stake is useful to help overcome the limitations of authorised heritage discourse, a concept propounded by Laura-Jane Smith to articulate how some narratives are often privileged while others are excluded [24].

The identification of values following such frameworks has become an indispensable tool in the heritage site manager's toolbox. It is not, however, without its own limitations and risks. One such risk is that if such frameworks are applied by rote, they may underplay the nuances that may give a site its distinctive significance. Another inherent risk is that in the effort to identify and articulate a list of distinct and different values, the interplay between them may be underplayed. The values identified in these typologies may range from technological to aesthetic, or from scientific to symbolic value. A common characteristic of most of the value typologies reviewed by Fredheim and Khalaf is that they distinguish between key types of value such as material, architectural, technological, scientific, and symbolic value. Although not usually quoted in discussions on value, Hawkes' ladder of inference, mentioned in the previous section, may also be helpful here. In contrast to Hawkes' model, the value typologies under discussion here are not hierarchic; that is, they do not purport to suggest that any type of value is more significant or more certain than any other. However, the very process of separating out these different categories, on lines that are arguably not very different from the positivist thinking prevalent in the 1960s and 1970s, may draw attention away from the interconnectedness of these different values—that interconnectedness being, arguably, no less important and distinctive than the values themselves. This point will be returned to later, in the specific context of UBH sites.

2.3. Implications for Archaeological Sites and for Living Traditions of Community Engagement

The developments outlined in the previous section have some important implications for the way we understand and manage cultural heritage, including, of course, underground built heritage. Two key scenarios will be drawn out here for the purposes of the present discussion. The first concerns the way we interpret and understand the material evidence of past cultures. The second concerns the way we engage with living cultural traditions today. These two different scenarios, though they share some common principles, have very different requirements in terms of sustainable practices and engagement with communities and audiences. Each will be considered in turn in this section, before some of the specific implications for the sustainable management of underground built heritage will be explored in the following sections.

In the case of material evidence of past cultures, as with an archaeological site where a living tradition of engagement with the original purpose of the site is absent, insights into past lifeways and worldviews may be gleaned from material evidence that may be the only remaining document and witness of those lost practices. Through the encounter with such evidence, local communities and visitors today may engage with the way other people in the past may have inhabited and ordered the same places and landscapes, possibly in very different ways to those familiar today.

In the case of living traditions, the dynamics of the relationship between community and place may be very different. Cycles of rituals, festivals and daily practices, rhythms of assembly, work and leisure, and the often unwritten rules regulating spatial behaviour, from the taskscapes of productivity to regulated access or taboos around illness and death, are woven into a single complex tapestry. Material culture, places, and people form inseparable parts of a web of meaningfully constituted relationships in space and time. Here, the relationship with visitors from outside the community is likely to be a very different one, posing its own spectrum of management challenges.

In this wider context, the management of sites with spiritual significance has received particular attention. Sacred landscapes, for example, have become a focus of research on best practices in the Delos Initiative, under the auspices of the International Union for the Conservation of Nature (IUCN). Sites of religious significance present their own specific challenges. One influential study of a monastic site in Meteora, Greece [25] has examined how the value systems and attitudes embraced by the traditional systems of stewardship are often in tension with mainstream conventional conservation and management practices, which may need to be renegotiated in such contexts, in line with the paradigm shifts outlined here.

For the sake of clarity, it should be added that scenarios presenting archaeological evidence of lost cultures and belief systems often exist side by side with living traditions and community practices. Archaeological remains which present the material vestiges of long-gone practices may have also been assigned new uses and meanings by living communities. Such living traditions may therefore be inseparable from places that are also witnesses of lost ways of life in the past.

3. Method

The present paper is designed to highlight a specific set of issues concerning some characteristics that are often encountered in underground built heritage environments, and the practical implications that these may have for the management of such sites today. The general trends and principles outlined in the previous sections were applied to the specific context of UBH. The method and approach is a qualitative and discursive one, the purpose being to focus on some characteristics that have often been overlooked, and which are closely tied to the paradigm shift described in the theoretical background section, in order to highlight some of the practical consequences for the management of these issues in UBH environments. It should be emphasised that the intention here is not to attempt an exhaustive description or inventory of possible characteristics that may be encountered in underground built heritage sites. The literature that is reviewed here, both in the preceding theoretical framework, and in the following analysis of the implications for UBH environments, is therefore very selective, and not remotely intended to offer a comprehensive review of the vast array of scholarly literature that has appeared on other comparable cases.

The following analysis proceeded in three steps, which will be reported in the next three sections. First is a consideration of some of the distinguishing characteristics that set underground environments apart from built heritage more generally, which then draws on cross-cultural examples to underline the prevalence of the contexts where these characteristics are assigned significance in the belief systems and worldviews across a wide spectrum of social temporal and spatial contexts.

Second, the practical consequences of these values are considered by reviewing some examples of contexts where there is living memory of these belief systems and worldviews.

Third, the contrasting situation of archaeological contexts is considered by reviewing some examples of environments that preserve evidence of the association of the physical characteristics of underground environments with belief systems that existed in the past but are now lost. The practical implications for the site manager, and how these may diverge from the previous scenario, are also analysed.

4. Mediating Worldviews and Belief Systems in Underground Places

A common characteristic of many underground built environments is that they are often cut into bedrock, in whole or in part. A direct consequence of this is that, generally speaking, such underground settings lend themselves more readily to an engagement with the more permanent and durable natural geology of a site than buildings above ground. While the materials used in historic buildings often offer a fascinating case-book of how the resources of the surrounding region have been exploited, an underground environment is more likely to present elements of the natural geology still in situ.

Another element of the natural environment that is often encountered in underground built heritage is hydrology. The percolation and flow of groundwater through underground environments is closely controlled by geological structure. Water seepage and accumulation is a familiar characteristic of many natural and artificial underground spaces. The collection, management, diversion, and use of such water has given rise to countless instances of complex and ingenious solutions in underground built heritage sites.

The visible presence of elements of the natural world in underground environments has often been assigned symbolic significance. In a wide array of cultures, the encounter with the natural features of geology and hydrology in underground environments has been incorporated into the belief systems and worldviews of those cultures, often playing a significant role in their cosmological or geomorphological narratives. This phenomenon may be observed both in cases of living cultural traditions, and in cases attested to by material evidence alone, which may afford us rare glimpses of understanding into the perspectives and worldviews of long-lost cultures. The following sections will take a comparative approach to illustrate these characteristics, with reference to a small selection of examples, in order to allow a discussion of some of challenges and opportunities that they present for the understanding of the way people have related to these underground settings, and for the sustainable management of these environments. It is probably easier to begin with some examples drawn from living cultural traditions, and then to move on to examples of material remains from lost cultures that are more remote in time.

5. Living Traditions of Community Engagement

One of the most ubiquitous uses of underground built environments is to provide a resting place for the dead. Church crypts, charnel houses, catacombs, and cemeteries all share the same fundamental concept, across a wide array of the cultures, that the appropriate place for the dead is underground. Such practices are often rooted in belief systems, one of the more common of which is the idea of a tiered cosmology, typically with an underground tier, or underworld, for the dead, an earthly tier for the living, and a heavenly tier in the sky. It is commonly observed that many of the great churches and cathedrals of Europe display elements that exist in each of these three tiers. The crypts that reach into the underworld or the world of the dead, the main spaces for the congregation to worship at ground level, and the domes, spires, or belfries reaching heavenward.

A variant of the creation of underground spaces for the deposition of the dead that is widely practised and celebrated in many cultures is the creation of burial spaces for important spiritual or temporal leaders. In the Christian tradition, the tombs of saints and martyrs are often located in monumental spaces below places of worship. In the historic centre of Bari, for example, two important Romanesque churches each have an underground space as their ritual and cultic epicentre, where the remains of the respective

patron saint are housed. Bari Cathedral has an underground crypt below the main altar, where the remains of its patron Saint Sabinus are venerated to this day. Nearby, the Basilica of San Nicola houses the even more famous remains of Saint Nicholas of Myra in a similar monumental crypt below the main altar, which are the constant focus of intense devotion among the inhabitants of the town, as well as visitors from further afield.

The case of the crypt of Saint Nicholas provides a remarkable example of how a hydrological phenomenon may acquire major symbolic significance for a community, giving rise to an elaborate ritual which is still carefully observed each year. The crypt in the Basilica, where the body of the saint is buried, stands a few metres away from the shoreline, and its floor is very close to the present-day sea level. Figure 1 shows a general view of the crypt, with the tomb of Saint Nicholas at the centre.



Figure 1. Crypt below main altar, Basilica of Saint Nicholas of Bari (Author).

Because of sea levels having risen since the building of the Basilica in the eleventh century, there have been frequent incursions of groundwater from the overlying water table into the crypt, and its floor has been raised several times over the centuries as a result [26]. The high levels of water content below the crypt and the Basilica are also of concern from a conservation point of view [27]. These hydrological phenomena have, however, also given rise to a ritual practice that has been deeply cherished by believers for centuries. Since at least the early seventeenth century, water collecting in the tomb of the saint has been carefully harvested by a priest and highly valued for the miraculous and healing properties it was believed to have [28]. This practice has continued to the present, when once a year, on 9 May, a priest prostrates himself in front of the tomb to collect the water, known as ‘manna’, in the presence of important clerics and dignitaries, while the ceremony is broadcast live on television. The hydrological setting of this underground environment is very likely the main explanatory factor for this phenomenon. In the eyes and the belief system of the communities that venerate the saint, the resulting accumulation of water within the tomb imbues the collected water with supernatural properties. It is no longer treated as simply water, but carefully curated and distributed because it is believed, by a large community, to hold supernatural properties. Any future interventions to control the levels of water content below the Basilica floor will also need to take this aspect and its values into careful consideration.

Comparable examples abound, albeit lesser known than the case of Saint Nicholas. Water sources in sacred sites are often integrated into the networks of belief and cultic

practices associated with the site. Two other examples may be drawn from Malta, a small Mediterranean island where semi-arid conditions have tended to give added significance to any water source. The first is a water source in the underground rock-cut sanctuary of 'Our Lady of the Grotto' in Mellieħa, in the north of the island [29].

Figure 2 shows the cult statue of the Virgin Mary standing on a pedestal in a basin that is filled with water from an underground spring. Popular beliefs regarding the supernatural properties of the statue and the site abound among the local community [30] (pp. 174–175). These include the conviction that water from this source has healing properties. In the mid-twentieth century, a folklorist recorded that '... people still go there to drink of its healing waters' [30] (p. 174), and the site is still deeply venerated today.



Figure 2. Grotto of the Sanctuary of 'Our Lady of the Grotto', Mellieħa, Malta (Author).

Another well-documented case where water from a sacred context was believed to have special qualities is the chapel of St Paul the Hermit, built into a cave in a deep valley in the locality of Mosta [31]. The inner part of the chapel is partly a natural cave, and partly hewn into the living rock. Here, a water source trickles from the rock and collects in a series of purposely-carved basins. During the early modern period, water from this site was highly prized for the health-giving properties it was believed to have, and according to some chroniclers, it was even served for drinking to some of the Grand Masters of the Knights of Saint John [31] (pp. 245–260); [32] (p. 204). The chapel is still in use today and is the focus of an annual celebration, although the water is no longer collected for human consumption.

Another example of cultic practices developing around an underground site, this time not involving hydrology, is Saint Paul's Grotto in Rabat, Malta. In this case, the entire complex of Saint Paul's Church appears to have been built around the pre-existing underground site. The complex appears to be built over part of the rock-cut ditch that once marked the western boundary of the ancient town of Melite. Rock-cut chambers and late Roman catacombs honeycomb the soft and chalky limestone on the western side of the ditch, which was originally outside the Roman town. According to a pious tradition that may be traced back to the medieval period, Saint Paul was held prisoner in one of these chambers. Figure 3 shows a map published by a seventeenth-century antiquarian to show what the ancient town may have looked like. The grotto is clearly marked in the side of the ditch, to the left [33].



Figure 3. Archaeological reconstruction of the ancient town of Melite, by Giovanni Francesco Abela. Saint Paul's Grotto is prominently shown in the side of the ditch, to the left [33].

In the early seventeenth century, a monumental sanctuary complex was built around this underground grotto by the Grand Master of the Knights of Saint John, Alof de Wignacourt, to celebrate the cult of the famous saint, which began to attract a growing number of pilgrims from across Europe [34]. The site and the cult continued to receive further embellishment by his successors, including the church dedicated to Saint Publius, directly over the grotto, to which it is connected by a magnificent monumental staircase. Throughout these developments, the site has remained a focus of intense devotion for the native Maltese population. Saint Paul was not only the patron of this church and this parish, but is venerated as the patron and protector of the entire island, and is inseparable from the identity of the Maltese population [35,36].

Several geomorphological narratives are associated with the cult of Saint Paul in Malta. One widespread belief, well documented in the seventeenth and eighteenth centuries, was that fossilised sharks' teeth found in the island's sedimentary limestone were created by the saint's miraculous intervention. These fossils were highly prized as talismans to protect their wearer against poison and the evil eye, becoming conflated with the Saint's reputation as a healer and protector from snake venom, largely on the strength of the incident recorded in the Acts of the Apostles, when he shook a viper from his hand into the flames of a fire that he was kindling, remaining unharmed by its venom. A related geomorphological belief that was prevalent throughout the early modern period, and in this case tied directly to Saint Paul's Grotto in Rabat, was that stone taken from the walls of the grotto, when powdered and ingested, had powerful medicinal properties. This gave rise to a veritable industry for the production of pellets that contained the sought-after powdered stone [37]. Another related belief related to the grotto, which members of the local community still repeat to visitors today, is that however much rock was scraped away for the purpose of pellet production, miraculously, the grotto always retained the same dimensions. Figure 4 shows some of the monumental baroque embellishments that were added over time around the rock-cut grotto.



Figure 4. Saint Paul's Grotto, Rabat Malta (Daniel Cilia).

In 2013, as part of the refurbishment of the nearby Wignacourt Museum, a new access arrangement to the grotto was introduced. Access through the church of Saint Publius and down the monumental staircase was barred, and the church door kept closed. On most days, the grotto became accessible only through the museum entrance across the road, even for those wishing to visit the grotto for devotional purposes, who are granted free admission. This issue will be returned to in the discussion at the end of this paper.

6. Archaeological Evidence of Past Engagement with Underground Environments

In the cases considered above, there is either a living tradition or a recent memory of beliefs and practices woven by a community around an underground site and water sources within it, which are popularly believed to be imbued with special properties. It is now useful to turn to a different type of scenario, where only the material remains of a long-lost culture have reached us, in the form of underground archaeological sites. In such contexts, the archaeological interpretation of the material evidence may also shed light on past ways of engaging with the underground environments.

Historic and ethnographic evidence such as that considered in the previous section has been widely used in archaeology to inform the interpretation of archaeological evidence from the more distant past, in order to explore the possibility that broadly comparable beliefs and practices may have also been practiced by these largely lost cultures [38]. A significant part of this work has focussed on underground sites. One seminal study has examined the evidence from a number of caves in southern Italy, and has made a strong case that the water and the mineral deposits created by water percolation in these caves were carefully curated for ritual purposes during the Neolithic [39,40].

An interesting example to illustrate how archaeological evidence may be used to explore attitudes to underground environments in the distant past is the prehistoric underground complex of Ħal Saflieni, discovered in Paola, Malta in 1902. This UNESCO World Heritage site, widely known as the Ħal Saflieni Hypogeum, appears to have served as a burial site for over a millennium, from the early fourth to around the mid-third millennium BC. Carved on three successive levels into the soft Globigerina Limestone, the site is best-known for the carved imitations of megalithic architecture that form several of its walls. Another, lesser-known characteristic is the way that the excavation of the Hypogeum during the Neolithic exploited the natural geological structure. The cultural implications of this characteristic have only recently started receiving more attention [41]. It has long been recognized that several walls in the Hypogeum were made up of pre-existing natural faults and joints in the rock, which were carefully exposed by the Neolithic inhabitants who were carving out these spaces [42]. More recently, it has been argued that such features were more extensively used than previously thought. Horizontal bedding planes were also exploited to create smooth floors and roofs. It has also been argued that the natural boundaries in the rock represented by faults and joints in the bedrock were not only observed by the Neolithic excavators, but also acquired symbolic significance for them [43]. Through careful observation of how these natural surfaces were incorporated into the rock-cut complex, it has been argued that these natural discontinuities in the rock were respected as boundaries between the world of the living and the underworld of the dead, and that these were meaningfully used to mediate the relationship between the living and the dead buried in the complex. In some cases, monumental staircases and doorways were carefully planned around the pre-existing fault-planes in a way that suggests an interest not only in the physical and mechanical characteristics of the faults, but also in their symbolic value in the overall purpose of the site. On the left of Figure 5, one of the smooth fault planes in the middle level of the Hypogeum is clearly visible. A monumental doorway at the far left is cut through the fault plane and leads down to the lower level of the site.

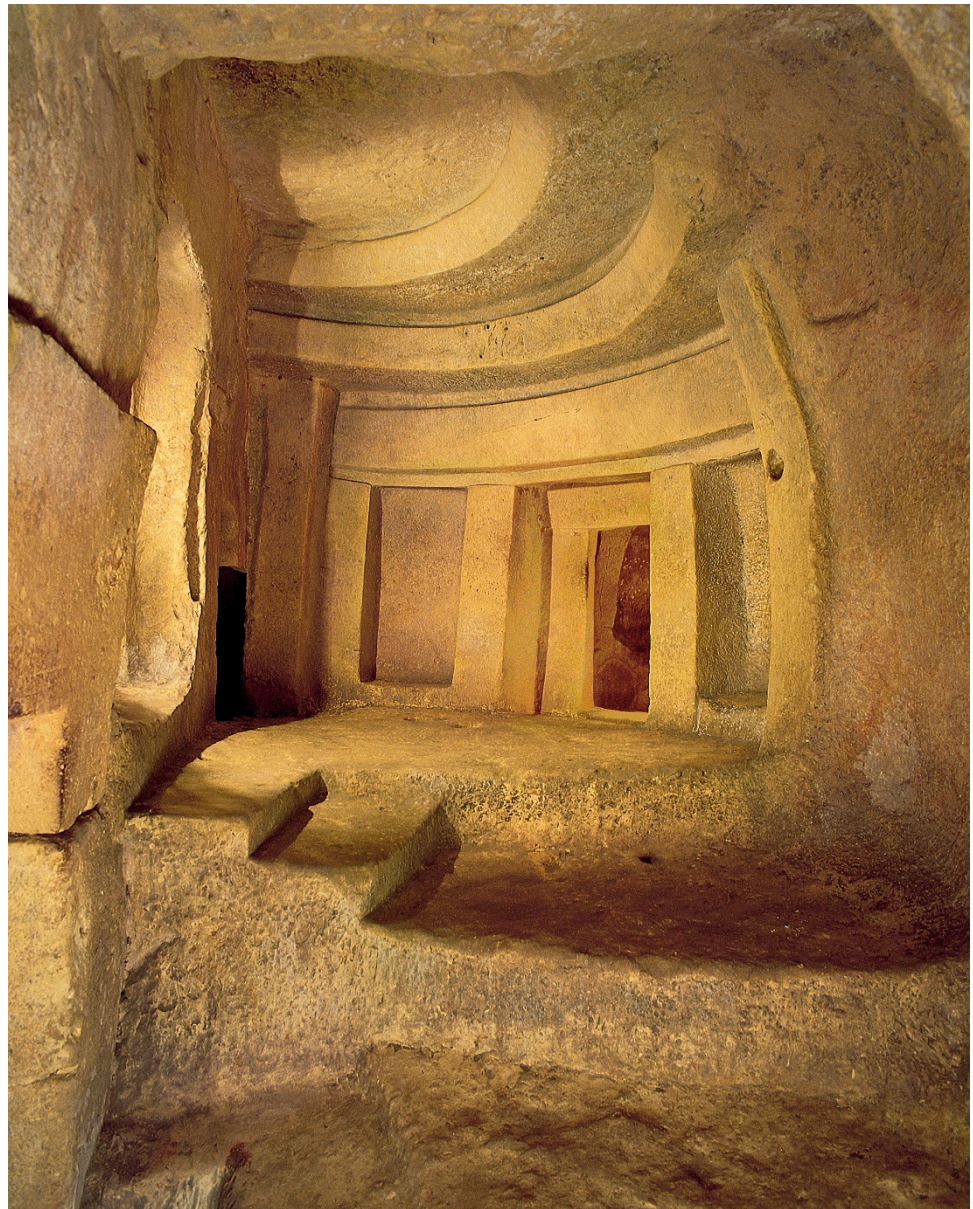


Figure 5. Hypogeum of Ħal Saflieni. Note the smooth fault plane used as a wall to the left. The monumental doorway at far left is cut through the fault plane and leads down to the lower level of the site (Daniel Cilia).

Elsewhere within the same complex, there is also evidence of the careful curation of water percolating into the site along natural fissures, with the carving of basins in the side of a rock-cut chamber in order to trap and collect the percolating water. Similar curation of water percolating in a ritual context may also be observed in the nearby megalithic complex known as the Tarxien Temples, also dating from the late Neolithic period. Here, a small niche and basin were cut into the side of an underground rock-cut pit in the heart of the ritual complex [43], very probably to trap and collect water percolating along an underground natural fissure [29].

While the detail of the belief systems behind this material evidence is lost to us forever, attentive observation and study is making it abundantly clear that laborious effort was invested to manipulate, curate, and display these natural elements in underground environments, which speaks eloquently of a complex system of beliefs and ways of relating to these subterranean settings in the remote past.

7. Discussion

This paper began by reviewing a profound paradigm shift that took place across the humanities and the social sciences over the past three decades, and went on to consider some of the implications of that shift for sustainable stewardship of cultural heritage sites today. The defining characteristics of this transformation have been the returns of human experience and perception to the fore, both as subjects of study, and as values informing our management decisions today. One consequence of this shift has been the renewed attention paid directed to the study of past humans' perceptions and attitudes to place, through more emic approaches, such as phenomenology or multisensory perspectives. Another consequence, this time in the field of heritage site management, has been the recognition of the importance of the culture-specific traditions, practices, perspectives, and worldviews of indigenous and local communities when considering the values of a site.

Some of the specific characteristics of underground built heritage, and particularly those showing an association with belief systems, have been considered in light of these shifting paradigms. The various examples that have been considered have shown how a characteristic common to many underground built heritage sites is that they allow an engagement with elements of the natural world, such as geological materials and structure, as well as groundwater hydrology. This opportunity for engagement with elements of the natural world, even when located in urban settings, has lent itself across many cultures to be used to help articulate and order people's place in the world, and has often become associated with ideas of the sacred. Different cultural expressions centred on underground sites include the articulation of cosmological concerns, and particularly beliefs about the chthonic forces of the underworld. The most prevalent manifestation of such beliefs is the mediation of the relationship between the world of the living and the underworld of the dead. Another form of cultural manifestation often associated with underground built heritage sites are the geomythological narratives which often offer aetiological explanations for the formation and significance of geological structures and hydrological phenomena.

These aspects of underground built heritage sites pose interesting challenges and opportunities for their sustainable stewardship. The first of these, when dealing with archaeological evidence from the distant past, is to recognise the possibility that a site may bear witness to how people in the remote past may have made sense of their place in the world, and where appropriate, to investigate this possibility. Where tenable evidence of past attitudes, beliefs, or worldviews is found to be present, a further set of challenges present themselves. These begin with ensuring that this characteristic of the site is added to the list of the values that need to be safeguarded in any decisions about its management and presentation. A further challenge is to document the evidence and its interpretation; and the third, to disseminate these insights to present-day audiences, to allow them a glimpse of how a past culture may have used underground built heritage sites to engage with the environment and to make sense of their place in the world. In this sense, even the worldviews of a long-lost and long-forgotten culture may, through the witness of the archaeological evidence, be brought back to life, to enrich the encounter of present-day audiences with some of the very different ways that people have understood and shaped their world in the past.

A second challenge, introduced at the end of Section 2.2 above, is inherent in value-based typologies that are intended to help the user identify lists of distinct and different values. As already noted above, an inherent risk if such frameworks are applied uncritically is that the intersections between those different values may be overlooked. The UBH sites that have just been considered are very suitable for demonstrate this. At the Saffieni Hypogeum, for instance, the geological characteristics are arguably an important value of the site. The architectural design of the carved interiors, inspired by the megalithic architecture built above ground, is another outstanding value of the site. Another value is the structural engineering of the same interiors, which have successfully withstood five millennia of tremors, water infiltration, and human depredation. A further value is the symbolic value of the different spaces, and the role that they appear to have played in the

mediation between the world of the living and the world of the dead. As shown in Table 2, these distinct and different values may each be equated to a rung on Hawkes' ladder of inference, from the more positivist qualities of geology and structural technology, through the more culture-specific aesthetic and architectural qualities, to the most abstract level of symbolic associations and belief systems, which are at the top of ladder. The distinction between these different values is inevitably shaped by and rooted in a long epistemological tradition of contradistinction between technology, culture, and belief.

Table 2. Some key values and characteristics of the Saflieni Hypogeum, ordered by Hawkes' (1954) 'Ladder of Inference' [4].

Key Values and Characteristics of Saflieni Hypogeum	Hawkes' Levels of Inference
Symbolic associations	Religious/Spiritual Institutions and Thought Life (Ideology)
Architectural design	Social/Political Institutions and Dynamics (Political Economy)
	Subsistence Economics (Modes of Production/Environment)
Structural technology	Processes that Create Sites and Materials
Geological structure	Description of Material Objects; Natural Environment

More recent archaeological and ethnographic work, notably that by Tim Ingold [44], has dedicated much attention to questioning and dismantling these very divides. As the example of the Saflieni Hypogeum shows, the separation between the natural environment, technology, architecture, and belief is an intrinsically problematic one. The architectural, structural, and symbolic values are all embedded and embodied in the geological properties and values of the site. The creative cultural solutions that shaped the site were in turn shaped by, and a response to, the geological properties of the site. Considered holistically, the close interdependence between these values is at least as significant as the values themselves. It is this very quality, this inseparability, which may be at risk of being overlooked in the search for and definition of a list of distinct values.

This is a challenge that needs to be taken into account in any toolkit intended to guide a site manager through the process. For this challenge to be addressed, any tool for the definition of values should include iterations where the intersections and interdependencies between the various values have been identified. In the case of the Hypogeum, this more holistic and integrated approach allows fresh insights into some of the most crucial properties of the site, which were central to the significance of the site to its creators, and are arguably still central to its significance to humanity today. This is the way the natural geological characteristics of the site were appropriated through human technological ingenuity and reshaped by their architectural creativity, to mediate their worldviews and belief systems at a symbolic level. This is a clear case when the whole is greater than the sum of its parts. A list of values alone risks missing the fundamental point that a site may represent a way of 'being in' and 'inhabiting' the world, to borrow Ingold's [44] preferred terminology, that is an inseparable complex of ways of making, reshaping, and crafting the material environment, which is informed by, articulates, mediates, and embodies a distinct worldview.

The rediscovery and presentation of past worldviews and attitudes may present particular challenges and opportunities for the engagement of local audiences and communities. Present-day inhabitants of the same places and landscapes may have no cultural affiliation with the lost culture or cultures that inhabited the same place in the past, while those places and landscapes may have been transformed beyond recognition. When poorly handled by archaeologists and site managers, such situations may perpetuate a rupture between archaeological sites and local communities [45]. On the other hand, there is also the basic fact that these two groups of people, separated by time and culture, were and are engaged with the same places, albeit in very different ways. Properly managed, articulated, and presented, this common factor may provide the basis for meaningful engagements and

partnerships between archaeologists, site managers, and local communities, and has given rise to many success stories [46,47].

Underground built heritage sites which are the focus of a living tradition for a living community present their own distinct array of challenges. The fundamental inseparability of worldviews from technology or subsistence, noted earlier for past societies, is no less true of many traditional societies today. The interests of indigenous groups and local communities need to be carefully prioritised and respected when defining and managing the types of access that may be allowed and encouraged for visitors from outside those groups. In cases of underground built heritage sites that are the focus of a system of beliefs, such as the ones that have been considered here, there is an even more acute risk of tensions and conflict between the competing needs of local groups and those of visitors. The example of Saint Paul's Grotto in Rabat, Malta is instructive. The decision to close the baroque monumental entrance to the grotto complex, and to integrate it into the visitor experience of the very efficiently-run museum nearby, made perfect sense from a logistical and promotional point of view. It has freed up personnel from supervising the flow of visitors through the original entrance, as well as creating an additional selling point to draw visitors to the museum, now the only way to also visit the famous crypt and grotto. From the point of view of many members of the resident community of Rabat, however, the new arrangement has reshaped their relationship with the grotto of their deeply-cherished patron. Although the museum policy, commendably, is to allow anyone wishing to pray in the grotto and crypt free admission through the museum entrance, this is not quite the same as the access through the monumental baroque entrance and marble stairway that many generations of Rabat residents had enjoyed up until 2013. In personal communications to the present author, some members of the Rabat community have expressed a sense of loss and nostalgia for the previous access arrangement to the grotto, and that the current access arrangement has prioritised its enjoyment by visitors to the museum, and of course, has helped support the museum's ticket sales and revenue stream. There may be solutions which cater better to the different needs of all the groups involved. An interesting partnership in such instances could be to widen the training of volunteers or employees from among the members of the community, so that they may continue to have a greater role in the general stewardship of the site and its presentation to visitors, while supervising access into the crypt and grotto through its original entrance. The purpose of major pilgrimage sites such as Saint Paul's Grotto, or the crypt of Saint Nicholas of Bari, has been for many centuries to welcome and impress visitors from far afield. The tradition of foreign pilgrims and visitors is itself a value of such sites to be cherished and maintained. What is to be avoided, however, is doing so by restricting or distorting the way local communities access and venerate the site, as appears may have happened in Saint Paul's Grotto. Although less rewarding in pecuniary terms, the tradition of engagement of local communities with the site is undeniably central to its values, and a solution which reinstates access through the original entrance is therefore a desideratum.

8. Conclusions

It has been demonstrated that a widely-occurring characteristic of UBH sites is their relationship with worldviews and belief systems, which may range from evidence of past belief systems in archaeological contexts, to active living traditions, or even combinations of these two scenarios. A well-informed understanding of this dimension of underground environments, where it is present, is a prerequisite for their sustainable stewardship.

The same principles that have been outlined in the previous section may be generalised more widely to underground sites which hold cultic significance for local communities, and which are touchstones of their identity and sense of place. Traditional forms of stewardship embedded in the community need to be carefully taken note of at the outset of any new site management initiative, and efforts made to integrate these existing practices, or at least their more successful aspects, in partnerships with whichever innovative model is proposed for the future sustainable management of an underground site.

The examples that have been reviewed and discussed here can by no means be taken as representative for the full range and complexity of the values that the specific characteristics of UBH sites may acquire in the worldviews of different societies. They suffice to highlight the need of taking this possibility into account whenever defining the research agenda for a UBH site. Future research on a wider range of examples will continue to map out the richly nuanced complexity of the associative and symbolic value that underground environments have acquired for so many different societies across time.

An awareness of this possible spectrum of associations and values, and of the interdependencies between those values, is an essential and practical addition to every UBH site manager's toolkit. A critical aspect of the definition of values using the current framework of value typologies is that, while these tools are immensely useful, there is a risk that in their application, less attention is given to the significance of the close interdependence that may exist between what appear to be distinct and different values. In order to avoid this pitfall, the process of value identification and definition should include iterations which specifically explore the potential interdependencies between those values, which may be no less central to the significance of the site than the distinct values themselves.

Funding: This paper has been supported by the funds of the COST Action CA18110 "Underground Built Heritage as catalyser for Community Valorisation", <https://www.cost.eu/actions/CA18110> and <https://underground4value.eu> (accessed on 28 September 2021).

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Data are contained within the article or available from referenced sources.

Acknowledgments: The author gratefully thanks the participants of COST Action CA18110 for many hours of stimulating debate, Daniel Cilia for permission to reproduce Figures 4 and 5, and the anonymous reviewers for their very valuable comments and feedback.

Conflicts of Interest: The author declares no conflict of interest.

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